



2023-2024 WATER AND SANITARY SEWER SYSTEM IMPROVEMENT & MAINTENANCE PROJECT

A Community Development Block Grant (CDBG)
Water-Related Infrastructure (WRI) Project

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CITY OF HILLSDALE
97 N. Broad Street
Hillsdale, MI 49242

CITY OF HILLSDALE – BOARD OF PUBLIC UTILITY
45 Monroe Street
Hillsdale, MI 49242

INVITATION FOR BIDS

The City of Hillsdale will receive Bids for replacement of water shut off valves in the water main system and replacement/repair/lining of certain sanitary sewer lines and construction of a force main/lift station in a project titled Water Valve & Sanitary Sewer Main Improvements until **2:00 PM.**, Standard Time on the **18th day of April, 2023**, at **City of Hillsdale – City Hall, 97 N. Broad St., Hillsdale, MI 49242** at which time and place all bids will be publicly opened and read aloud.

Bids are invited upon the several items and quantities of unit price work as listed in the Bid Proposal Section of this document.

Contract Documents, including Drawings and Technical Specifications, are on file at the office of City Clerk at City of Hillsdale – City Hall, 97 N. Broad St., Hillsdale, MI 49242.

Copies of the Contract Documents may also be obtained through MITN and the City of Hillsdale Website.

A certified check or bank draft, payable to the order of City of Hillsdale, negotiable U.S. Government bonds (at par value) or a satisfactory Bid Bond executed by the Bidder and an acceptable surety in an amount equal to five percent (5%) of the total Bid shall be submitted with each Bid.

Attention is called to the fact that not less than the minimum salaries and wages as set forth in the Contract Documents must be paid on this project, and that the Contractor must ensure that employees and applicants for employment are not discriminated against because of their race, color, religion, sex, or national origin.

The City of Hillsdale reserves the right to reject any or all Bids or to waive any informality in the bidding.

Bids may be held by the City of Hillsdale for a period not to exceed 30 days from the date of the opening of Bids for the purpose of reviewing the Bids and investigating the qualifications of Bidders, prior to awarding of the Contract.

A firm unit-price contract award will be made in writing to the lowest responsive and responsible bidder.

Date: **March 17, 2023**

City of Hillsdale

By: Kristin L. Bauer, P.E.
Title: City Engineer

INSTRUCTIONS TO BIDDERS

The City of Hillsdale Board of Public Utilities (BPU) is requesting proposals for the following project:

The project will address critical infrastructure maintenance/improvements required throughout the City of Hillsdale on the water main and sanitary sewer systems.

Water System: Replacement of water shut off valves in the water main system.

Sanitary Sewer System: Replacement and/or cured-in-place lining of existing sanitary sewer system and construction of a new force main and associated lift station.

RFP due date/ Public Opening:

Sealed proposals are due by 2:00 pm (local time) on April 18, 2023 at the following location:

Hillsdale City Hall
Office of the City Clerk
97 N. Broad Street
Hillsdale, MI 49242

Project Locations:

Water System Work: Locations are throughout the City of Hillsdale. See project drawing "WL" for locations of water valves to be replaced.

Sanitary Sewer System Work: Locations are throughout the City of Hillsdale. See project drawing "SAN L" for locations of sanitary sewer work.

Scope of Work:

This project is a prevailing wage project and subject to Davis-Bacon Wage requirements.

Water System Work: Replacement of water shut off valves in the water main system by direct replacement or utilizing a live tap insert valve. Other miscellaneous items of work will include removal and installation of fire hydrants and relocations water service lines (curb stop to water main).

Sanitary Sewer System Work: Replacement and/or cured-in-place lining of identified sections of the existing sanitary sewer sections and construction of a new sanitary sewer force main and lift station. Other miscellaneous items of work may include reconstruction of existing manholes and/ or construction of new manholes.

All work shall be in accordance with the project drawings, project specifications and any applicable sections of the 2012 MDOT Standard Specifications for Construction.

Proposed Project Schedule:

BPU Board Presentation:	May 9, 2023
City Council Anticipated Award of Contract:	May 15, 2023
Water Valve Replacement Completion Date:	December 31, 2024
Sanitary Sewer Construction Completion Date:	December 31, 2024

(Work on all sections of this project can be completed in 2023, as contractors schedule allow)

INSTRUCTIONS TO BIDDERS

Grantee/Local Public Agency: City of Hillsdale, 97 N. Broad St., Hillsdale MI 49242

1. USE OF SEPARATE BID FORMS

These Contract Documents include a complete set of bidding and contract forms which are for the convenience of Bidders and are not to be detached from the Contract Document, filled out, or executed. Separate copies of Bid Forms are furnished for that purpose.

2. INTERPRETATIONS OF ADDENDA

No oral interpretation will be made to any Bidder as to the meaning of the Contract Documents or any part thereof. Every request for such an interpretation shall be made in writing to the City of Hillsdale. Any inquiry received seven or more days prior to the date fixed for opening the Bids will be given consideration. Every interpretation made to a Bidder will be in the form of an Addendum to the Contract Documents, and when issued, will be on file in the office of the City Clerk and the office of the Engineer at least five days before Bids are opened. In addition, all Addenda will be emailed to each person holding Contract Documents, but it shall be the Bidder's responsibility to make inquiry as to the Addenda issued. All such Addenda shall become part of the Contract and all Bidders shall be bound by such Addenda, whether or not received by the Bidders.

3. INSPECTION OF SITE

Each Bidder should visit the site of the proposed work and fully acquaint himself with the existing conditions there relating to construction and labor, and should fully inform himself as to the facilities involved, the difficulties and restrictions at tending the performance of the Contract. The Bidder should thoroughly examine and familiarize himself with the Drawings, Technical Specifications, and all other Contract Documents. The Contractor by the execution of the Contract shall in no way be relieved of any obligation under it due to his failure to receive or examine any form or legal instrument or to visit the site and acquaint himself with the conditions there existing and the Grantee/Local Public Agency will be justified in rejecting any claim based on facts for which he should have been on notice as a result thereof.

4. ALTERNATIVE BIDS

No alternative bids will be considered unless alternative bids are specifically requested by the technical specifications.

5. BIDS

- (a) All Bids must be submitted on forms supplied by the Grantee/Local Public Agency and shall be subject to all requirements of the Contract Documents, including the Drawings, and these INSTRUCTIONS TO BIDDERS. All Bids must be regular in every respect and no interlineations, excisions or special conditions shall be made or included in the Bid Form by the Bidder.
- (b) Bid Documents including the Bid, the Bid Guaranty, the Non-Collusion Affidavit, the Certification of Bidder Regarding Equal Employment Opportunity, the Certification of Bidder Regarding Section 3, and the Statement of Bidder's Qualifications shall be enclosed in envelopes (outer and inner), both of which shall be sealed and clearly labeled with the words "Bid Documents", project number, name of Bidder, and date and time of bid opening in order to guard against premature opening of the Bid.

- (c) The Grantee/Local Public Agency may consider as irregular any Bid on which there is an alteration of or departure from the Bid Form hereto attached and at its option may reject the same.
- (d) If the Contract is awarded, it will be awarded by the Grantee/Local Public Agency to a responsible Bidder on the basis of the lowest Bid and the selected Alternative Bid items, if any. The Contract will require the completion of the work according to the Contract Documents.
- (e) Each Bidder shall include in his Bid the following information:

Principals

Names

Home Addresses (City, State, Zip Code and Telephone Numbers)

Firm

Name

Federal Employment Identification Number

Address (City, State and Zip Code and Telephone Numbers)

6. BID GUARANTY

- (a) The Bid must be accompanied by a Bid guaranty which shall not be less than five percent (5%) of the amount of the Bid. At the option of the Bidder, the guaranty may be a certified check, bank draft, negotiable U.S. Government Bonds (at par value), or a Bid bond in the form attached. The Bid bond shall be secured by a guaranty or a surety company listed in the latest issue of U.S. Treasury Circular 570. The amount of such Bid bond shall be within the maximum amount specified for such Company in said Circular 570. No Bid will be considered unless it is accompanied by the required guaranty. Certified check or bank draft must be made payable to the order of **City of Hillsdale**. Cash deposits will not be accepted. The Bid guaranty shall insure the execution of the Agreement and the furnishings of the surety bond or bonds by the successful Bidder, all as required by the Contract Documents.
- (b) Revised Bids submitted before the opening of Bids, whether forwarded by mail or telegram, if representing an increase in excess of two percent (2%) of the original Bid, must have the Bid guaranty adjusted accordingly; otherwise the Bid will not be considered.
- (c) Certified checks or bank drafts, or the amount thereof, Bid bonds, and negotiable U.S. Government bonds of unsuccessful Bidders will be returned as soon as practical after the opening of the Bids.

7. COLLUSIVE AGREEMENTS

- (a) Each Bidder submitting a Bid to the Grantee/Local Public Agency for any portion of the work contemplated by the documents on which bidding is based shall execute and attach thereto, an affidavit substantially in the form herein provided, to the effect that he has not entered into a collusive agreement with any other person, firm, or corporation in regard to any Bid submitted.
- (b) Before executing any subcontract the successful Bidder shall submit the name of any proposed subcontractor for prior approval and an affidavit substantially in the form attached.

8. STATEMENT OF BIDDER'S QUALIFICATIONS

Bidders shall be experienced in the kind of Work to be performed, shall have the necessary equipment therefor, and shall possess sufficient capital to properly execute the Work within the time allowed. Bids received from Bidders who have previously failed to complete work within the time required, or who have previously performed similar work in an unsatisfactory manner, may be rejected. A Bid may be rejected if Bidder cannot show that Bidder has the necessary ability, facilities, equipment, and resources to commence the Work at the time prescribed and thereafter to prosecute and complete the Work at the rate or within the times specified. A Bid may be rejected if Bidder is already obligated for the performance of other work which would delay the commencement, prosecution or completion of the Work.

- To demonstrate qualifications to perform the Work, Bidder shall complete and submit with its Bid the Qualifications Statement which is included in this Project Document. Bidders may be asked to and shall furnish additional data to demonstrate Bidder's qualifications.
- Bidder is required to complete and submit with its Bid the *Certification Regarding Debarment, Suspension, and other Responsibility Matters* form which is included in the Project Documents.
- A bidder's failure to submit required qualification information within the time indicated may disqualify Bidder from receiving an award of the Contract.
- No requirement in this Section to submit information will prejudice the right of the Owner to seek additional pertinent information regarding Bidder's qualifications.
- Bidder is advised to carefully review those portions of the Bid Form Requiring Bidder's representations and certifications.
- Bidders shall be qualified to do business in the jurisdiction where the Project is located or covenant to obtain such qualification prior to signing the Agreement.

9. UNIT PRICES

The unit price for each of the several items in the proposal of each Bidder shall include its pro-rata share of overhead so that the sum of the products obtained by multiplying the quantity shown for each item by the unit price Bid represents the total Bid. Any Bid not conforming to this requirement may be rejected as informal. The special attention of all Bidders is called to this provision, for should conditions make it necessary to revise the quantities, no limit will be fixed for such increased or decreased quantities nor extra compensation allowed, provided the net monetary value of all such additive and subtractive changes in quantities of such items of work (i.e., difference in cost) shall not increase or decrease the original contract price by more than 25 percent (25%), except for work not covered in the Drawings and Technical Specifications as provided for in Section 109 hereof.

10. CORRECTIONS

Erasures or other changes in the Bids must be explained or noted over the signature of the Bidder.

11. TIME FOR RECEIVING BIDS

- (a) Bids received prior to the advertised hour of opening will be securely kept sealed. The officer whose duty it is to open them will decide when the specified time has arrived. No Bid received thereafter will be considered, except when a Bid arrives by United States mail after the time fixed for opening, but before the reading of all other Bids is completed, and it is shown to the satisfaction of the Grantee/Local Public Agency that the non-arrival

on time was due solely to delay in the mails for which the Bidder was not responsible, such Bid will be received and considered.

- (b) Bidders are cautioned that, while telegraphic modifications of Bids may be received as provided above, such modifications, if not explicit and if in any sense subject to misinterpretation, shall make the Bid so modified or amended, subject to rejection.

12. OPENING OF BIDS

At the time and place fixed for the opening of Bids, the Grantee/Local Public Agency will cause to be opened and publicly read aloud every Bid received within the time set for receiving Bids, irrespective of any irregularities therein. Bidders and other persons properly interested may be present, in person or by representative.

13. WITHDRAWAL OF BIDS

Bids may be withdrawn on written or telegraphic request dispatched by the Bidder in time for delivery in the normal course of business to the time fixed for opening; provided that written confirmation of any telegraphic withdrawal over the signature of the Bidder is placed in the mail and postmarked prior to the time set for Bid opening. The Bid guaranty of any Bidder withdrawing his Bid in accordance with the foregoing conditions will be returned promptly.

14. AWARD OF CONTRACT: REJECTION OF BIDS

- (a) The Contract will be awarded to the responsible Bidder submitting the lowest Bid complying with the conditions of the Invitation for Bids. The Bidder to whom the award is made will be notified at the earliest possible date. The Grantee/Local Public Agency, however, reserves the right to reject any and all Bids and to waive any informality in Bids received whenever such rejection or waiver is in its interest.
- (b) The Grantee/Local Public Agency reserves the right to consider as unqualified to do the work of general construction any Bidder who does not habitually perform with his own forces the major portions of the work involved in construction of the Improvements embraced in this Contract.

15. EXECUTION OF AGREEMENT: PERFORMANCE AND PAYMENT BOND

- (a) Subsequent to the award and within ten (10) days after the prescribed forms are presented for signature, the successful Bidder shall execute and deliver to the Grantee/Local Public Agency an Agreement in the form included in the Contract Documents in such number of copies as the Local Public Agency may require.
- (b) Having satisfied all conditions of award as set forth elsewhere in these documents, the successful Bidder shall, within the period specified in paragraph "a" above, furnish a surety bond in a penal sum not less than the amount of the Contract as awarded, as security for the faithful performance of the Contract, and for the payment of all persons, firms or corporations to whom the Contractor may become legally indebted for labor, materials, tools, equipment, or services of any nature including utility and transportation services, employed or used by him in performing the work. Such bond shall be in the same form as that included in the Contract Documents and shall bear the same date as, or a date subsequent to that of the Agreement. The current power of attorney for the person who signs for any surety company shall be attached to such bond. This bond shall be signed by a guaranty or Surety Company listed in the latest issue of the U.S. Treasury Circular 570 and the penal sum shall be within the maximum specified for such company in said Circular 570. If applicable State laws require separate bonds as security (1) for

the faithful performance of the Contract and (2) for the payment of all services, labor, and materials, paragraph "b" above must be revised in accordance with the statutory requirements of the particular State. These bonds shall be signed by a guaranty or surety company listed in the latest of the U.S. Treasury Circular 570 and the total penal sum shall be within the maximum specified for such company in said Circular 570.

- (c) The failure of the successful Bidder to execute such Agreement and to supply the required bond or bonds within ten days after the prescribed forms are presented for signature, or within such extended period as the Grantee/Local Public Agency may grant, based upon reasons determined sufficient by the Grantee/Local Public Agency, shall constitute a default, and the Local Public Agency may either award the Contract to the next lowest responsible Bidder or re-advertise for Bids, and may charge against the Bidder the difference between the amount of the Bid and the amount for which a Contract for the work is subsequently executed, irrespective of whether the amount thus due exceeds the amount of the Bid Bond. If a more favorable Bid is received by re-advertising, the defaulting Bidder shall have no claim against the Grantee/Local Public Agency for a refund.

16. INSURANCE

- The Contractor shall, at its own expense, provide for the payment of Worker's Compensation benefits to its employees employed on or in connection with the work covered by this RFP, in accordance with applicable laws and statutorily required.
- The Contractor shall, at its own expense, carry and maintain Comprehensive General Public Liability Insurance with minimum limits of Bodily Injury of \$500,000 per person, \$1,000,000 per accident, \$250,000 per occurrence of property damage and \$2,000,000 Excess Liability. Blanket contractor and completed operations coverage shall be included with the same minimums.
- The Contractor shall, at its own expense, carry and maintain Comprehensive Auto Liability with the same limits as for General Public Liability. Liability coverage shall name City of Hillsdale as an additional insured.
- The Contractor shall likewise require its subcontractors, if any, to provide for such benefits and carry and maintain such insurance at no expense to the City.
- Before commencement on the project contemplated herein, and at any time thereafter upon written request by the City, the Contractor shall furnish the City with a copy of certificates of insurance as evidence that policies providing the required coverage's and limits of insurance are in full force and effect.
- All insurance coverage furnished under this Contract, with the exception of Worker's Compensation and Employer's Liability, shall include the City, and employees as additional insured with respect to the activities of the Contractor and its subcontractors. Any certificate or certificates presented as evidence of insurance shall specify the date when such benefits and insurance expire. The Contractor agrees that said benefits and insurance shall be provided and maintained until after the entire work under the Contract has been performed and accepted. The Contractor shall provide the City at least thirty (30) days advance written notice prior to cancellation, termination, or material alteration of said policies of insurance.

17. WAGES AND SALARIES

Attention of Bidders is particularly called to the requirements concerning the payment of not less than the prevailing wage and salary rates specified in the Contract Documents and the conditions of employment with respect to certain categories and classifications of employees.

The rates of pay set forth under GENERAL CONDITIONS, PART II, are the minimums to be paid during the life of the Contract. It is therefore the responsibility of Bidders to inform themselves as to local labor conditions, such as the length of work day and work week, overtime compensation, health and welfare contributions, labor supply and prospective changes or adjustments of rates.

18. EQUAL EMPLOYMENT OPPORTUNITY

Attention of Bidders is particularly called to the requirement for ensuring that employees and applicants for employment are not discriminated against because of their race, color, religion, sex or national origin. (See Section 134 hereof.)

19. COMMUNICATIONS

Communication regarding this proposal can be directed to the following:

Kristin L. Bauer, P.E.
City Engineer
City of Hillsdale
Hillsdale, MI 49242
517-437-6479
kbauer@cityofhillsdale.org

20. OTHER CONDITIONS APPLICABLE TO THIS PROPOSAL

- Applicable Laws: The Ordinances and Charter of the City of Hillsdale and laws of the State of Michigan concerning competitive bidding, contracts and purchases will be employed.
- The City is exempt from the payment of any federal excise or any Michigan sales tax (State of Michigan Sales Tax Exemption number: 38-6004621). The price must be net, exclusive of taxes.
- The Contractor shall indemnify and hold harmless the City of Hillsdale, its council members, city manager, directors, employees and agents from and against all liabilities, claims, demands, causes of action of every kind and descriptions, damages, Losses and Litigation Expenses, including but not limited to attorney's fees through appeals, arising out of or resulting from the performance of work in this contract, providing that any such claim, demand, cause of action, damage, Loss or expense (1) is attributable to bodily injury, disease or death, or to injury to or destruction of property including the loss of use resulting therefrom, and (2) is caused in whole or in part by any negligent act or omission of the Contractor, anyone directly or indirectly employed by the Contractor, or anyone for whose acts for any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder. This indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the contractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.



BIDDER FORMS

BIDDER'S QUALIFICATION FORM

BID PROPOSAL

CERTIFICATION OF BIDDER - EQUAL EMPLOYMENT OPPURTUNITY

NONCOLLUSION AFFIDAVIT OF PRIME BIDDER

BID BOND

CERTIFICATION OF BIDDER – SECTION 3 BUSINESS

BIDDER'S QUALIFICATIONS STATEMENT

THE INFORMATION SUPPLIED IN THIS DOCUMENT IS CONFIDENTIAL TO THE EXTENT PERMITTED BY LAWS AND REGULATIONS

The following information shall be submitted with the completed bid proposal.

1. SUBMITTED BY:

Official Name of Firm: _____

Address: _____

2. SUBMITTED TO:

3. SUBMITTED FOR:

Owner : _____

Project Name: _____

4. CONTRACTOR'S CONTACT INFORMATION:

Company Contact: _____

Title: _____

Phone: _____

Email: _____

5. ORGANIZATION INFORMATION:

Type of Organization: _____

Name of Owner/Partners/Executive Officers:

State of Organization: _____

Date of Organization: _____

6. Licensing:

License Type/Number: _____

Jurisdiction of License: _____

License Type/Number: _____

Jurisdiction of License: _____

7. OTHER INFORMATION:

Disadvantage Business Enterprise: Y N

Minority Business Enterprise: Y N

Women Owned Enterprise: Y N

Small Business Enterprise: Y N

Other: _____

8. BONDING INFORMATION:

Bonding Company: _____

Address: _____

Bonding Agent: _____

Address: _____

Contact Name: _____

Phone: _____

Aggregate Bonding Capacity: _____

Available Bonding Capacity (as of date of this submittal):

9. CONSTRUCTION EXPERIENCE:

Provide the following information:

1. Current Experience: List all uncompleted projects currently under contract with estimated completion dates.
2. Previous Experience: List all project completed within the last 5 years.
3. Provide detailed information, including owner's contact information, for any projects that the listed firm has failed to complete. Include projects not completed by any owner, officer, partner, joint venture participant or proprietor of the listed firm.
4. Are there any judgements, claims, disputed or litigation pending or outstanding involving the listed firm or any owner, officer, partner, joint venture participant or proprietor.

BID PROPOSAL

All sections of this project will be awarded to one contractor as a **complete project**. Pricing must be supplied for all sections of this project.

All bid items will be paid utilizing Unit Prices in accordance with the submitted proposal for each section of the bid.

NOTE: Bidders should provide pricing for all items listed, even those with zero quantity. Zero quantity items will result in a \$0.00 total cost amount and not affect the overall bid.

SECTION 1 - Water Main System Work:

Water Valve Replacements and Associated Items of Work:

ITEM DESCRIPTION	EST. QUANT.	UNIT	UNIT COST	TOTAL COST
Mobilization – Water Section 1 (Max. 5% of Bid Amount)	1	LS		
Mobilization – Insert Valve	3	Per Trip		
Pav't, Rem, Modified	45	SY		
HMA, Rem, Modified	450	SY		
Sidewalk, Rem	90	SY		
Curb, Rem	325	FT		
Hydrant, Abandon	1	EA		
Hydrant, Rem	1	EA		
Valve, Rem, Blank Main	2	EA		
Valve, Rem, Pipe Main	2	EA		
Bolted Valve, 4"	13	EA		
Bolted Valve, 6"	26	EA		
Bolted Valve, 8"	5	EA		
Bolted Valve, 10"	5	EA		
Bolted Valve, 12"	9	EA		
Bolted Valve, 16"	0	EA		\$ 0.00
Tapping Valve, 4"	2	EA		
Tapping Valve, 6"	3	EA		
Tapping Valve, 8"	2	EA		

ITEM DESCRIPTION	EST. QUANT.	UNIT	UNIT COST	TOTAL COST
Tapping Valve, 10"	1	EA		
Tapping Valve, 12"	2	EA		
Tapping Valve, 16"	0	EA		\$ 0.00
Insert Valve, 4"	0	EA		\$ 0.00
Insert Valve, 6"	4	EA		
Insert Valve, 8"	0	EA		\$ 0.00
Insert Valve, 10"	4	EA		
Insert Valve, 12"	1	EA		
Insert Valve, 16"	0	EA		\$ 0.00
Sleeve, 4"	26	EA		
Sleeve, 6"	52	EA		
Sleeve, 8"	10	EA		
Sleeve, 10"	10	EA		
Sleeve, 12"	18	EA		
Sleeve, 16"	0	EA		\$ 0.00
Tapping Sleeve, 4" x 4"	0	EA		\$ 0.00
Tapping Sleeve, 4" x 6"	0	EA		\$ 0.00
Tapping Sleeve, 6" x 6"	0	EA		\$ 0.00
Tapping Sleeve, 6" x 8"	0	EA		\$ 0.00
Tapping Sleeve, 8" x 8"	0	EA		\$ 0.00
Tapping Sleeve, 8" x 10"	0	EA		\$ 0.00
Tapping Sleeve, 10" x 10"	0	EA		\$ 0.00
Tapping Sleeve, 10" x 12"	0	EA		\$ 0.00
Tapping Sleeve, 12" x 12"	0	EA		\$ 0.00
Reducer, 6" to 4"	14	EA		
Reducer, 8" to 6"	3	EA		
Reducer, 10" to 8"	3	EA		
Reducer, 12" to 10"	3	EA		

ITEM DESCRIPTION	EST. QUANT.	UNIT	UNIT COST	TOTAL COST
Pipe Section, C900-DR18, 4"	52	LF		
Pipe Section, C900-DR18, 6"	104	LF		
Pipe Section, C900-DR18, 8"	20	LF		
Pipe Section, C900-DR18, 10"	20	LF		
Pipe Section, C900-DR18, 12"	36	LF		
Pipe Section, C900-DR18, 16"	0	LF		\$ 0.00
Gate Valve Box Only	65	EA		
Curb Stop and Box	5	EA		
Pav't Sawcut – Street Surface	1975	LF		
Valve Replacement Site Work	70	EA		
Overnight/Weekend Replacement Site Work	2	EA		
Water Service, Long, 1 Inch	5	EA		
Water Service Line, Curb stop into Home	0	EA		\$ 0.00
Hydrant Assembly	1	EA		
Hand Patching, LVSP	150	TON		
MDOT - Pav't Repr, Nonreinf Conc, 12", Modified	25	SY		
Aggregate Base, 8", 22A	470	SY		
Curb & Gutter, F4	325	LF		
Sidewalk, Conc, 4"	140	SF		
Sidewalk Ramp, Conc, 6"	575	SF		
Detectable Warning Surface	65	LF		
Turf Restoration	1	LS		
Project Cleanup	1	LS		
Traffic Control – Water Daily Closure	8	Per Hole		
Traffic Control – Water Overnight Closure	60	Per Hole		

ITEM DESCRIPTION	EST. QUANT.	UNIT	UNIT COST	TOTAL COST
Traffic Control – Water Detour	1	Per Detour		
Traffic Control – 2 Flaggers w/ advance warning signs	22	Per 4 Hours		
Traffic Control – MDOT Lane Closure	1	LS		
SECTION 1 – WATER MAIN SYSTEM SUBTOTAL:				

Section 1 - Water Main System Subtotal Written Out in Words. In case of discrepancy, the amount shown in words will govern.

SECTION 2 - Sanitary Sewer System Construction:

Reconstruct Sanitary Sewer, New Force Main/Lift Station & Spot Replacements:

ITEM DESCRIPTION	QUANT	UNIT	UNIT COST	TOTAL COST
Mobilization – Sanitary Section 2 (Max. 5% of Bid Amount)	1	LS		
Pav't, Rem	90	SY		
HMA, Rem	2,800	SY		
Curb & Gutter, Rem	975	LF		
Bulkhead Ex Sanitary Sewer	1	EA		
Abandon Ex Manhole	3	EA		
Pav't Sawcut – Street Surface	4,600	LF		
By-Pass Pumping	700	LF		
<u>Willow Street</u> San. Sewer 8"	360	LF		
<u>Willow Street</u> New 48" Dia. Doghouse MH	2	EA		
<u>W. St. Joe Street</u> San. Sewer 8"	305	LF		
<u>W. St. Joe Street</u> New 48" Dia. Doghouse MH	2	EA		
<u>Mechanic Street</u> San. Sewer 10"	325	LF		
<u>Mechanic Street</u> New 48" Dia. Doghouse MH	2	EA		

ITEM DESCRIPTION	QUANT	UNIT	UNIT COST	TOTAL COST
<u>Mechanic Street</u> New 48" Dia. Sanitary MH	1	EA		
<u>Marion Street</u> Force Main Sewer, 6"	950	LF		
<u>Marion Street</u> New 48" Dia. Doghouse MH	1	EA		
<u>Marion Street</u> Lift Station Construction	1	LS		
Sanitary Sewer Service Connection	14	EA		
Sanitary Service Connection @ MH	2	EA		
HMA, LVSP	750	TON		
Hand Patching, LVSP	35	TON		
MDOT - HMA, LVSP, 12" thick	70	TON		
Pav't Repr, Nonreinf, Conc, 12", Modified	40	SY		
Sidewalk/Driveway, Conc, 6"	450	SF		
Aggregate Base, 8", 22A	2,800	SY		
Curb & Gutter, F4	975	LF		
Turf Restoration	1	LS		
Project Cleanup	1	LS		
Traffic Control – Willow Street	1	LS		
Traffic Control – W. St. Joe Street	1	LS		
Traffic Control – Marion Street	1	LS		
Traffic Control – Mechanic Street	1	LS		
Traffic Control – Sanitary Spot Replacements	6	Per Site		
Traffic Control – MDOT Lane Shift	1	LS		
SECTION 2 – SANITARY SEWER SYSTEM CONSTRUCTION SUBTOTAL:				

Section 2 - Sanitary Sewer System Construction Subtotal Written Out in Words. In case of discrepancy, the amount shown in words will govern.

SECTION 3 - Sanitary Sewer System Lining:

Sanitary Sewer Lining and Associated Items of Work:

ITEM DESCRIPTION	QUANT.	UNIT	UNIT COST	TOTAL COST
Mobilization - Lining (Max. 5% of Bid Amount)	1	LS		
7 and 8-inch CIPP Sewer Lining	3,470	LF		
Dog House Manhole, 48 Inch Dia	1	EA		
Expose and Raise Buried Manhole Casting	2	EA		
Project Cleanup	1	LS		
Traffic Control – Sanitary Lining	10	Per Site		
Traffic Control – MDOT Lane Shift	1	LS		
SECTION 3 - SANITARY SEWER SYSTEM LINING SUBTOTAL:				

Section 3 - Sanitary Sewer System Lining Subtotal Written Out in Words. In case of discrepancy, the amount shown in words will govern.

OVERALL PROJECT BID SUMMARY

BID SECTION	SECTION SUBTOTAL
Section 1 - Water Main System Subtotal:	
Section 2 - Sanitary Sewer System Construction Subtotal:	
Section 3 - Sanitary Sewer System Lining Subtotal:	
PROJECT BID GRAND TOTAL:	

Project Grand Total Written Out in Words. In case of discrepancy, the amount shown in words will govern.

The undersigned, having familiarized (himself/herself) with the Request for Proposal, the bidder shall examine the scope of work to be completed and shall completely familiarize (himself/herself) with existing conditions to be encountered, the difficulties and limitations involved in completing the project and all other factors affecting the work proposed with this project. The Contractor shall provide all necessary labor, transportation, meals, etc. to perform all the work and furnish all necessary material to complete plans outlined in the proposal.

In submitting this proposal, it is understood and agreed by the undersigned that the right is reserved by the City to reject any or all proposals. It is further understood and agreed by the same undersigned that any qualifying statements, or conditions made to the above proposal, as originally published, as well as any interlineations, erasures, omissions, or entered wording obscure as to its meaning, may cause the bid to be declared irregular and may be cause for rejection of the bid.

Bidder has examined and carefully studied the Bidding Documents, other related data identified in the Bidding Documents, and the following Addenda, receipt of all which is hereby acknowledged:

<u>Addendum No.</u>	<u>Addendum Date</u>
_____	_____
_____	_____
_____	_____

Bidder hereby agrees to commence work under this contract on or before a date to be specified in written Notice to Proceed of the Owner and to fully complete the project as stipulated in the specifications.

Bidder further agrees to pay as liquidated damages the sum of \$1,550.00 for each consecutive calendar day thereafter as hereinafter provided in Paragraph 19 of the General Conditions.

The Bidder agrees that this bid shall be good and may not be withdrawn for a period of thirty (30) calendar days after the scheduled closing time for receiving bids.

Upon receipt of written notice of the acceptance of this bid, Bidder will execute the formal contract attached within 10 days and deliver a Surety Bond or Bonds as required by Paragraph 15b of the Instruction to Bidders.

The bid security is to become the property of the Owner in the event the contract and bond are not executed within the time above set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

Certification Regarding Debarment, Suspension and Other Responsibility Matters—Primary Covered Transaction

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

- II. Where the prospective primary participant is unable to certify to any the statements in this certification, such prospective participant shall attach an explanation to this proposal.

SIGNATURE NAME OF PROPOSER _____

PRINTED NAME OF PROPOSER _____

TITLE _____

NAME OF COMPANY _____

ADDRESS _____

CITY/STATE/ZIP _____ TELEPHONE _____

EMAIL _____ DATE _____

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

**CERTIFICATION OF BIDDER REGARDING EQUAL
EMPLOYMENT OPPORTUNITY**

INSTRUCTIONS

This certification is required pursuant to Executive Order 11246 (30 F.R. 12319-25). The implementing rules and regulations provide that any bidder or prospective contractor, or any of their proposed subcontractors, shall state as an initial part of the bid or negotiations of the contract whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and, if so, whether it has filed all compliance reports due under applicable instructions.

Where the certification indicates that the bidder has not filed a compliance report due under applicable instructions, such bidder shall be required to submit a compliance report within seven (7) days after bid opening. No contract shall be awarded unless such report is submitted.

CERTIFICATION BY BIDDER

NAME AND ADDRESS OF BIDDER (Include ZIP Code)

-
1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause.
 Yes No
-
2. Compliance reports were required to be filed in connection with such contract or subcontract.
 Yes No
-
3. Bidder has filed all compliance reports due under applicable instructions.
 Yes No None Required
-
4. Have you ever been or are you being considered for sanction due to violation of Executive Order 11246, as amended?
 Yes No

NAME AND TITLE OF SIGNER (Please type)

SIGNATURE
Replaces Form HUD-1238.CD-1, which is obsolete.

DATE

HUD-950.1(11-78)

NONCOLLUSION AFFIDAVIT OF PRIME BIDDER

State of _____)

County of _____) ss.

_____, being first duly sworn, deposes and says that:

1. He is _____ of _____, the Bidder that has submitted the attached Bid;
2. He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;
3. Such Bid is genuine and is not a collusive or sham Bid;
4. Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or cost element of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the (*Grantee/Local Public Agency*) or any person interested in the proposed Contract; and
5. The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

(Signed)

(Name & Title)

Subscribed and sworn to before me
this ____ day of _____, _____

(Notary Public)

My commission expires _____.

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, _____ as PRINCIPAL, AND _____, as SURETY are held and firmly bound unto _____ hereinafter called the Grantee/Local Public Agency 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 submitted the Accompanying Bid, dated _____, _____, for

_____.

NOW, THEREFORE, if the Principal shall not withdraw said Bid within the period specified therein after the opening of the same, or, if no period be specified, within thirty (30) days after the said opening, and shall within the period specified therefore, or if no period specified, within ten (10) days after the prescribed forms are presented to him for signature, enter into a written Contract with the Grantee/Local Public Agency in accordance with the Bid as accepted, and give bond with good and sufficient surety or sureties, as may be required, for the faithful performance and proper fulfillment of such contract; or in the event of the withdrawal of said Bid within the period specified, or the failure to enter into such Contract and give such bond within the time specified, if the Principal shall pay the Grantee/Local Public Agency the difference between the amount specified in said Bid and the amount for which the Grantee/Local Public Agency may procure the required work or supplies or both, if the latter be in excess of the former, then the above obligation shall be void and of no effect, otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounded parties have executed this instrument under their several seals this _____ day of _____, _____, the name and corporate seal of each corporate party being hereto affixed and these present signed by its undersigned representative, pursuant to authority of its governing body.

1. Forms of Bid Bonds prepared to meet the requirements of local or State laws or the needs of the Grantee/Local Public Agency should be substituted for this form where necessary.

_____ (SEAL)

_____ (SEAL)

By: _____

Attest:

Attest:

By: _____

Affix
Corporate
Seal

By: _____

Affix
Corporate
Seal

Countersigned by _____

2. Attorney-in-Fact, State of _____

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the _____,
_____, Secretary of the Corporation named as Principal in the within
bond; that _____, who signed the said bond on behalf of the Principal
was then _____ of said corporation; that I know his
signature, and his signature thereto is genuine; and that said bond was duly signed, sealed, and
attested to for and in behalf of said corporation by authority of this governing body.

_____ Corporate

Title _____ Seal

2. Power-of-attorney for person signing for Surety Company must be attached to bond.

Certification of Bidder Regarding Section 3 Business and MBE/WBE/DBE Participation

GRANTEE NAME: **City of Hillsdale**

PROJECT NAME: **Water Valve & Sanitary Sewer Main Improvements**

SECTION 3 OF THE HOUSING AND URBAN DEVELOPMENT ACT OF 1968

As a condition of receiving Federal funds, the City of Hillsdale is required to comply with Section 3 of the Housing and Urban Development (HUD) Act of 1968 (Section 3), which provides that employment and other economic opportunities generated by certain HUD financial assistance shall, to the greatest extent feasible, and consistent with existing Federal, State and local laws and regulations, be directed to low- and very low-income persons. In accordance with HUD regulations (24 CFR Part 135), Section 3 requirements pass down to construction contractors and subcontractors funded with HUD funds.

BUSINESS ENTERPRISE FOR MINORITIES, FEMALES, AND PERSONS WITH DISABILITIES ACT (30 ILCS 575/)

It is the goal of the State of Michigan that not less than 20% of the total dollar amount of State-funded contracts shall be established as a goal to be awarded to businesses owned by minorities, females, and persons with disabilities. As a condition of receiving funds through the State, the City of Hillsdale shall, to the maximum extent feasible, ensure that contracts and subcontracts issued pursuant thereto are awarded to businesses owned by minorities, females, and persons with disabilities.

BIDDER CERTIFICATION

In order to assist the City of Hillsdale in complying with the requirements set forth above, (Bidder/Contractor) hereby certifies that it will take all necessary affirmative steps to assure that, to the maximum extent feasible:

- Businesses owned by minorities, females, and persons with disabilities and Section 3 business concerns are contacted/solicited concerning potential subcontracting opportunities associated with the project; and
- Subcontracting opportunities generated by the project are awarded to businesses owned by minorities, females, and persons with disabilities and Section 3 business concerns.

In addition, (Bidder/Contractor) agrees to document all actions take to comply with the requirements listed above, the results of actions taken, and any impediments encountered.

I declare and affirm under penalty of law that the statements made herein are true and accurate to the best of my knowledge. I understand that falsifying information and incomplete statements will disqualify certification status.

Signature of Business Owner or Authorized Representative: _____

Date: _____

Attested by: _____

Date: _____



TECHNICAL SPECIFICATIONS

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CITY OF HILLSDALE
GENERAL INFORMATION

DESCRIPTION

All work shall be performed promptly and professionally in conjunction with the attached specifications, the 2012 MDOT Standard Specifications for Construction and City of Hillsdale Codes and Ordinances, as applicable.

Work covered by these documents include, but are not limited to the following:

- Water system construction
- Sanitary sewer system construction
- Coordination with City Staff and Property Owners.

SITE ACCESS/HOURS OF WORK

- By City of Hillsdale Ordinance Section 14-63, work shall be restricted to the following hours, except as work may relate to the safety and/or protection of persons, the work or the property at the site:
 - Monday through Saturday (except legal Holidays): 7:00am to 6:00pm
 - Work requests outside these time limits require written permission of the City Manager.
- Contractor shall limit construction access to the public rights-of-way (ROW).

WORK RESTRICTIONS

No work will be allowed during the following observed holidays: Good Friday, Memorial Day, Fourth of July, Labor Day, Veterans Day, Thanksgiving, the day after Thanksgiving, Christmas Eve, Christmas Day, New Year's Eve, and New Year's Day.

No water main shut downs can occur during the following events/time frames in the City of Hillsdale. In some cases work can occur in other areas of the city that aren't affected by said event:

- County Fair: September 24th thru 30th , 2023 and September 22nd thru 28th, 2024 (South end of town and areas surrounding the Fairgrounds)
- Hillsdale College Area: Work will require coordination between the College, City and Contractor. Generally mid-August and mid-May should be avoided for move-in and graduation.
- Great American Parade: July 3, 2023 and 2024
- Schools – No water shutdowns during school operations. Coordination will be required between the City, Contractor and schools.

CITY OF HILLSDALE
GENERAL INFORMATION

REQUIRED SUBMITTALS

Submit product certificates, at the request of the city, on the Manufacturer's letterhead certifying that the product complies with the requirements herein and water main products were Made in America or Canada.

PERMITS

The contractor shall ensure that all permits to be issued have been obtained prior to beginning of any work.

This section includes provisions for specific permits but may not include all required permits.

- EGLE Permits – Permitting through EGLE is being facilitated by City Staff and is anticipated for approval prior to award of this contract.

SITE PRODUCT STORAGE & CLEANING

- Products for the contractors use may be stored within the public ROW and shall be properly secured and barricaded. Any areas damaged by the material storage shall be restored at completion of the project to the satisfaction of the Department of Public Services and this contract.
- No loose material i.e.; soil materials, stone, etc. shall not be stored within the roadway. Loose materials stored off the roadway shall be surrounded by properly installed silt fence or similar measures to ensure material will not wash into the roadway and/or storm sewer systems.
- Contractor shall ensure the work area is maintained free of debris and waste materials are remove daily.
- Contractor shall maintain and ensure all paved surfaces are kept clean.
- Should dust or other site issues become an issue the contractor shall correct any unsatisfactory conditions within 24 hours of notice of the issue. Should the contractor not mitigate the issues in a timely manner the city may arrange for corrective measures and charge the contractor for the work.

**CITY OF HILLSDALE
DETAILED SCOPE
WATER VALVE REPLACEMENT PROJECT**

The city is requesting replacement of water system valves that are currently non-operational and/or leaking. This project will be staged to limit water outages to the residents of the city.

Project Completion Dates (Work can be completed in 2023, as schedules allow):

Due to a scheduled grant funded paving project in 2024 on W. St. Joe/Griswold Streets from Bacon to Waterworks Ave the following items of work will be prioritized to be completed by **June 28, 2024**:

- Nine (9) Valve replacements; numbers 328, 329, 330, 331, 332, 333, 334, 335, and 336.
- One (1) Insert Valve at the W. St. Joe and South Street Intersection.
- All work shown on Drawing Sheet W14.

Completion Water Valve Replacement Work:

December 31, 2024

Water outages and boil water notices will be handled by city staff working closely with the contractor. Coordination and scheduling of work areas will be required by the Contractor with city staff.

The Contractor and subcontractors shall contact the MISS DIG system in accordance with the published rules and regulations of the notification system.

Valve replacements can occur via two options with other options considered by the city:

- Daily Schedule – Contractor will excavate, shut-off water service, replace valve(s), water service restored, and backfilled on the same day.
- Multiple Day Schedule – Day One the contractor will excavate, prepare site, and secure the construction area. Day two the water will be shut-off, valve(s) replaced, water service restored, and backfilled. Only 3 valve areas, per crew, will allowed to be open at any given time. No excavated areas shall remain open for more than one day without approval of the city.

Temporary patching of valve replacement sites shall be topped with 2” minimum of cold patch material with the cost of this material considered incidental to the work.

Final restorations of all street openings shall be completed, at a minimum, once per month. MDOT final restorations shall be completed immediately upon acceptance of the work.

The city will work with the contractor to schedule replacements based on the city’s needs. Timing associated with some of the affected properties may require work to be scheduled overnight night or on weekend hours.

It is planned that the replacements will utilize new bolted valves; however, the city has anticipated that tapping valves may be needed in some locations. The contractor shall have a tapping valve on-site during replacements in case it is needed.

**CITY OF HILLSDALE
DETAILED SCOPE
WATER VALVE REPLACEMENT PROJECT**

For bidding purposes, the city provides the following information:

- Bolted valve quantities are for all identified project sites.
- Tapping valves may be needed at some locations. Pricing for a small quantity of tapping valves is requested in the bid and if used will replace the need for a bolted valve and will be paid at the cost of the tapping valve.
- Live tapped insert valve pricing is requested for sizes noted and should include all costs for installation of the valve. Excavation for this installation will be paid as “Valve Replacement Site Work”. Mobilization for insert valve work will be paid as “Mobilization - Insert Valve” and should include all costs as noted in the Mobilization Special Provision.
- Two sleeves are estimated to be needed for each valve replacement location.
- Reducer pricing is requested as there are valves at the junction of two main sizes, it is unknown as to which main the valve is on. Refer to the table below for the locations where these occur. Water main sizes at valve replacement locations are shown on the project drawings.
- An average of four (4) feet of pipe is estimated for each replacement location.
- New gate valve boxes shall be provided at each replacement location.
- New curb stops and boxes shall be provided at each water service site.
- Temporary patching of excavation location sites shall be topped with a minimum 2” of cold patch material with the cost of this material considered incidental to the work.
- Pricing for the above items, unless noted otherwise, shall be pricing for the purchase of the item. Contractors will be paid by the actual materials used at each project replacement site. The contractor shall coordinate all quantities for payment with the Project Manager daily during the project.

All work shall be performed promptly and professionally in conjunction with the attached specifications, the 2012 MDOT Standard Specifications for Construction and City of Hillsdale Codes and Ordinances, as applicable.

Removal Items:

- **Pavement Rem, Modified, HMA Rem, Modified, Sidewalk and Curb removals** will be paid by the unit of the actual removals at each location per the standard and special provisions.
- **Hydrant, Abandon** should include all costs for the abandonment of an existing hydrant including the removal of the hydrant and valve box and abandonment of piping to 12” below grade. Water main will be abandoned in place. Removed items shall be undamaged and will remain property of the city.
- **Hydrant, Rem** should include all costs for the removal of an existing hydrant, piping, gate valve and tee in the supply main. Replace the tee with a new section of water main pipe. Removed items shall be undamaged and in one piece and will remain property of the city. Excavation will be paid as “Valve Replacement Site Work”.
- **Valve, Rem, Blank Main** shall include all associated costs to remove the existing water main valve at the main and cap. Excavation will be paid as “Valve Replacement Site Work”.

CITY OF HILLSDALE
DETAILED SCOPE
WATER VALVE REPLACEMENT PROJECT

- **Valve, Rem, Pipe Main** shall include all associated costs to remove the existing valve and install a new pipe section in the main. Excavation will be paid as “Valve Replacement Site Work”.

Miscellaneous Items:

- **Pav’t Sawcut** shall be per the attached special provision.
- **Valve Replacement Site Work** shall include but not be limited to all labor, materials, equipment, and materials necessary to excavate the estimated eight-foot (8’) by eight-foot (8’) project area to the water main. Backfill shall be included in this item of work and be in accordance with the Water Typical Details on sheet W15 of the project drawings. Backfill shall be placed and compacted in no greater than (10”) lifts to the level required for placement of the aggregate base layer in preparation for paving. This pay item will also be utilized for excavation/backfill associated with new insert valves and identified hydrant work.
- **Overnight/Weekend Valve Replacement Site Work** shall include but not be limited to all labor, materials, equipment, and materials necessary to excavate the estimated eight-foot (8’) by eight-foot (8’) project area to the water main for replacement of the identified valve. Backfill shall be included in this item of work and be in accordance with the Water Typical Details on sheet W15 of the project drawings. Backfill shall be placed and compacted in no greater than (10”) lifts to the level required for placement of the aggregate base layer in preparation for paving. This item shall cover valve replacements started between the hours of 7:00 PM and 7:00 AM or on Saturdays or Sundays.
- **Water Service, Long, 1 inch** shall include but not be limited to all labor, materials, equipment, materials, and excavation/backfill necessary to re-establish the water service, greater than thirty feet (30’) in length, from the existing curb stop location to the water main. The current service line shall be cut, crimped and abandoned in place. Bids shall also include the cost for installation of the new curb stop, curb box and all fittings required to connect the new service to the service pipe on the downstream side of the curb box. Backfill and compact with Class II sand or approved on-site material in lifts not to exceed ten inches (10”) lifts to the level required for placement of the aggregate base layer in preparation for paving.
- **Hydrant Assembly** shall include but not be limited to all labor, materials, equipment, materials, and excavation/backfill necessary to install a new fire hydrant onto the existing main in accordance with the project typical detail (drawing sheet W15) in the location specified. Hydrant shall be set in 1 yard of coarse gravel for drainage purposes. Backfill and compact with Class II sand or approved on-site material in lifts not to exceed ten inches (10”) lifts to the level required for placement of the top soil for turf restoration.
- **Hand Patching, LVSP** shall include but not be limited to all labor, materials, equipment, and materials necessary to install HMA in accordance with specification section 501 at all applicable locations.

**CITY OF HILLSDALE
DETAILED SCOPE
WATER VALVE REPLACEMENT PROJECT**

- **Pav't Repr, Nonreinf Conc, 12" (<72 Hours)** shall include but not be limited to all labor, materials, equipment, and materials necessary to install "high early" concrete pavement and epoxy anchored lane ties in accordance with specification section 603 and standard detail R-44-F within the MDOT roadway. Concrete pavement will be even with adjacent HMA pavements i.e., no HMA overlay.
- **Aggregate Base, 8", 22A** shall include but not be limited to all labor, materials, equipment, and materials necessary to install aggregate base course in accordance with specification section 302 in the roadway excavation areas.
- **Curb & Gutter, F4; Conc Sidewalk 4"; Conc Ramp 6"; Detectable Warning Surface** shall include but not be limited to all labor, materials, equipment, and materials necessary to install concrete elements in accordance with specification section 802, 803 and standard detail R-28-J and R-30-G. Areas of sidewalks removed during project work shall be maintained with Maintenance Gravel until final hard restoration, costs for Maintenance Gravel is considered incidental to the applicable work item. Pedestrian barricades shall be utilized to protect the sidewalk removal area until the maintenance gravel is in place.
- **Turf Restoration** shall include but not be limited to all labor, materials, equipment, and materials necessary to complete Turf Restoration in accordance with the attached special provision at all applicable excavated grass areas. Locations to be included in this LUMP SUM item include but not limited to the areas noted in the below table as affecting grass areas.
- **Project Cleanup** shall include but not be limited to all labor, materials, equipment, and materials necessary to complete Project Cleanup in accordance with the attached special provision.
- **Traffic Control Items** shall include but not be limited to all labor, materials, equipment, and materials necessary to complete Traffic Control Operation in accordance with the attached special provision and Traffic Control Typical shown on sheet W16 of the project drawings.

WATER VALVE REPLACEMENT LOCATIONS

VALVE NUMBER	VALVE LOCATION	SIZE 1	SIZE 2	Material CI/DI	IN PAV'T GRASS or CURB
459	on E Bacon at 115	6		CI	Asphalt
309	on Howell at E Bacon	8		CI	Asphalt over Brick
310	on E Bacon at Howell	12		CI	Asphalt
312	on E Bacon at Howell	12	10	CI	Asphalt
430	on Manning at Bacon E	6		CI	Asphalt
432	on E Bacon at Manning	10	8	CI	Asphalt
282 - Rem	on Wolcott at E Bacon	6		CI	Asphalt & Grass
426	on West at Bacon E	6		CI	Asphalt
563	on Norwood at W Bacon	6	4	CI	Asphalt

**CITY OF HILLSDALE
DETAILED SCOPE
WATER VALVE REPLACEMENT PROJECT**

VALVE NUMBER	VALVE LOCATION	SIZE 1	SIZE 2	Material CI/DI	IN PAV'T GRASS or CURB
333	on Barnard at Griswold	6		CI	Asphalt
334	on Barnard at Griswold	4	6	CI	Asphalt
335	on Griswold at Barnard	6		CI	Asphalt & Grass
525	on Barnard at Greenwood	4		CI	Asphalt
143	in island at N Broad (M-99) and Howell	10	8	DI	Concrete Sidewalk
353	on E Carleton at Ferris	6		CI	Grass
18	on W. Carleton (M-99) across from 412 W Carleton	6		DI	MDOT Asphalt over Conc
22	on W Carleton (M-99) at Mechanic	10	6	CI	Grass
INSERT	on W Carelton (M-99) north of Mechanic St	10		CI	Grass
INSERT	on Galloway Dr. within the Wastewater Treatment Plant	10		CI	Grass
INSERT	on W Carleton (M-99) at 401 W Carleton	10		CI	MDOT Asphalt over Conc
INSERT	on W Carleton (M-99) at 290 W Carleton	6		CI	Grass
INSERT	on W Carleton (M-99) at 401 W Carleton	10		CI	MDOT Asphalt over Conc
119	on College at Hillsdale	6	8	CI	Asphalt
122	on Hillsdale at College	10		CI	Asphalt
INSERT	on Union at College	6		DI	Asphalt
50	on College at West	4	6	CI	in Conc. Curb
80	on Manning at E Fayette	6		CI	Asphalt
81	on E Fayette at Manning	8		DI/PVC	Asphalt
111 - Rem	at 225 W Fayette St	6		CI/DI	Asphalt
INSERT	at 225 W Fayette St	6		CI	Asphalt
290	on Ludlam at Griswold	6		CI	Asphalt
336	on LoPresto at Griswold	6		CI	Asphalt
INSERT	on E Hallett at 45 E Hallett	6		CI	Asphalt

**CITY OF HILLSDALE
DETAILED SCOPE
WATER VALVE REPLACEMENT PROJECT**

VALVE NUMBER	VALVE LOCATION	SIZE 1	SIZE 2	Material CI/DI	IN PAV'T GRASS or CURB
472	on Budlong at E Hallett	6		CI	Grass
502	on Manning at Hallett	4	6	CI	Asphalt
497	on West at E Hallett	4	6	CI	Asphalt
518	on Hallett at Reading	6		CI	Asphalt
209	on Hillsdale at Barber	12	10	CI	Concrete Curb
210	on Barber at Hillsdale	12		CI/DI	Asphalt
123	on N Manning at River	4	6	CI	Asphalt
261	on Marion at Lombard	4	6	CI	Asphalt & Grass
43	on Mechanic at Arch	8		CI	Asphalt & Grass
438	on Mechanic at Barr	8		CI	Grass
125	on Monroe at West	4	6	CI	Asphalt
482	on Elm at Morry	4	6	CI	Asphalt
546	on N Norwood at Westwood St	6	4	CI	Asphalt
193	on Marion at Oak	12		PVC	Asphalt
69 - Rem	on Oak at River	8		PVC	Asphalt
517	on Rea at Goodrich	4	6	CI	Asphalt
292	on E South at Griswold	6	4	CI	Asphalt
306	on S Howell at E South	8	6	CI	Asphalt
276	on E South at S Manning	6	4	CI	Asphalt & Grass
328	on E South at W St Joe	6		CI	Asphalt
329 - Rem	on W St Joe at E South	12		CI	Asphalt
330	on W St Joe at E South	12		CI/DI	Asphalt
331	on W St Joe at E South	12		CI	Asphalt
332	on E South at W St Joe	10	12	CI	Asphalt
INSERT	on W St Joe at E South	12		CI	Asphalt
559	on W South at S Norwood	6		CI	Asphalt
273	on W South at Reading	6		CI	Asphalt
274	on W South at Reading	6		CI	Asphalt
275	on Reading at W South	6		CI	Asphalt
377	on Lewis at Spring	4		CI	Asphalt
ABAN. HYD	on W. St Joe	12		CI	Grass

**CITY OF HILLSDALE
 DETAILED SCOPE
 WATER VALVE REPLACEMENT PROJECT**

VALVE NUMBER	VALVE LOCATION	SIZE 1	SIZE 2	Material CI/DI	IN PAV'T GRASS or CURB
NEW HYD	on W St Joe at Barnard	12		DI	Asphalt & Grass
REM HYD	on W. St Joe	12		DI	Asphalt & Grass
SERVICES	on W. St Joe	12		DI	Asphalt & Grass
SERVICES	on W. St Joe	12		DI	Asphalt & Grass
SERVICES	on W. St Joe	12		DI	Asphalt & Grass
SERVICES	on W. St Joe	12		DI	Asphalt & Grass
SERVICES	on W. St Joe	12		DI	Asphalt & Grass
248	on Riverdale at State	4		CI	Concrete Curb
586	on Salem at State	6	4	CI	Asphalt
53	on Union btwn 81 & 250 Union	12		DI	Asphalt
218	on Union at Barber	12		DI	Asphalt
25	on Waldron at Budlong	6		DI	Asphalt
499	on Armstrong at S West	4		CI	Asphalt
429	on S West at Barry	6		CI	Asphalt
339	on Willow at Lake	6		CI	Asphalt

Above items highlighted in Gray are associated with a scheduled grant funded paving project and will be prioritized for completion by June 28, 2024.

**CITY OF HILLSDALE
DETAILED SCOPE
SANITARY SEWER LINING AND REPLACEMENT PROJECT INFORMATION**

The city is requesting completion of the following major items of work:

- Sanitary Sewer CIPP Lining – 10 locations, 15 Pipe Sections, 3,470 LF
- Sanitary Sewer Full Replacement – 3 Locations, 990 LF
- Sanitary Sewer Spot Replacement – 7 Locations, 115 LF
- Sanitary Sewer Force Main Construction with one lift station – 1 Location, 950 LF

Project Completion Dates (Work can be completed in 2023, as schedules allow):

Due to a scheduled grant funded paving project in 2024 on W. St. Joe/Griswold Streets from Bacon to Waterworks Ave the following items of work will be prioritized to be completed by **June 28, 2024**:

- All work shown on Drawing Sheet San 2.

Final Completion Sanitary Sewer & Lining Work:

December 31, 2024

The Contractor and subcontractors shall contact the MISS DIG system in accordance with the published rules and regulations of the notification system.

Temporary patching of spot replacement location sites shall be topped with 2" minimum of cold patch material with the cost of this material considered incidental to the work.

Final restorations of all street openings for spot replacement locations shall be completed, at a minimum, once per month. MDOT final restorations shall be completed immediately upon acceptance of the work.

Final restorations of Sanitary Trenches associated with sewer replacement locations shall be completed immediately upon acceptance of the work.

All work shall be performed promptly and professionally in conjunction with the attached specifications, the 2012 MDOT Standard Specifications for Construction and City of Hillsdale Codes and Ordinances, as applicable.

Removal Items:

- **Pavement Rem, Modified, HMA Rem, Modified, Sidewalk/Driveway and Curb removals** will be paid by the unit of the actual removals at each location per the standard and special provisions.
- **Bulkhead Ex Sanitary Sewer** contractor shall cut and cap the existing sanitary sewer five feet (5') from the existing manhole and fill the pipe to the manhole with flowable fill.
- **Abandon Ex Manhole** contractor shall demolish and remove from the site the existing manhole materials to approximately 36" below grade and bulkhead any existing piping in the manhole. Backfill the manhole with clean sand fill materials compacted in lifts no greater 12".

**CITY OF HILLSDALE
 DETAILED SCOPE
 SANITARY SEWER LINING AND REPLACEMENT PROJECT INFORMATION**

Miscellaneous Items – Reconstruction, Force Main/Lift Station, & Spot Replacements:

- **Pav't Sawcut** shall be per the attached special provision.
- **By-Pass Pumping** shall be in accordance with the Sanitary Sewer Standard and paid by the LF of sanitary sewer by-passed, as needed.
- **Sanitary Sewer, 6 or 8 or 10 inch, Tr Det B** shall include but not be limited to all labor, materials, equipment, materials, excavations and backfill necessary to install the sanitary sewer/force main in accordance with the attached Sanitary Sewer Standard. Sewer piping shall be measured horizontally along pipe centerline and paid by the linear foot, installed and backfilled. Please provide pricing for each requested project location:
 - **W. St Joe Street San. Sewer, 8" per LF**
 - **Willow Street San. Sewer, 8" per LF**
 - **Mechanic Street San Sewer, 10" per LF**
 - **Marion Street Force Main Sewer, 6" per LF**
- **Lift Station Construction**, shall include but not be limited to all labor, materials, equipment, excavations and backfill necessary to construct a new lift station, electrical components and generator per the project special provisions and project drawing pages LS 1 to LS 10. All items noted on these sheets shall be included in the Lump Sum pricing for this work.

NOTE: The force main sewer piping from the attachment at the reducer outside the valve pit and the sanitary service line from 88 Marion will be paid per the unit pricing in Section 2 of the bids for sanitary service connection at MH.

- **Sanitary Structure, 48 inch dia.** shall include but not be limited to all labor, materials, equipment, excavations and backfill necessary to construct a new precast concrete manhole structure in accordance with the attached Sanitary Sewer Standard. Structures will be measured and paid for by the unit including installation, backfill, and connections to new sewer. The unit price shall include the entire structure depth and include the cost of cleaning of the new sanitary sewer manhole, and temporary or final grade adjustments of the structure.
- **Doghouse Manhole Structure, 48 inch dia.** shall include but not be limited to all labor, materials, equipment, excavations and Class III sand backfill necessary to construct a new precast concrete manhole structure over an existing sanitary sewer in accordance with the attached Sanitary Sewer Standard and provided standard detail. The unit price shall include the entire structure depth and include the cost of cleaning of the new sanitary sewer manhole, and temporary or final grade adjustments of the structure. Structures will be measured and paid for by the unit for the street indicated in the bids.
- **Sanitary Sewer Service Connection** shall include but not be limited to all labor, materials, equipment, materials, excavations and backfill necessary to re-establish the existing sanitary sewer services from the new sanitary sewer main to right-of-way (ROW) line. These services will be measured and paid for by the unit (EA) for the connection of existing sewer services with new PVC materials from the

**CITY OF HILLSDALE
DETAILED SCOPE**

SANITARY SEWER LINING AND REPLACEMENT PROJECT INFORMATION

sanitary sewer main to the right-of-way (ROW) line. Backfill and compact with Class II sand or approved on-site material in lifts not to exceed ten inches (10”).

- **Sanitary Sewer Service Connection @ Manhole** shall include but not be limited to all labor, materials, equipment, materials, excavations and backfill necessary to re-establish the noted existing sanitary sewer service into a sanitary sewer manhole. These services will be measured and paid for by the unit (EA) for the connection of existing sewer services with new PVC materials from the sanitary sewer manhole to the identified connection point. Backfill and compact with Class II sand or approved on-site material in lifts not to exceed ten inches (10”).
- **HMA, LVSP (intended to sewer replacement and force main areas)** shall include but not be limited to all labor, materials, equipment, and materials necessary to install HMA in accordance with specification section 501 at the application rates noted in the HMA Application Estimate Special Provision. Trenches for this pay item will be a minimum of 11’ to allow for use of a paver.
- **Hand Patching, LVSP (intended for spot replacement areas)** shall include but not be limited to all labor, materials, equipment, and materials necessary to install HMA in accordance with specification section 501.
- **MDOT – HMA, LVSP, 12”** shall include but not be limited to all labor, materials, equipment, and materials necessary to install HMA in accordance with specification section 501 at the application rates noted in the HMA Application Estimate Special Provision. Trenches for this pay item will be a minimum of 11’ to allow for use of a paver.
- **Pav’t Repr, Nonreinf Conc, 12” (<72 Hours)** shall include but not be limited to all labor, materials, equipment, and materials necessary to install “high early” concrete pavement and epoxy anchored lane ties in accordance with specification section 603 and standard detail R-44-F at Mechanic Street.
- **Aggregate Base, 8”, 22A** shall include but not be limited to all labor, materials, equipment, and materials necessary to install aggregate base course in accordance with specification section 302 in the roadway excavation areas.
- **Curb & Gutter, F4; Conc Drive 6”** shall include but not be limited to all labor, materials, equipment, and materials necessary to install concrete elements in accordance with specification section 802, 803 and standard detail R-30-G. Driveway areas removed during project shall be maintained with Maintenance Gravel until final hard restoration, costs for Maintenance Gravel is considered incidental to the applicable work item.
- **Turf Restoration** shall include but not be limited to all labor, materials, equipment, and materials necessary to complete Turf Restoration in accordance with the attached special provision at all applicable excavated grass areas. Locations to be included in this LUMP SUM item include but not limited to the following areas:
 - Arch Street spot replacement area in the grass.
 - Mechanic Street restoration around MH1551 and MH1552.
 - Willow Street at locations around sanitary service line re-connections.
 - Marion Street at locations of sanitary service line re-connection and areas around the new lift station and generator.

CITY OF HILLSDALE
DETAILED SCOPE
SANITARY SEWER LINING AND REPLACEMENT PROJECT INFORMATION

- **Project Cleanup** shall include but not be limited to all labor, materials, equipment, and materials necessary to complete Project Cleanup in accordance with the attached special provision.
- **Traffic Control Items** shall include but not be limited to all labor, materials, equipment, and materials necessary to complete Traffic Control Operation in accordance with the attached special provision and Traffic Control Details as shown in the project drawings.

Miscellaneous Items – Sewer Lining:

- **CIPP Lining, 7 & 8 Inch** shall include but not be limited to all sewer flow control, pre-and post- installation CCTV inspections, pipe preparation including any root removals or stopping leaks or removal of any obstructions such as mineral deposits or protruding laterals not indicated on the drawings, installation of the proposed liner per manufacturer recommendations, reinstatement of all non-bulk headed service connections, and all labor, equipment and materials required to complete the installation according to the Contract Drawings and Specifications. Measured horizontally along the sewer through manholes, bends and closures, with no deductions for same for the types and sizes listed on the Bid Form.
- **Doghouse Manhole Structure, 48 inch dia.** shall include but not be limited to all labor, materials, equipment, excavations and Class III sand backfill necessary to construct a new precast concrete manhole structure over an existing sanitary sewer in accordance with the attached Sanitary Sewer Standard and provided standard detail. The unit price shall include the entire structure depth and include the cost of cleaning of the new sanitary sewer manhole, and temporary or final grade adjustments of the structure. Structures will be measured and paid for by the unit. Costs for HMA hand patching (4" thick) over 8" of 22A Aggregate Base material shall be included in this bid item.
- **Expose and Raise Buried Manhole Casting** shall include but not be limited to all labor, materials, equipment, materials, excavations/backfill and HMA Pavement restoration required necessary to expose and raise the existing manhole casting, utilizing adjusting rings, to street elevation. For bidding purposes it should be assumed that excavations will be limited to 12" below existing street elevation. Costs for HMA patching (4" thick) or concrete restoration (6" thick) around the casting in the street shall be included in this bid item.
- **Project Cleanup** shall include but not be limited to all labor, materials, equipment, and materials necessary to complete Project Cleanup in accordance with the attached special provision.
- **Traffic Control Items** shall include but not be limited to all labor, materials, equipment, and materials necessary to complete Traffic Control Operation in accordance with the attached special provision and Traffic Control Details as shown in the project drawings.

**CITY OF HILLSDALE
 DETAILED SCOPE
 SANITARY SEWER LINING AND REPLACEMENT PROJECT INFORMATION**

SANITARY SEWER SYSTEM WORK INFORMATION

STREET	CROSS STREETS	UP STREAM MH	DOWN STREAM MH	PROPOSED FIX	PIPE DIA. *
ARCH	URAN TO MECHANIC	1643	1642	REPLACE 10' OF PIPE	8
BUENA VISTA	ARBOR VIEW TO STATE	2235	2234	REPLACE 10' OF PIPE 1 SERVICE RECONNECTION	8
DIVISION	SUMMIT TO HILLSDALE	2177	2188	REPLACE 10' OF PIPE	8
HEATHCLIFF	BACON TO DEAD END	3340	3455	REPLACE 20' OF PIPE 1 SERVICE RECONNECTION	8
MARION	ELLEN TO LOGAN			CONST. FORCE MAIN 1 SERVICE TO CONSTRUCT	
MECHANIC	CARLETON TO ARCH	1551	1552	REPLACE ENTIRE PIPE NO SERVICES	10
ST JOE W	BARNARD TO SOUTH	2559	2560	REPLACE ENTIRE PIPE NO SERVICES	8
WILLOW	LAKE TO OAK	2016	2018	REPLACE ENTIRE PIPE 12 SERVICE CONNECTIONS	8
BACON E	CARLETON TO GRISWOLD	3069	3065	SPOT REPLACE 10' OF PIPE & CIPP LINE 3 SERVICE LOCATIONS	8
BROAD S	HALLETT TO S CITY LIMITS	1522	1521	SPOT REPLACE A 10' AND 35' PIPE SECTION & CIPP LINE 3 SERVICE LOCATIONS	7
BACON E	SUPERIOR TO GRISWOLD	2522	2523	CIPP LINE 8 SERVICE LOCATIONS	8
BACON W	GLENDALE TO HIGHLAND	3454	3453	CIPP LINE 1 SERVICE LOCATION	8
BARBER	AT UNION	2201A	2201	CIPP LINE 1 SERVICE LOCATION	8
BARBER	AT UNION	2200	2201A	CIPP LINE 1 SERVICE LOCATION	8

**CITY OF HILLSDALE
 DETAILED SCOPE
 SANITARY SEWER LINING AND REPLACEMENT PROJECT INFORMATION**

STREET	CROSS STREETS	UP STREAM MH	DOWN STREAM MH	PROPOSED FIX	PIPE DIA. *
FAIRGROUNDS	IN FAIRGROUNDS	2934	2933	CIPP LINE 0 SERVICE LOCATIONS	8
GOODRICH	WEST TO REA	3160	3131	CIPP LINE 4 SERVICE LOCATIONS	8
SOUTH E	HOWELL TO BUDLONG	1636	2546	CIPP LINE 1 SERVICE LOCATION	8
SOUTH W	NORWOOD TO READING	3436	2507	CIPP LINE 5 SERVICE LOCATIONS	8
SOUTH W	NORWOOD TO DEAD END	3433	3433A	CIPP LINE 1 SERVICE LOCATION	8
ST JOE W	SOUTH TO BACON	3284	3283	CIPP LINE 5 SERVICE LOCATIONS	8
UNION (EAST MAIN)	BARBER TO COLLEGE	1930	2201	CIPP LINE 6 SERVICE LOCATIONS	8
WEST N	COLLEGE TO FAYETTE	1848	1848A	CIPP LINE 3 SERVICE LOCATIONS	8
WEST N	COLLEGE TO GALLOWAY	1849	1848	CIPP LINE 1 SERVICE LOCATION	8

Above items highlighted in Gray are associated with a scheduled grant funded paving project and will be prioritized for completion by June 28, 2024.

Pipe diameters are provided and the best information the city has. The contractor shall field verify all information prior to completing any work including lining. The city will not be responsible for additional costs incurred if pipe diameters differ from the above.

Refer to the sanitary sewer pipe reports, tabular reports, and miscellaneous pictures provided as an alternate document for further information on the pipe sections noted above.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
MOBILIZATION**

DESCRIPTION

This work shall be done in accordance with Section 150 of the MDOT 2012 Standard Specifications for Construction and as specified herein.

CONSTRUCTION

Work shall include the preparatory work and operations including, but not limited to, the following:

- Preparatory work and expenses incurred prior to beginning work onsite.
- Transport materials, personnel, and equipment to the job site.
- Establishment of temporary onsite construction facilities, if required.
- Provided insurance, bonds, and other costs associated with the project in general and not included in other pay items.
- Coordination with property owners.
- All required submittals.

MEASUREMENT AND PAYMENT

This pay item is as listed and will be paid as follows each individual Pay Item:

- 50% of the Mobilization payment will be made after 5% of the applicable section contract amount is earned and billed.
- Final 50% payment will be made after 25% of the applicable section contract amount is earned and billed.

PAY ITEM

PAY UNIT

Mobilization – Water Valve Replacement.....Lump Sum (LS)
(Max. 5% of Bid Amount of Section 1)

Mobilization - Insert Valve.....per Trip

This pay item will be paid per the trip to Hillsdale to complete the scheduled work which may include multiple valve installations on the same day. This pay item is not subject to above contract completion requirements for Mobilization payment.

Mobilization – San. Recon./Force Main/Spot Replace Section.....Lump Sum (LS)
(Max. 5% of Bid Amount of Section 2)

Mobilization – Sanitary Sewer Lining.....Lump Sum (LS)
(Max. 5% of Bid Amount of Section 3)

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
PAVEMENT SAWCUT STREET SURFACE**

a. Description. This work consists of sawcutting concrete and HMA roadway Pavement ONLY. Sawcutting of sidewalk concrete and curb/gutter and other similar items are considered incidental to that work and area not paid with this item of work.

b. Materials. None specified.

c. Construction. Sawcut concrete or HMA street surfaces at locations shown on plans and as directed by the Engineer. In removing old pavement, curb, gutter, sidewalk, crosswalk and similar structures, where portions of the existing structure are to be left in the surface of the finished work, remove the old structure to existing joints or saw to a reasonably true line with a vertical face. Perform sawcuts with a power driven concrete saw to the full depth of the item being sawcut.

Take precautions to maintain a clean vertical edge on the sawcut throughout the duration of the work. Any resawing or additional removal and replacement of pavement, curb and gutter or sidewalk which may be necessary due to Contractor carelessness will be at the Contractor's expenses.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price for the following pay item:

PAY ITEM

PAY UNIT

Pavt Sawcut Street SurfaceLineal Foot (LF)

Pavt Sawcut will be measured by length and will be paid for all sawcutting of HMA and concrete pavement.

Payment for this item will not be made when pavement is removed by a milling machine or other method that does not require a sawcut.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
PAVEMENT & HMA REMOVAL, MODIFIED**

a. Description. This work consists of removing existing concrete, brick and HMA pavement in accordance with sections 204 and 501 of the MDOT Standard Specifications for Construction, except as modified herein. The existing pavement thickness varies and are estimated as noted below:

- M-99 (N. Carleton Hwy) – 8” non-reinf. concrete overlaid with 4” HMA (Water Valve Replacement Location)
- M-99 (S. Broad St) – 12” HMA (Sanitary Sewer Spot Replacement)
- City Streets (unless otherwise noted) -- 4” to 5” thick HMA (Water Valve and Sanitary Sewer Project Locations).

S. Howell St. south of Bacon – estimated 4” to 5” thick HMA underlain by 1 or 2 courses of brick (Water Valve #309 Replacement Location)

b. Materials. Use Granular Material Class II in conformance with section 902 of the Standard Specifications for Construction for backfill.

c. Construction. Remove the existing pavement to sawed joints at removal limits as indicated required. Protect existing utilities during removal operations.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price for the following pay items:

Pay Item	Pay Unit
Pavt, Rem, Modified.....	Square Yard
HMA Surface, Rem, Modified	Square Yard

Removal of concrete and masonry pavements including any overlaying HMA surface, will be paid as **Pavt, Rem, Modified** and will be measured in place from edge to edge of pavement and to saw cut limits, excluding curb and gutter. **Pavt, Rem, Modified** will be paid for as one quantity, regardless of the thickness or composition of pavement being removed.

HMA Surface, Rem Modified will be measured in place from edge to edge of pavement and to saw cut limits. **HMA Surface, Rem Modified** will be paid for as one quantity, regardless of the thickness of the pavement being removed. Removal of the HMA surface overlying a concrete or masonry pavement is considered part of the underlying material (regardless of thickness) and will be included in the quantities of **Pavt, Rem, Modified**.

Curb and gutter removal will be paid for separately as Curb and Gutter, Rem.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
WATER SYSTEM STANDARD**

PART ONE - GENERAL

1.01 Description

- A. The CONTRACTOR shall furnish all labor, materials, and equipment required to construct water main, and all necessary appurtenant work as herein specified. The water main shall be installed in the locations as shown on the plans and shall meet the line acceptance tests.

1.02 Testing

A. General

1. Furnish all equipment and personnel to conduct system acceptance tests as specified herein. All tests shall be conducted under the supervision of the ENGINEER. No acceptance tests shall be conducted until the entire system is constructed or just prior to placing the system in service, provided the water main has been installed and backfilled for not less than 30 days.
2. All water mains, branches, and valves shall be tested for pressure, leakage and disinfection.
3. Should the results of any test fail to meet the criteria established in this Specification, the CONTRACTOR shall at his own expense, locate and repair rejected section and retest until it is within specified allowance.
4. Provide all labor, supervision, pumps, measuring devices, power and other material and equipment necessary for conducting acceptance tests on all piping.

B. Preparation

1. After the pipe has been laid and backfilled as specified, the CONTRACTOR shall fill the line, or a valve section thereof, to be tested with water in such a manner as to expel all air from the pipe. This may be done through fire hydrants at the high points; or, if no hydrant is available at such point, the CONTRACTOR shall make the taps necessary to accomplish the expulsion of all air. At the close of the test all taps shall be satisfactory plugged with brass plugs.
2. Only City of Hillsdale personnel or the CONTRACTOR under direct supervision of City of Hillsdale personnel may fill or flush lines.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
WATER SYSTEM STANDARD**

C. Sequence

1. All water mains connected to an existing water system shall be flushed, chlorinated and bacteriological tested prior to pressure testing. The sequence for acceptance testing shall be:
 - a. Flushing
 - b. Chlorination
 - c. Flushing
 - d. Bacteriological Testing
 - e. Pressure Testing

2. Where mains can be totally isolated from the existing water system with air gaps, pressure testing shall precede chlorination and bacteriological testing. The sequence for acceptance shall be:
 - a. Pressure Testing
 - b. Connect to system
 - c. Flushing
 - d. Chlorination
 - e. Flushing
 - f. Bacteriological Testing

D. Flushing

1. Mains shall be flushed with clean potable water until the water runs clear. When flushing mains prior to chlorination; all hydrants heads, operating stems and hydrant valves mechanisms shall be removed.

E. Chlorination

1. All disinfection of water mains shall be in conformance with AWWA standards 651-92.

2. All new mains and pipes and existing mains contaminated by the CONTRACTOR shall be chlorinated to a minimum residual chlorine concentration of fifty (50) parts per million with commercial liquid chlorine solution or approved equal. The chlorinated water shall be allowed to stand in the mains for 24 hours. At the end of the 24-hour period the chlorinated water at all parts of the mains shall show a free available chlorine residual of not less than twenty-five (25) parts per million. If less than twenty-five (25) parts per million residual is shown at the end of the first 24 hour period, additional chlorine shall be added until a residual of not less that twenty-five (25) parts per million at all parts of the system is shown after a subsequent 24 hour period. The chlorinated water shall then be removed from the mains and the mains flushed with potable water for bacteriological testing.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
WATER SYSTEM STANDARD**

F. Bacteriological Testing

1. The OWNER will take bacteriological samples of the water in the mains for analysis at two different times. The first samples will be taken 24 hours after the mains have been satisfactorily chlorinated, flushed and filled with potable water. The second sample will be taken 24 hours later. Each sample will be incubated for 24 hours.
2. The CONTRACTOR shall provide a sufficient number of corporation cocks and copper tubing for taking samples. Samples shall not be collected from hoses or fire hydrants.
3. Bacteriological testing will begin on Mondays to afford the City of Hillsdale personnel and the testing laboratory a full work week to conduct the testing.
4. The CONTRACTOR shall not be permitted to put the water main into service until two consecutive satisfactory tests have been produced.

G. Pressure Testing

1. All pressure testing shall be in conformance with AWWA standard C600-93.
2. All pipe laid under this contract shall be subject to a hydrostatic pressure of 150 psi on the elevation of the lowest point in the system. The main shall be maintained under the test pressure for a minimum continuous period of 2 hours by pumping potable water into the line at frequent intervals. The volume of water so added shall be measured and considered to represent the leakage from the main. No pipeline installed will be accepted until the leakage is measured over a 1 hour period is less than 0.092 gallons per inch diameter of the pipe per 100 feet. All visible leaks must be corrected. The maximum length of water main to be tested at one time shall be 2000 feet.
3. If the CONTRACTOR chooses to pressure test against an existing valve he assumes the responsibility of meeting the leakage requirements. The CONTRACTOR may at his discretion provide a physical break and cutting in sleeve for pressure test.

PART TWO – PRODUCTS

All materials shall be of U.S. or Canadian manufacture. All standards shall be the latest edition. The Contractor shall direct all requests for any variances to the Engineer in writing. The manufacturer shall supply a sworn statement (certification) that all pipe, hydrant, valves, fittings, gaskets, and all appropriate appurtenances furnished comply with the standards referenced in these specifications. Catalog cuts for all materials to be installed shall be provided to the Engineer for review. No materials shall be installed prior to the approval of the catalog cuts by the Engineer.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
WATER SYSTEM STANDARD**

2.01 Pipe and Fittings

A. Ductile iron pipe water main shall meet all the requirements of the latest revision of the American National Standard Institute (ANSI) Specifications, A21.51 and the American Water Works Association (AWWA) Specification C151. All joints excepting joints for valves and hydrants shall be “push on.” Pipe shall be furnished in 18 or 20 Ft. lengths, unless otherwise required. The pipe shall meet the thickness class requirements shown in the table below.

Size Diameter	Nominal Inches	inside	Thickness Class
4			52
6			52
8			52
10			52
12			52
14			54
16			54
18			54
20			54
24			54

B. Pipe shall withstand a working pressure of 125 psi plus a 100 psi surge pressure.

C. Pipe shall be cement-lined and seal coated with an approved bituminous seal coat in accordance with ANSI Specification A21.4 (AWWA C-104).

D. Ductile iron or cast iron fittings shall meet all the requirements of the latest version of the ANSI specification A21.10 for a working pressure of 125 psi and be of the mechanical joint type. Plugs, where shown on the plans, shall be solid mechanical joint plug type.

E. Mechanical joints shall be in conformity with the requirements of the latest revision of the ANSI specification A21.11.

F. All nuts and bolts shall be Cor-Blue or Stainless Steel or equal, as approved by the City of Hillsdale Water Superintendent.

G. Push on joints shall meet all the requirements of the latest revision of AWWA specification C111. Push-on joints shall consist of a molded rubber gasket to affect the joint seal. A rubber gasket and sufficient lubricant to assemble the joints shall be furnished with each joint. The lubricant shall have deleterious effect upon the color, taste, or odor of potable water and shall not be corrosive to either the pipe or gasket. Pipe furnished with push-on type joints shall be equal in strength and leak

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
WATER SYSTEM STANDARD**

tightness to pipe furnished with mechanical joints as specified when installed under identical conditions, and shall meet all other requirements of these specifications. In addition to the above mentioned requirements, the gasket and lubricant shall conform to the latest revision of the ANSI specification A21.11.

H. PVC PRESSURE PIPE

1. PVC pressure pipe water main shall meet all the requirements of the latest revision of ANSI/AWWA C900 or ANSI/AWWA C905. PVC water main shall be manufactured from compounds conforming to PVC cell classification of 12454 as defined in ASTM D1784. PVC C900 and C905 pipe shall conform to DR18. Pipe shall be furnished in twenty-foot lengths.
2. Restrained Joint PVC pipe shall utilize either JM Eagle Eagle Loc 900 restrained joint system or CertainTeed Certa-Lok restrained joint system. Fusible PVC pipe by Underground Solutions may also be used as an alternate to restrained joint pipe in open cut applications, with prior approval.
3. Fittings to be used with PVC pipe shall meet all the requirements of the latest revision of ANSI/AWWA C110/A21.10 for full body ductile iron fittings and ANSI/AWWA C153/A21.53 for compact ductile iron fittings and be of the mechanical joint type.
4. Mechanical restraint devices for PVC pipe shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10. Twist off nuts shall be used to insure proper actuating of the restraining device. Restrained mechanical joints for PVC pipe shall be Megalug, Series 2000PV by EBAA Iron, or approved equal. Bolts and nuts for buried service shall be made of non-corrosive, high-strength, low-alloy steel having the characteristics specified in ANSI/AWWA C111/A21.11.
5. PVC pipe shall incorporate a formed bell complete with a single rubber gasket conforming to ASTM F477. Joints shall be designed to meet the zero leakage test requirements of ASTM D3139.
6. Pipe shall be marked per AWWA C900 or AWWA C905, and shall include as a minimum:
 - Nominal size
 - PVC
 - Dimension Ratio, Standard Dimension Ratio or Schedule
 - AWWA pressure class or rating
 - AWWA Standard designation number
 - NSF-61 mark verifying suitability for potable water service
 - Extrusion production-record code (if applicable)

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Trademark or trade name

Cell Classification 12454 and/or PVC material code 1120 may also be included.

7. Should PVC Pressure pipe be used water main be installed on this project tracer wires will be required per the attached per the attached Trace Wire Specification.

2.02 Valves

A. All valves installed under this Specification shall conform to the applicable requirements of AWWA C500, C504, and C509 standards governing construction materials and workmanship. Each valve shall carry the name or trademark of the manufacturer. All valves shall have operating nuts that turn to the left (counterclockwise) to open.

B. Resilient Seated Gate Valves

1. Gate valves shall be resilient seated type unless otherwise noted. Resilient seated gate valves shall have a cast or ductile iron body and bonnet. Valves shall have a minimum non-shock W.O.G. working pressure of 200 psi. The wedge shall be ductile iron encased in a bonded-in-place styrene-butadiene elastomer covering to form resilient seating surfaces. Stem shall be bronze of non-rising design with double O-ring packing.
2. Resilient seated gate valves shall be manufactured by Waterous, American Flow Control or Clow.

C. Butterfly Valves

1. Butterfly valves shall have a cast iron body, neck and top piece with a minimum non-shock W.O.G. working pressure of 150 psi. Seats shall be Hycarbuna "N" providing leak-proof shut off with the disc and acting as a body liner to prevent corrosion. Disc shall be NI-resist cast iron with a 304 stainless steel shaft rotating in permanently lubricated bearings. Stem seal shall be Hycarbuna "N". Joints shall be flanged. Flanged to mechanical joint adapters shall be provided for each valve.
2. Butterfly valves shall be manufactured by Henry Pratt Company.

D. Swing Check Valves

Valves shall have a cast or ductile iron body and bolted cap with a minimum non-shock W.O.G. working pressure of 150 psi. Seats shall be bronze and shall be screwed into the valve body. The disc shall be bronze or cast iron with permanently rolled in bronze faces. The disc hinge pin shall be aluminum bronze or stainless steel riding in bronze bushings, one on each side of the valve. Valves shall have ANSI 125 pound standard drill flat faced flanges unless

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otherwise specified or shown on the Plans. Valves shall have outside weighted arm.

E. Air Release Valves

Air release valves when specified shall be designed to operate under a maximum operating pressure of 300 psi and capable of venting 200 CFFAS (cubic feet of free air per second). Valves shall be cast iron with bronze internal parts and Type 304SS float.

F. Insertion Valves

Insertion Valves will be a resilient wedge gate valve designed for use in potable water, raw water, reclaimed water, sewage, and irrigation. The design will allow the valve to be installed into an existing pressurized pipeline while maintaining constant pressure and service as usual. After closing the wedge and adequately restraining the valve body the downstream pipe can be completely removed and replaced (allowing for upsizing of the pipe if necessary or required). The host pipe must not be a permanent component of the Insertion Valve.

Insertion Valves must have a stainless steel or ductile iron body with a pressure rating that meets or exceeds the requirements of AWWA C515. The heavy-duty ductile iron construction should meet ASTM A536 Grade 65-45-12. Sizes 12" and smaller must be capable of working on Cast/Grey Iron or Ductile Iron Class A, B, C and D, IPS PVC, C900 and C909 PVC, Steel, AC pipe diameters without changing either top or bottom portion of split valve body.

The Insertion Valves will be fully epoxy coated on the interior and the exterior and the coating must be applied before assembly. The Insert Valve must be coated with a minimum of eight mils epoxy in compliance with AWWA C550 and certified to ANSI/NSF-61.

The construction of the resilient wedge must comply with AWWA C509 requirements. The ductile iron wedge will be fully encapsulated with EPDM rubber by a high pressure and temperature compression or injection mold process. This will assure the ductile gate is fully coated with molded rubber-no exposed iron. The resilient wedge must seat on the valve body and not the pipe to obtain the optimum seating and flow control results. The resilient wedge will be totally independent of the carrier pipe. The resilient wedge must not come into contact with the carrier pipe or depend on the carrier pipe to create a seal. Pressure equalization on the down or upstream side of the closed wedge will not be necessary to open the valve. The wedge must be symmetrical and seal equally well with flow in either direction. The resilient wedge must ride inside

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the body channels to maintain wedge alignment throughout its travel to achieve maximum fluid control regardless of high or low flow pressure or velocity.

Valves must have a gate valve stem and wedge nut that is stainless steel in accordance with Section 4.4.5.1 of the AWWA C515 Standard and must be capable of being installed under a line pressure of up to 250 psi without service disruption. The NRS stem must have an integral thrust collar in accordance with Section 4.4.5.3 of AWWA C515 Standard. The valve bolting materials must develop the physical strength requirements of ASTM A307 with dimensions conforming to ANSI B18.2.1.

The stuffing box, operating stem and resilient wedge will be removable, repairable and or replaceable under pressure.

The split restraint device must consist of multiple gripping wedges incorporated into a follower gland meeting ANSI/AWWA C110/A21.10. The devices must have a working pressure rating of 350 psi for 4-12". Gland body wedges and wedge actuating components must be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536. Mechanical joint restraints must require conventional tools and installation procedures per AWWA C600, while retaining full mechanical joint deflection during assembly as well as allowing joint deflection after assembly.

All parts and components to be exclusively and completely assembled, manufactured, machined and coated in the USA.

All physical and chemical test results shall be recorded such that they can be accessed via the identification number on the casting. These Material Traceability Records (MTR's) are to be made available, in hard copy, to the owner should they request such documentation.

All components shall be manufactured and assembled in the United States.

Hydra-Stop Insta-Valve 250 is an approved Insert Valve product.

G. Corporation Stops

One inch corporation stops shall be FB1000-4-NL ballcorp, CC taper thread, pack joint outlet for copper or plastic CTS. All stops shall have bronze cast bodies, keys, stem washers and nuts. Inlet threads shall conform to the latest revision of AWWA C800. The outlet connection shall be a compression fitting Q style.

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H. Valve Boxes

Valve boxes 5 ¼" shall be of cast iron construct iron. They shall be of three-piece, screw type adjustment design. All valve boxes shall be installed flush with the top of the proposed site grade. Covers shall be designed to be removed easily to provide access to the valve. The base shall not rest upon the valve assembly. All valve boxes shall be Tyler Pipe 6860 Item D with a number 6 base.

I. Gate wells

1. Brick for grade adjustment of gate wells shall meet the requirements for "medium brick" of the Standard Specifications for Clay Sewer Brick, ASTM Serial Designation C32, or the latest revision thereof.
2. Mortar for masonry or plastering outside of gate wells shall be made of one part of Portland cement to two parts of sand. Mortar materials and mixing shall correspond, in general, to those for concrete.
3. Reinforced concrete gate wells shall conform to the latest revision of ASTM Specifications for Pre-cast Reinforced Concrete Manhole Sections, Serial Designation C478, with rubber gasket joints.
4. All gate well component parts shall have the name of the manufacturer stenciled on the inside. The lettering shall be a minimum of 4 inches high.
5. Steps shall be plastic-coated steel. They shall be M.A. industries PSI-PF, or equal.
6. Frames and covers shall be cast iron conforming to the Standard Specifications Castings, Serial Designation A48, or the latest revision thereof, East Jordan No. 1040 with type C cover, Neenah No. R-1642, with type C solid cover with two (2) ¾ inch holes, or equal. They shall have machined bearing surfaces and suitable notches for convenient removal of the cover. Covers shall have the letters "Water System" cast integrally with the cover. All frames and covers shall be coated at the point of the manufacturer with coal tar pitch varnish or other approved asphaltum coating.

2.03 Service Leads

- A. Pipe for service leads 1 inch to 2 inch shall be soft annealed Type K copper, HPDE pipe SDR 11, or CTS Poly Pipe SDR 9 with tracer wire similar to that laid with water main when approved by the Engineer.
- B. Curb Stop: 1 inch to 2 inch curb stops for service connections shall be Ford Type B44 pack joint for Copper or Plastic CTS, Minneapolis Patter or equal as approved by the Engineer. All parts shall be cast from bronze and compression connections on both ends.
- C. Curb Boxes: All curb boxes shall be two piece Minneapolis pattern, adjustable with pent. All curb boxes shall be coated inside and out with a tar base enamel.

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2.04 Fire Hydrants Assembly

- A. Fire hydrants shall comply with the latest revision of AWWA Standard, C502. Hydrants shall be compression type to close with the pressure. They shall have a 5 1/4" valve opening and 6" mechanical joint inlet. Hydrants shall have two 2 1/2" hose connections and one 5" Stortz fitting pumper connection.
- B. Fire hydrants shall have inside barrel dimension of not less than 6" I.D. from top to bottom. The 1 1/8" pentagon operating nut shall open left (counter clockwise).
- C. All nozzles shall be on a removable head with a flange so that they may be rotated by changing the position of the flange.
- D. Hydrant shall be fully bronze mounted, including top of the operating stem where it passes through the double O-ring seal in the bronze packing gland. The forged operating stem in the base and the valve seat shall also be of bronze. The molded valve shall be of composition rubber and the cast iron valve clamps shall be packed with O-ring seals and held tight to the stem by a threaded bronze hex retainer ring and threaded bronze locknut, anchored with set screws.
- E. Hydrant shall be designed for 250 psi working pressure and tested to 300 psi. Those portions of the hydrant above grade shall have two coats of red enamel. All unpainted surfaces shall have two coats of coal tar pitch varnish.
- F. The hydrants shall be East Jordan Part #55971D HYD 6'-0" Bury, MJ Connection, Open Left, 2 drains tapped and plugged, 1HS AWWA Standard, C502 or similar approved by the Engineer.
- G. All fire hydrants assemblies shall be equipped with a gate valve and box. The cost of the gate valve and box shall be included in the cost of the hydrant.

2.05 Tapping Sleeves and Valves

- A. Tapping sleeves, when specified, shall be full length of heavy-duty stainless steel construction designed for use with the type of pipe to be tapped. Tapping sleeve body shall be 18-8 type 304 stainless steel. Flange shall be CF8 cast stainless steel. Gasket shall be full circumferential SBR compound for water service. Tapping sleeve shall contain a test plug to assure seal prior to tapping. Tapping sleeve shall be JCM Industries, type 432; Romac Industries type SST; or equal.
- B. Tapping valves shall meet the specification for gate valves except that the valve shall have a flange compatible with the tapping sleeve. Tapping valves shall be Waterous resilient wedge or equal.

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PART THREE – EXECUTION

3.01 Pipe Installation

- A. Any pipe damaged in transport or handling shall be rejected and removed from the site of the work.

- B. In handling and placing ductile iron pipe and fittings, no metal shall be used in contact with the inside of the pipe to fit or support the pipe. The pipe shall be moved only through the use of belt slings or automatic release type pipe tongs. Care shall be taken not to injure the pipe or pipe coating, and no damaged or imperfect pipe shall be used in the work except that minor damage to pipe coating may be repaired subject to the review of the ENGINEER.

- C. The main shall be laid on a compacted sand cushion, 4 inches thick. Sand backfill material shall be placed around and above the main as per the trench detail included in the plans. Sand shall be compacted in 9 inch lifts to not less than 95 percent of the maximum unit density as determined at optimum moisture content. Sand shall conform to Class II granular as defined in 2003 MDOT 902. Pipe shall be laid with a minimum cover of 6 feet with a minimum 10 foot horizontal separation and 18 inch vertical separation from existing sewer.

- D. All pipe and fittings shall be carefully lowered and moved into position in the trench or vault in a controlled manner such as will prevent damage to the pipe and its coating and lining.

- E. In assembly of push-on or shove type joints, the bell socket recess and the gasket shall be wiped clean and the gasket placed properly in position. A thin film of lubricant shall then be applied to the surface of the gasket to come into contact with the entering pipe. The plain end of the entering pipe shall be cleaned and then entered and forced home to the base of the socket. Where pipe is cut, the entering end shall be beveled before being inserted in the joint. Where time permits drying, the cut and beveled end shall be coated with coal tar enamel.

- F. To prevent trench water from entering the pipe, joints which for any reason may not be completed as the pipe is laid shall be thoroughly packed with approved material, in a manner to make them watertight. Open ends of fittings shall be tightly closed with approved plugs and well packed, as shall the end of the last pipe laid whenever work is not in progress.

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- G. Each pipe shall be laid accurately to the live and grade shown on the Plans. Whenever it is necessary to deflect pipe from a straight line, either in the horizontal or vertical plane, to avoid obstructions, or where long radius curves are permitted, the amount of deflection allowed shall not exceed that required for satisfactory jointing and shall be reviewed by the ENGINEER. In no case shall deflection of joints exceed the manufacturer's recommended maximum deflection.
- H. The CONTRACTOR shall not be entitled to any additional compensation because depth is more than specified at certain locations or due to clearances at manholes, or due to unforeseen obstacles, or occasioned in order to avoid undue changes in grade.
- I. The trench shall be backfilled closely behind the pipe laying. Unless otherwise directed or permitted by the ENGINEER, the backfilling shall follow at least two lengths behind pipe laying and shall be completed to the top of the trench not more than ten lengths behind pipe laying.
- J. External anchorage designed to hold the pipe to the proper line and grade against internal static and dynamic forces and external loads shall be provided at all tees, wyes and plugs, and wherever the pipe is deflected from a straight line and the resultant forces are not self-contained through the use of flanges, anchor ties and the like. Concrete thrust blocks or anchorage shall be 3000 PSI concrete.
- K. Air release valve and manhole shall be constructed where shown on the Plans. All castings and manholes shall be as specified under gate wells. Gate wells shall be constructed in accordance with the details shown on the Plans. All castings shall be as specified under gate wells.

3.02 Service Leads

- A. Service leads shall be installed where shown on the Plans. All service taps shall be the "wet" method type and no tap shall be made until the acceptance test has been conducted and the line is under pressure.
- B. Water service connections shall be constructed with a minimum of five feet cover, at right angles to water main between main and curb stop. Service taps should be located at ten o'clock or two o'clock on the circumference of the pipe.
- C. When crossing a paved street, the service lead shall be jacked under the pavement. Auguring and/or jacking requirements on paved streets for the installation of pipe less than 2 1/2" outside diameter shall be made by a "compactor" type machine or similar method without removing existing soil, if soil condition permit.
- D. Refer to Tracer Wire Special Provision if plastic service material is used for service leads.

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3.03 Hydrants

- A. Fire hydrants shall be constructed in accordance with the details shown on the Plans. Finish grade level to center of nozzle caps shall measure between 24 and 30 inches unless shown otherwise on the Plans. A maximum of one hydrant barrel extension and one operating stem extension may be used to accommodate changes in grade. Under no condition shall extended hydrant have more than one coupling in the operating stem. Pumper connection shall point toward the street.

- B. Fire hydrants shall be installed with barrel vertical and properly based. Concrete thrust blocks shall be placed behind the hydrant, tee, and every bend. Care should be taken to insure that the drain holes on the hydrant are not plugged by the thrust blocks. Hydrant shall be set in 1 yard of coarse gravel for drainage purposes. If ground water is encountered, the drain hole shall be plugged as directed by the manufacturer. The backfill shall be Class II sand thoroughly tamped around the hydrant and valve box in a maximum of ten-inch (10") layers.

- C. Fire hydrant and gate valve shall be set apart 14 inches. Gate valves and valve box shall be as specified under the valve paragraphs of the Section.

3.04 Connection to Existing Mains

- A. When making a dry connection to an existing main, the existing main to which a connection is to be made shall be isolated by the closing of the necessary existing valves, and the water from the existing main shall then be piped out or removed by other means so the connection may be made in the dry.

After the connection has been acceptably made, the portion of the new line to the nearest valve shall be satisfactorily tested and disinfected, along with the drained portion of the existing main, before the isolated existing main is placed back in service, except as the ENGINEER may otherwise direct. In as much as residents served by this isolated main will be temporarily out of water during this period, the work shall be prosecuted as rapidly as possible, and the time of , and the procedure in, making such connections shall be subject to the review of the ENGINEER. Such work may be required to be done at night in order to minimize inconvenience of water users. The CONTRACTOR shall not be entitled to any additional compensation because of night work or other special requirement in work under the Section.

- B. The CONTRACTOR shall make particular effort, prior to bidding, to ascertain whether or not valves in the existing mains to be connected to the new mains are so located as to provide isolation. If valves are not found to be adequate, then the CONTRACTOR shall utilize other means to make the connection with a minimum of interruption to service.

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- C. When making a wet tap connection to an existing main, a tapping sleeve designed for the type of pipe being tapped shall be utilized and the tap shall be made in accordance with the manufacturer of the tapping equipment.
- D. Wherever adapters are required to properly connect the pipe with existing pipe or other material or manufacturer, the nominal I.D. of adapter shall be the same size as the nominal diameter of pipe connected thereto. Adapter shall also be furnished and used as required by the manufacturer for connection to fittings.

3.05 Thrust Blocks

- A. The Contractor shall furnish and place horizontal and/or vertical thrust blocks at all plugs, caps, tees and fittings whether or not indicated on the drawings unless otherwise specified. The cost of thrust blocks shall be included in the unit price bid per foot of water main. The inspector or Engineer shall approve all thrust blocks of any nature prior to backfilling.
- B. In unstable soil conditions, the thrust blocks are to be supported by piling driven to solid foundations or by removal of the unstable soils and replacement with ballast of sufficient stability to resist the thrusts. The thrust blocks are to be approved by the Engineer before backfilling. The cost of piling or ballast at thrust blocks shall be included in the unit price bid per foot of water main.

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DESCRIPTION

This work includes the replacement of existing water service line and reconnection to the water main.

This work shall be in accordance with this special provision and the applicable section of the MDOT 2012 Standard Plans and Specifications.

Lead and/or galvanized pipe water service lines (LSL) may exist between the curb box and water meter located inside the house or in a meter pit outside the house/building.

Should any portion of the existing water service line be a LSL no partial replacement of the water service line will be allowed and all LSL shall be removed during the same replacement.

For the protection of underground utilities and in conformance with Public Act 174 of 2013, the Contractor shall contract the Miss Dig system, Inc. by phone at 811 or 800-482-7171 or via the web at either elocate.missdig.org for single address or rte.missdig.org, a minimum of 3 business days prior to excavation, excluding weekends and holidays.

The Contractor shall contact the Engineer to schedule work that may interfere with existing water service. Approval of temporary shut off shall be obtained from the City of Hillsdale.

MATERIALS

Any materials supplied by the Contractor shall be new, meeting the specifications contained herein.

All nuts and bolts shall be Cor-Blue, Stainless Steel or equal to be approved by the City's Water Superintendent. All pipe, pipe fittings, etc. shall be stamped with the appropriate NSF markings and Made in America or Canada.

Water Service Leads

Copper tubing, shall be Type K, soft annealed, in accordance with ASTM B88. The size of tubing shall match the existing size of the water service being replaced, expected to be 1" (some may be ¾"). The fittings shall conform to ASTM B16.26, cast copper alloy. Joints of the copper tubing shall be flared. All water services to be constructed from the curb-stop to the building.

HDPE SDR-11, in accordance with ASTM D3350.

CTS Poly Pipe 200 PSI – PE 3408/PE4710, SODR 9 conforming with ASTM D2737 and any other applicable standards.

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Tracer Wire, Grounding and Termination/Access Boxes (for use with HDPE or CTS Poly piping alternate)

Tracer wire, grounding and termination/access boxes shall be provided and installed as specified in the attached applicable sections of the MRWA specifications and details attached.

CONSTRUCTION METHODS

- New water service lines shall be installed utilizing a method determined by the contractor.
- Construction methods shall be submitted for approval by the City at the pre-construction meeting. This plan will be discussed, reviewed and possibly revised prior to commencement of the work.
- During the water service installation process, all valves serving the house/building shall be turned off to prevent particles from entering water system.
- Upon commencing work on any segment of a lead service line no segment of the water service line shall be used for water service until all segments of a water service line is replaced.
- All joints, fittings, and valve connections shall be exposed during a test period. The contractor shall contact the Engineer and/or Water Superintendent for an inspection to ensure that work has been done correctly and to properly record the work for the City's records.
- The contractor shall excavate the curb box which is typically located near the sidewalk or property line. These curb stops will located by city staff through a MISS DIG request.
- Curb stops may be replaced during this work. If not otherwise noted for replacement in the contract documents the Contractor shall coordinate the need for these replacements with the City's Water Department Staff.
- The water service line inside the house/building on the inlet side of the water meter shall also be disconnected by the contractor.
- Work interior to the building shall be completed by a licensed plumber. All parts required for work by the plumber shall be supplied by the plumber. Any meter horns or water meters will be supplied by the city, as needed
- The plumber shall connect the new water service to the existing stub extending from the existing curb stop.
- The contractor/plumber shall install a new water shutoff valve on the new water line inside the home before the water meter connections.
- The opening in the wall at the location where the service line extends through the foundation of the house/building shall be enlarged by the contractor, if necessary. Any new or existing cored or enlarged holes for the water services shall be sealed with Fosrock, Preco Plug or equal between the piping and the hole.
- If it is necessary for the contractor to excavate on the outside of the building foundation to facilitate installation of the water service line, such work shall be completed in a manner that causes the least amount of disruption to yard areas and other locations near the house/building.

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- Prior to reconnecting the water meter, the new service line shall be thoroughly flushed with sufficient water volume and velocity to remove all foreign material from within the pipe. If material within the pipe damages or plugs a customer's meter or service piping, the contractor shall be responsible for the cost of all repairs to the service line and related plumbing.
- Following reconnection of the service line, an outside faucet shall be turned on for a period of at least two minutes to further flush any foreign material from the service line.
- The Contractor will secure any required inspections to ensure that work has been done correctly and properly documented by city staff.
- The Contractor shall provide to the resident the City's standard "Flushing Instructions" at completion of the water service replacement work.
- The excavation and installation process shall be performed in a manner to allow placement of the new service line at a final cover depth of a five (5), minimum below finished grade regardless of the depth of the existing water service.

PERMITTING AND ACCESS AGREEMENTS

- The city will secure the required Consent Agreements from the residents to complete the work on the house side of the right-of-way line should this work be required.
- City staff will assist the contractor in coordinating access to complete this work.
- As part of our agreement with the Hillsdale County Building Department a plumbing permit is not required to be acquired for this work, however **all work interior to the building shall be completed by a Licensed Plumber.**

EXCAVATION

Contractor shall furnish all labor, equipment, and materials necessary to expose all parts of the water service system necessary to replace the existing water service line and, if applicable, remove or abandon the replaced water service line. Except where otherwise approved by the engineer, contractor will cut pavement/sidewalk to an appropriate dimension to carry out the appropriate repair.

Except where otherwise approved by the engineer, all excavations necessary to complete the water service replacement (under driveways, approaches, and sidewalks) shall be backfilled utilizing Class II sand backfill compacted to 95% of the material's maximum density. All such excavations shall be capped off by placing 12 inches of 21AA crushed limestone matching the existing base course elevation.

All excavations with the lawn/green belt areas are to be backfilled with the excavated material, well graded, and free of any debris and compacted in a maximum of 12" lifts. These excavations shall be filled to the level of the adjacent ground and left smooth. When weather permits, the top three (3) inches of backfill material will be removed and three (3) inches of screened topsoil will be placed in the excavation. Seed and mulch will be placed per the **TURF ESTABLISHMENT** Specification.

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Temporary restorations shall be maintained at the contractor's expense until the contractor has performed final restorations.

SAFETY

- Contractor(s) shall adhere to all safety procedures (or processes) that have been mandated by all applicable federal and state safety regulations, safe practice, using materials, tools, and rigging of a safe character.
- Contractor shall strictly comply with these laws, rules, and regulations including, but not limited to, OSHA and MIOSHA requirements, including without limitation MIOSHA "Right to Know" obligations, Michigan Occupational Safety and Health Act of 1974 and shall provide documented evidence of compliance upon request.
- Contractor shall provide and use all necessary guards, railing, barricades, excavation boxes and other protective devices to permit a safe working environment for contractor's employees, other contractors in the area of work site, city employees, and the public.
- The employees of the contractor shall wear the appropriate safety protective gear such as safety glasses, side shields, hearing protection, and any other gear deemed required to wear within the construction site.
- Contractor shall comply with OSHA and MIOSHA confined space requirements and procedures.
- Contractor must make the engineer aware of safety violations or any injuries that have occurred on job sites.

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MEASUREMENT AND PAYMENT

The completed work as measured for Water Services will be paid for at the contract unit prices for the following contract items (pay items):

<u>PAY ITEM</u>	<u>PAY UNIT</u>
Water Service Replacement, Long, 1 Inch	Each
Water Service Replacement, Curbstop into Home	Each

Water Service Replacement of the type and diameter specified will be by each service installed from end to end including all fittings necessary to install each service and shall be payment in full for all labor, materials (except those supplied by the city) and equipment required to complete the work as specified.

The following items will not be paid for separately, but shall be included in the price of the specified pay item:

- Excavation and backfill material, including bedding material
- Use of special fittings, all necessary jointing, disposal of excess excavated material if necessary.
- Removal and proper disposal of any existing lead/galvanized service materials.
- Vegetative, concrete and pavement removal and replacement as required to install the services.
- All connections to the existing water system and within the building/pit.
- Removal and replacement, or replace, re-salvaging and reinstallation of any fencing.

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SANITARY SEWER STANDARD**

DESCRIPTION

This Section includes work required for sanitary sewers, structures and appurtenant work. Excavation and backfill shall be in accordance with Section 402 of the Michigan Department of Transportation's 2012 *Standard Specifications for Construction* and shall be considered included in the cost of sanitary sewer, sewer lateral and related work.

REFERENCES

- A. ASTM – American Society of Testing Materials, latest edition.
- B. NCPI - National Clay Pipe Institute.

SUBMITTALS

- A. Submit the following for review by ENGINEER:
 - 1. Manufacturer's certification of compliance with specified materials.
 - 2. Shop drawings on radius pipe and manholes.
 - 3. Proposed equipment and method for leakage testing.
- B. Report the following "as-built" information to ENGINEER:
 - 1. Three (3) witness measurements to end of laterals from permanent fixtures such as building corners, power poles and trees 8-inch diameter and larger.
 - 2. Measurements from wyes or tees to nearest downstream manhole.
 - 3. Invert elevation of end of lateral.
- C. Report presence of underground utilities and drains.
- D. Line and grade control method other than Laser Beam shall be approved by ENGINEER.
- E. Operational Data: Approval of the proposed procedure and schedule for bypassing and point of discharge will be required by OWNER and ENGINEER

JOB CONDITIONS

- A. Maintain existing sanitary sewer system operational. At new connections to the existing sewer system, plug the downstream end of the new sewer until the new sewer has been tested and accepted.
- B. Flow Restrictions: Total restriction of wastewater flow is prohibited unless approved in writing by the OWNER.
- C. Do not bypass wastewater to ground or surface waters.

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- D. Responsibility: CONTRACTOR is responsible for any damages to private or public property due to sewer backup while controlling or bypassing wastewater flow.
- E. Install service lines as pipe laying progresses and within maximum of 600 feet of mainline sewer installation.
- F. Clean up promptly following pipe installation and within maximum of 400 feet behind pipe laying operation. Clean-up includes backfill and rough grading.

PRODUCTS

PIPE:

- A. Pipe and Fittings:
 - 1. Plastic (PVC) 4" – 15": ASTM D3034 – SDR 35.
 - 2. Plastic (PVC) 18" & larger: ASTM F679 Solid wall.
- B. Service Pipe and Fittings: Provide minimum 4-inch same classification as mainline pipe.
 - 1. Plastic (PVC) ASTM D3034 – SDR35.
- C. Plastic Pipe: Provide seating marks where couplings are used for jointing.
 - 1. Joints: Plastic (PVC) ASTM D3212. Provide rubber "O" ring.
- D. Joint Repair or Connecting to Existing Sewer Pipe of Different Material:
 - 1. Provide flexible rubber adapter coupling and stainless steel bands.
- E. Force Main Pipe:
 - 1. In all areas where ductile iron pipe is not specifically shown, force mains and/or pump lines shall be either Class 50 or 51 Ductile Iron (DI), SDR 21 PVC Pipe, or HDPE, ANSI DR 9, 250 PSI
 - 2. HDPE, ANSI DR9, 250 PSI, shall meet the requirements of ASTM F714/D3035/D3350 and the Applicable Standard ANSI/NSF 61/14, ANSI/AWWA C901/C906.
 - 3. SDR-21 PVC pipe shall meet the requirements of ASTM D1784 and be manufactured to ASTM D2241 with a pressure rating of no less than 200 PSI.

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4. Ductile Iron (DI) – American National Standard Institute (ANSI) Specification, A21.51 (AWWA Standard C151). Pipe shall be designed and manufactured for a working pressure of 150 psi plus 100 psi surge and a safety factor of 2. Minimum nominal metal thickness shall be:

a. SIZE	3"	4"	6"	8"	10"
Class 50			0.25	0.27	0.29
Class 51	0.25	0.26			

- b. Pipe joints shall be push-on joint incorporating a single molded rubber gasket, Type II, per Federal Specifications WW-P-42 lb. such as "Fastite", "Tyton", or "Super Bell-Tite" unless otherwise indicated on the plans. Joints shall meet the requirements of ANSI/AWWA A21.11/C111. Restrained joints shall be Lok-Fast, Lok-Tyte, or equal.
- c. Pipe shall be in nominal 16', 18' or 20' lengths.
- d. Mark each length of pipe. Marking shall include pipe class, casting period, manufacturer's name or trademark, and year of manufacture. Marking shall meet the requirements of ANSI Specification A21.51 (AWWA Standard C151).

5. Lining and Coating: Outside surfaces of the pipe and fittings shall be bituminous coated complying with ANSI/AWWA A21.51/C151 and ANSI/AWWA A21.10/C110.

6. Fittings shall be ductile iron Class 250 mechanical joints. Fittings shall meet the requirements of ANSI/AWWA A21.10/C110, ANSI/AWWA A21.11/C111, and ANSI/AWWA A21.53/C153. Design and manufacture fittings for a pressure rating of 150 psi.

- a. Fitting joints shall be restrained mechanical joints or restrained push-on joints. Joints shall meet the requirements of ANSI/AWWA A21.11/C111. Restrained joints shall be used instead of thrust blocking. Restrained joints shall be Lok-Fast, TR Flex, Lok-Ring, or equal.

MANHOLES:

- A. Manholes shall be water tight precast units unless otherwise specified.

- B. Precast Units: ASTM C76 Class III or ASTM C478 with circular reinforcement, modified for "O" ring gaskets.

1. Pipe Openings: Provide flexible, watertight rubber boot using mechanically compressed flexible joint re-seal, link-seal, Pressure Wedge, Kor-N-Seal or equal. Conform to ASTM C923.

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- C. Concrete: 3500 psi 28 day, 4 inch maximum slump.
- D. Concrete Brick: ASTM C55, Grade N-1.
- E. Grade Rings: ASTM C478 with "O" ring gaskets.
- F. Mortar: ASTM C270: 1-part Portland cement, 1 part lime and 3 parts sand by volume.
- G. Manhole Steps:
 - 1. Plastic with 3/8-inch steel rod reinforcement conforming to ASTM D2146, Type II.
 - 2. Dimensions: 10-inch deep by 10-inch wide, 5-inch tread depth.
 - 3. Comply with applicable Occupational Safety and Health Administration Standards (OSHA).
- H. Standard Manhole Castings: East Jordan 1045 Cover Q or East Jordan 1046 low profile frame with letter S.
- I. Bituminous Waterproofing: ASTM D449.
- J. Cement Waterproofing: Masonry filler.

EXECUTION

PERFORMANCE:

- A. General: Provide and maintain all bypass pumping equipment and manpower ~~necessary~~ to adequately perform the work as necessary.
- B. Isolation of Work Area:
 - 1. Temporarily bypass the wastewater flow from the nearest upstream to the nearest downstream manhole or divert the flow from the nearest upstream manhole to holding tanks.
 - 2. Dispose of waste from holding tank by pumping to nearest downstream manhole or by hauling from site by a licensed waste hauler.

PREPARATION:

- A. Alignment and Grade:
 - 1. Deviations: Notify Engineer and obtain instructions to proceed where there is a grade discrepancy, or an obstruction not shown on the plans.
 - 2. Laser Beam Control: Provide.
 - 3. Check grade: At set-up point, 25-foot, 50-foot, 100-foot and 200-foot points thereafter to the next setup point.
 - 4. Projector advancement: Reset at each manhole.

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B. Bedding:

1. Provide bedding area backfill in accordance with MDOT Standard Plan R-83series and limited to 1 ½ inch maximum aggregate size.
2. Provide continuous bearing by supporting entire length of pipe barrel evenly.

INSTALLATION:

A. Laying pipe:

1. Direction shall be upstream with spigot or tongue end downstream and bellend upstream.
2. Joints shall be smooth and clean.
3. Place pipe length and bedding as a unit in a frost free, dry trench.
4. Install PVC pipe in accordance with ASTM 2321 and these specifications.

B. Jointing:

1. Provide solvents, adhesives and lubricants as furnished by Manufacturer.
2. Gasket position: Confirm that the gasket is in place and that the joint is properly made.

C. Manholes:

1. Base bedding: Provide 4-inch pea stone with full and even bearing in impervious soils or wet conditions. Otherwise provide on undisturbed, frost-free, dry subgrade.
2. Fill joint space completely and trowel between sections of precast units.
3. Provide casting grade setting as follows:
 - a. Existing pavement: Finished grade.
 - b. Gravel or lawn grade: 4 inches below.
 - c. Unpaved areas: Finished grade.
4. Provide waterproofing on ASTM C478 units and cast-in-place manholes using one of the following methods:
 - a. Bituminous: Apply 1 gallon per 100 sq.ft. to outside free of holidays and open pin holes
 - b. Cement: Apply masonry filler to outside by brushing on two (2) coats, each minimum of 2 lbs. per sq. yd.
5. Flow channels:
 - a. Construct with concrete up to spring line of pipe and slope bench toward center of manhole. Trowel smooth.
 - b. Provide clean, smooth, straight flow channels for main line and laterals.
 - c. Provide smooth curvilinear flow channels for turning flows.
6. Casting adjustment: Concrete ring between leveling and top course of bituminous. Match cross slope of top of casting to cross slope of pavement.
7. All sanitary sewer laterals, sewer main, service connections and drop manhole pipes shall have flow channels and shall not discharge onto the

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surface of the bench. Outside drop connection required for drop of 2 feet or more.

- D. Abandoning and filling existing sanitary sewer and manholes:
1. Pipe: Plug ends of pipe to be abandoned and fill completely with flowable fill.
 2. Manhole: Remove top 3 feet of manhole, plug pipe openings and fill manhole to be abandoned with flowable fill.
- E. Connections:
1. Expose existing sanitary sewer and structures to which the new work is to be connected to confirm condition, location and elevation.
 2. Connect to existing sanitary manhole by coring an opening adequate to insert prefabricated flexible connection (rubber boot) and secure circumference of pipe.
 - a. Relay and repoint loose blocks and bricks on existing block and brick structures. Re-channel flow lines and benches with concrete, trowel smooth.
- F. Service Lines:
1. Align at right angles to street or easement line.
 2. Grade: Provide at uniform rate from mainline wye or riser to the property or easement line, at minimum grade 1/4 inch per foot.
 3. Provide minimum depth at street right-of-way line, property line or easement line as follows (based on house with 8-foot ceiling height in basement, length on private property of 100 feet, and minimum grade on private property of 1/8 inch per foot):
 - a. House with basement: 12 feet below first floor elevation or 3 feet below basement elevation, whichever is deeper.
 - b. Commercial and industrial buildings, schools, churches: As determined by Engineer.
 - c. The above depths govern, except that the minimum depth at the right-of-way line or property line shall be 6 feet below street or easement centerline grade unless otherwise permitted by ENGINEER.
 - d. Property line riser excluded from the above minimum depths.
 - e. The minimum depths shown above shall be increased based on actual basement ceiling height and distance away.
 4. Connection fitting:
 - a. Locate as directed by Engineer in field.
 - b. 45° or 60° Wyes: Provide on all pipe except concrete pipe.
 - c. Tees: Allowed only on reinforced concrete pipe.

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5. Main riser will be allowed where cover exceeds 13 feet at mainline.
 6. Plugging: Provide standard plugs or caps securely blocked.
 7. Markers: Place a wood marker (2" x 2" minimum) at end of lateral with sufficient length to extend from invert of lateral to ground surface. Attach a steel rerod 36 inches in length immediately next to the wood marker with the top of the rerod 2 inches below grade. Cover wood marker and steel rerod with 6' long 4" PVC pipe buried 3 feet.
 8. Witnesses: Report the following to the ENGINEER:
 - a. Wyes or Tees: Measurements to nearest downstream manhole.
 - b. End of Laterals: Three (3) measurements to permanent surface features and elevation.
 9. Property line Riser: Required on all laterals.
- G. Bypass Pumping: The Contractor, when required, shall provide for the flow of sewage around the section or sections of pipe designated for repair. 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 Owner may require a detail of the bypass plan to be submitted.

TESTING AND INSPECTION:

- A. General:
 1. Observation: By Engineer.
 2. Testing: Perform upon completion and before connecting to active system.
 3. Force Mains Only - Leakage tests: Provide promptly following installation of sewer pipe including services and keep within maximum 1200 feet behind pipe laying operation.
 4. Notification: Clean, pretest and arrange with ENGINEER for final inspection and test.
 5. Provide necessary equipment, manpower and assistance.
 6. Video televising: Provide prior to paving.
- B. Line and Grade: Allowable drift between structures from proposed alignment will be as follows:
 1. Line:
 - a. Through 36-inch: 0.20 foot.
 2. Grade:
 - a. Through 36 inch: 0.02 foot.
 - b. Allowable sag between pipe joints: 5% of pipe diameter with maximum of 1-inch.
 3. Repair sags in excess of tolerance prior to acceptance.

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- C. Video Televising:
1. CONTRACTOR shall complete video televising of new sewers that clearly shows the condition of pipe and joints prior to acceptance.
 - a. Sewer and manholes to be televised shall be cleaned completely free of debris prior to televising.
 - b. Identify locations of all laterals.
 2. CONTRACTOR shall provide one copy of televising in CD/DVD format to Engineer.
- D. **For Force Mains Only** - Leakage Testing:
1. CONTRACTOR shall provide all labor, equipment and supervision to perform exfiltration (water or air) test on all new force main sewer.
 2. Acceptable leakage will be as follows:
 - a. Water: Less than 100 gallons per inch of pipe diameter per mile of pipe per twenty-four (24) hours.
 - b. Air: Holding time not less than that listed in table.
 3. Correction: Repair defects and repeat test until acceptable.
 - a. Method of repairing defects shall be approved by Engineer.

Exfiltration Test (water):

1. Conditions: Determine groundwater elevation.
2. Procedure:
 - a. Fill system minimum 2 feet above high point of system or 2 feet above groundwater, whichever is higher.
 - b. Leakage: Quantity of water required to maintain constant level.

Exfiltration (air): Perform in accordance with NCPI Publication, "Low Pressure Air Test for Sanitary sewers", and in accordance with ASTM F 1417, "Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air".

1. Condition: Determine groundwater elevation.
2. Procedure:
 - a. All pressure readings are above the average groundwater head.
3. Exfiltration Air Test Table – See attached

ADJUST AND CLEAN

- A. General:
1. Keep pipe and structures clean as work progresses.

EXFILTRATION AIR TEST

TIME REQUIRED FOR LOSS OF PRESSURE FROM 3.5 PSIG TO 3.0 PSIG FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015 (CU. FT./MIN./SQ.FT. OF INTERNAL SURFACE AREA)

Pipe Diameter (in.)	Minimum time (min; sec.)	Length for Min. Time (ft.)	Time for Longer length (sec.)	Specification Time for Length (L) Shown (min:sec)											
				100ft	150ft	200ft	250ft	300ft	350ft	400ft	450ft	500ft	550ft	600ft	
4	1:53	597	.190L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:54
6	2:50	398	.427L	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12	3:34	3:55	4:16	
8	3:47	298	.760	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42	6:20	6:58	7:36	
10	4:43	239	1.187L	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54	9:54	10:53	11:52	
12	5:40	199	1.709L	5:40	5:40	5:42	7:08	8:33	9:48	11:24	12:50	14:15	15:40	17:06	
15	7:05	159	2.671L	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02	22:16	24:29	26:43	
18	8:30	133	3.846L	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51	32:03	35:16	38:28	
21	9:55	114	5.235L	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16	43:37	47:59	52:21	
24	11:20	99	6.837L	11:24	17:57	22:48	28:30	34:11	39:53	45:35	51:17	56:59	62:41	68:23	
27	12:45	88	8.653L	14:25	21:38	28:51	36:04	43:16	50:30	57:42	64:54	72:07	79:20	86:33	
30	14:10	80	10.683L	17:48	26:43	35:37	44:31	53:25	62:19	71:13	80:07	89:02	97:56	106:51	
33	15:35	72	12.926L	21:33	32:19	43:56	53:52	64:38	75:24	86:10	96:57	107:44	118:31	129:17	
36	17:00	66	15.384L	25:39	38:28	51:17	64:06	76:55	89:44	102:34	115:23	128:13	141:02	153:51	
39	18:25	61	18.054L	30:57	45:09	60:11	75:14	90:16	105:19	120:22	135:24	160:32	165:31	180:34	
42	19:50	57	20.939L	34:54	52:21	69:48	87:15	104:42	122:09	139:36	157:03	174:31	191:58	209:25	

Note: When 2 sizes of pipe are involved, the time shall be computed by the ratio of lengths involved.

Example: 400 feet of 10 inch pipe and 200 feet of 6 inch pipe

$$\text{Time} = \frac{\text{Length}(1) \times \text{Time}(1) + \text{Length}(2) \times \text{Time}(2)}{\text{Length}(1) + \text{Length}(2)} = \frac{400 \times 7:54 + 200 \times 2:50}{400 + 200}$$

$$= \frac{400 \times 474 + 200 \times 170}{400 + 200} = 373 \text{ seconds} = 6:13 \text{ (min:sec)}$$

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This standard specification, in its entirety, is provided for guidance should tracer wires be required and used on the proposed project. Any applicable sections shall be utilized for bidding and constructing the project. Not all portions of this specification and typical details may be applicable for the proposed project scope in the preceding documents.

Materials

General

All trace wire and trace wire products shall be domestically manufactured in the U.S.A.

All trace wire shall have HDPE insulation intended for direct bury, color coated per APWA standard for the specific utility being marked.

Trace wire

- **Open Trench** - Trace wire shall be #12 AWG Copper Clad Steel, High Strength with minimum 450 lb. break load, with minimum 30 mil HDPE insulation thickness.
- **Directional Drilling/Boring** - Trace wire shall be #12 AWG Copper Clad Steel, Extra High Strength with minimum 1,150 lb. break load, with minimum 30 mil HDPE insulation thickness.
- **Trace wire – Pipe Bursting/Slip Lining** - Trace wire shall be 7 x 7 Stranded Copper Clad Steel, Extreme Strength with 4,700 lb. break load, with minimum 50 ml HDPE insulation thickness.

Connectors

- All mainline trace wires must be interconnected in intersections, at mainline tees and mainline crosses. At tees, the three wires shall be joined using a single 3-way lockable connector. At Crosses, the four wires shall be joined using a 4-way connector. Use of two 3-way connectors with a short jumper wire between them is an acceptable alternative.
- **Direct bury wire connectors** – shall include 3-way lockable connectors and mainline to lateral lug connectors specifically manufactured for use in underground trace wire installation. Connectors shall be dielectric silicon filled to seal out moisture and corrosion, and shall be installed in a manner so as to prevent any uninsulated wire exposure.
- Non locking friction fit, twist on or taped connectors are prohibited.

Termination/Access

- All trace wire termination points must utilize an approved trace wire access box grade level/in-ground access box, specifically manufactured for this purpose.

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- All grade level/in-ground access boxes shall be appropriately identified with “sewer” or “water” cast into the cap and be color coded.
- A minimum of 2 ft. of excess/slack wire is required in all trace wire access boxes after meeting final elevation.
- All trace wire access boxes must include a manually interruptible conductive/connective link between the terminal(s) for the trace wire connection and the terminal for the grounding anode wire connection.
- Grounding anode wire shall be connected to the identified (or bottom) terminal on all access boxes.
- **Service Laterals** - Trace wire must terminate at an approved grade level/in-ground trace wire access box, located at the edge of the road right-of-way, out of the roadway, and immediately adjacent to the curb stop (either immediately North or East)
- **Hydrants** – Trace wire must terminate at an approved above-ground trace wire access box, properly affixed to the hydrant grade flange. (affixing with tape or plastic ties shall not be acceptable)
- **Long-runs, in excess of 500 linear feet without service laterals or hydrants**
Trace wire access must be provided utilizing an approved grade level/in-ground trace wire access box, located at the edge of the road right-of-way, and out of the roadway. The grade level/in-ground trace wire access box shall be delineated using a minimum 48” polyethylene marker post, color coded per APWA standard for the specific utility being marked.

Grounding

- Trace wire must be properly grounded at all dead ends/stubs.
- Grounding of trace wire shall be achieved by use of a drive-in magnesium grounding anode rod with a minimum of 20ft of #14 red HDPE insulated copper clad steel wire connected to anode (minimum 0.5 lb.) specifically manufactured for this purpose, and buried at the same elevation as the utility.
- When grounding the trace wire at dead ends/stubs, the grounding anode shall be installed in a direction 180 degrees opposite of the trace wire, at the maximum possible distance.
- When grounding the trace wire in areas where the trace wire is continuous and neither the mainline trace wire or the grounding anode wire will be terminated at/above grade, install grounding anode directly beneath and in-line with the trace wire. Do not coil excess wire from grounding anode. In this installation method, the grounding anode wire shall be trimmed to an appropriate length before connecting to trace wire with a mainline to lateral lug connector.
- Where the anode wire will be connected to a trace wire access box, a minimum of 2 ft. of excess/slack wire is required after meeting final elevation.

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Installation

General

- Trace wire installation shall be performed in such a manner that allows proper access for connection of line tracing equipment, proper locating of wire without loss or deterioration of low frequency (512Hz) signal for distances in excess of 1,000 linear feet, and without distortion of signal caused by multiple wires being installed in close proximity to one another.
- Trace wire systems must be installed as a single continuous wire, except where using approved connectors. No looping or coiling of wire is allowed.
- Any damage occurring during installation of the trace wire must be immediately repaired by removing the damaged wire, and installing a new section of wire with approved connectors. Taping and/or spray coating shall not be allowed.
- Trace wire shall be installed at the bottom half of the pipe and secured (taped/tied) at 5' intervals.
- Trace wire must be properly grounded as specified.
- Trace wire on all service laterals/stubs must terminate at an approved trace wire access box located at the edge of the road right-of-way, but out of the roadway. (See Trace wire Termination/Access)
- At all mainline dead-ends, trace wire shall go to ground using an approved connection to a drive-in magnesium grounding anode rod, buried at the same depth as the trace wire. (See Grounding)
- Mainline trace wire shall not be connected to existing conductive pipes. Treat as a mainline dead-end, ground using an approved waterproof connection to a grounding anode buried at the same depth as the trace wire.
- All service lateral trace wires shall be a single wire, connected to the mainline trace wire using a mainline to lateral lug connector, installed without cutting/splicing the mainline trace wire.
- In occurrences where an existing trace wire is encountered on an existing utility that is being extended or tied into, the new trace wire and existing trace wire shall be connected using approved splice connectors, and shall be properly grounded at the splice location as specified.

Sanitary Sewer System

- A mainline trace wire must be installed, with all service lateral trace wires properly connected to the mainline trace wire, to ensure full tracing/locating capabilities from a single connection point.
- Lay mainline trace wire continuously, by-passing around the outside of manholes/structures on the North or East side.
- Trace wire on all sanitary service laterals must terminate at an approved trace wire access box color coded green and located directly above the service lateral at the edge of road right of way.

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Water System

- A mainline trace wire must be installed, with all service lateral trace wires properly connected to the mainline trace wire, to ensure full tracing/locating capabilities from a single connection point.
- Lay mainline trace wire continuously, by-passing around the outside of valves and fittings on the North or East side.
- Trace wire on all water service laterals must terminate at an approved trace wire access box color coded blue and located directly above the service lateral at the edge of road right of way. Above-ground tracer wire access boxes will be installed on all fire hydrants.
- All conductive and non-conductive service lines shall include tracer wire.

Storm Sewer System

- If the storm sewer system includes service laterals for connection of private drains and tile lines, it shall be specified the same as a sanitary sewer application.
- Lay mainline trace wire continuously, by-passing around the outside of manholes/structure on the North or East side.

Prohibited Products and Methods

The following products and methods shall not be allowed or acceptable

- Uninsulated trace wire
- Trace wire insulations other than HDPE.
- Trace wires not domestically manufactured.
- Non locking, friction fit, twist on or taped connectors.
- Brass or copper ground rods
- Wire connections utilizing taping or spray-on waterproofing
- Looped wire or continuous wire installations, that has multiple wires laid side-by-side or in close proximity to one another
- Trace wire wrapped around the corresponding utility.
- Brass fittings with trace wire connection lugs.
- Wire terminations within the roadway, i.e. in valve boxes, cleanouts, manholes, etc. Connecting trace wire to existing conductive utilities

Testing

All new tracer wire installations shall be located using typical low frequency (512Hz) line tracing equipment, witnessed by the contractor, engineer and facility owner as applicable, prior to acceptance of ownership.

This verification shall be performed upon completion of rough grading and again prior to final acceptance of the project.

Continuity testing in lieu of actual line tracing shall not be accepted.

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Products

The following products have been deemed acceptable and appropriate:

Copper clad Steel (CCS) trace wire:

- Open Trench – Copperhead #12 High Strength part # 1230-HS
- Directional Drilling/Boring - Copperhead Extra High Strength part # 1245*EHS
- Pipe Bursting/Slip Lining – Copperhead SoloShot Extreme Strength 7 x 7 Stranded part #PBX-50

Connectors:

- Copperhead 3-way locking connector part # LSC1230*
- DryConn 3- way Direct Bury Lug: Copperhead Part # 3WB-01 Termination/Access

Non-Roadway access boxes applications:

- Trace wire access boxes Grade level Copperhead adjustable lite duty Part # LD14*TP

Concrete / Driveway access box applications:

- Trace wire access boxes Grade level Copperhead Part # CD14*TP 14”

Fire hydrant trace wire access box applications:

- Above ground two terminal with 1” conduit.
- Copperhead part # T3-75-F (Cobra T3 Test Station, denoting “F” includes mounting flange)

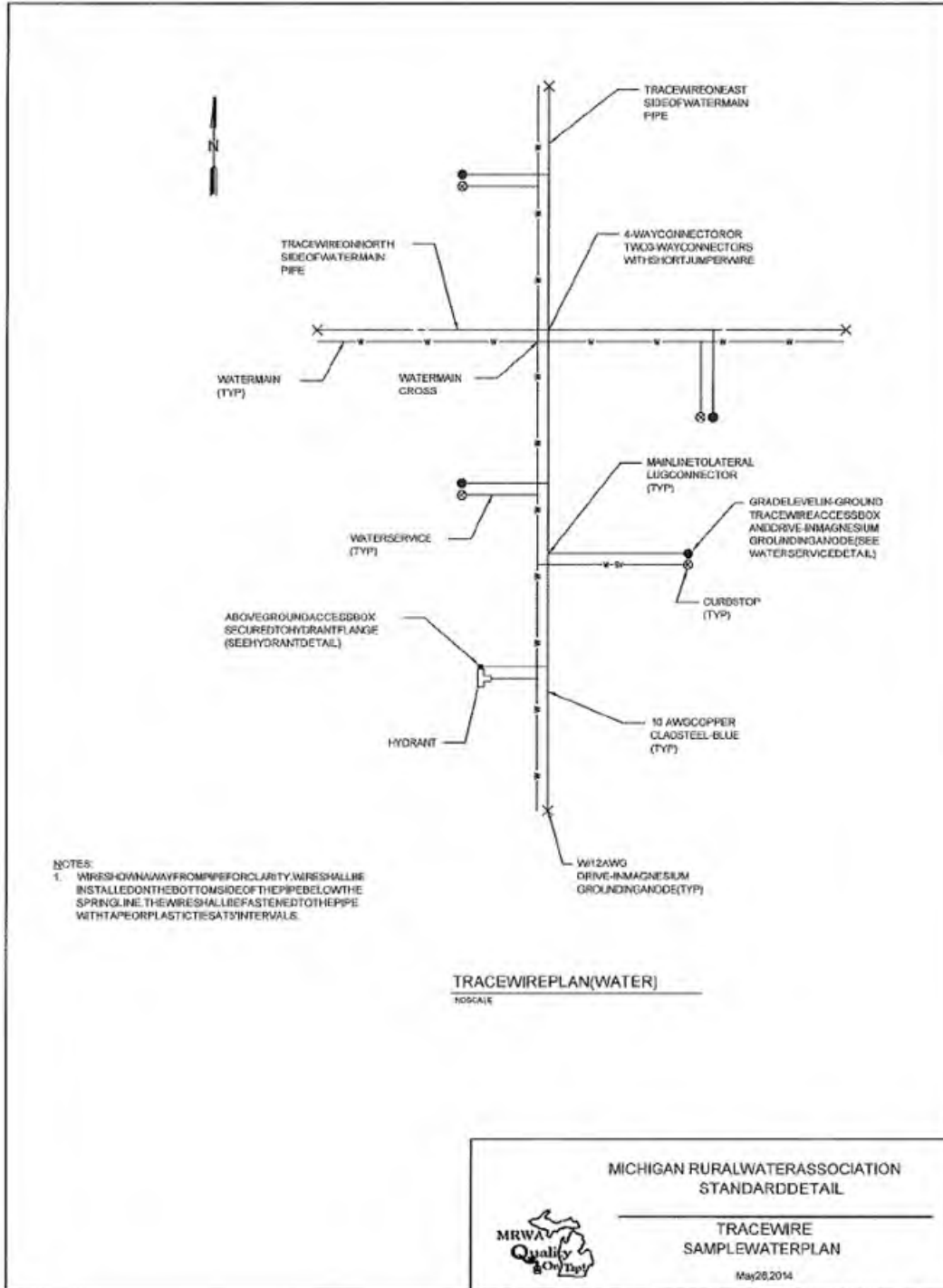
Grounding:

- Drive in Magnesium Anode: Copperhead Part # ANO-1005 (1.5 lb.)

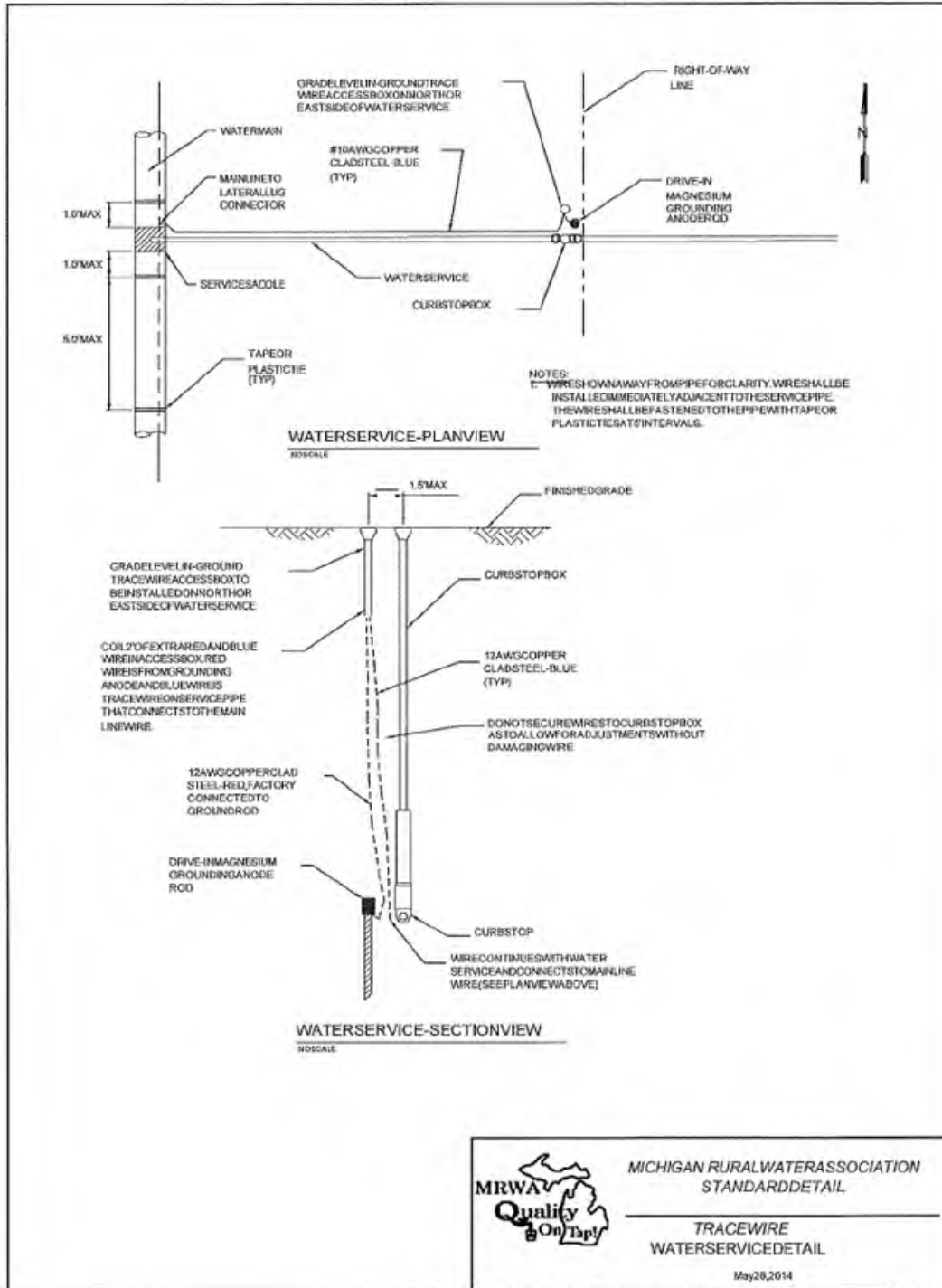
Manufacture product options:

The information provided by Copperhead Industries gives you product options to help you choose the correct wire – termination/access points – connectors and grounding products. Other manufactures provide these products; this information is only a guide and alternate products can be submitted for consideration.

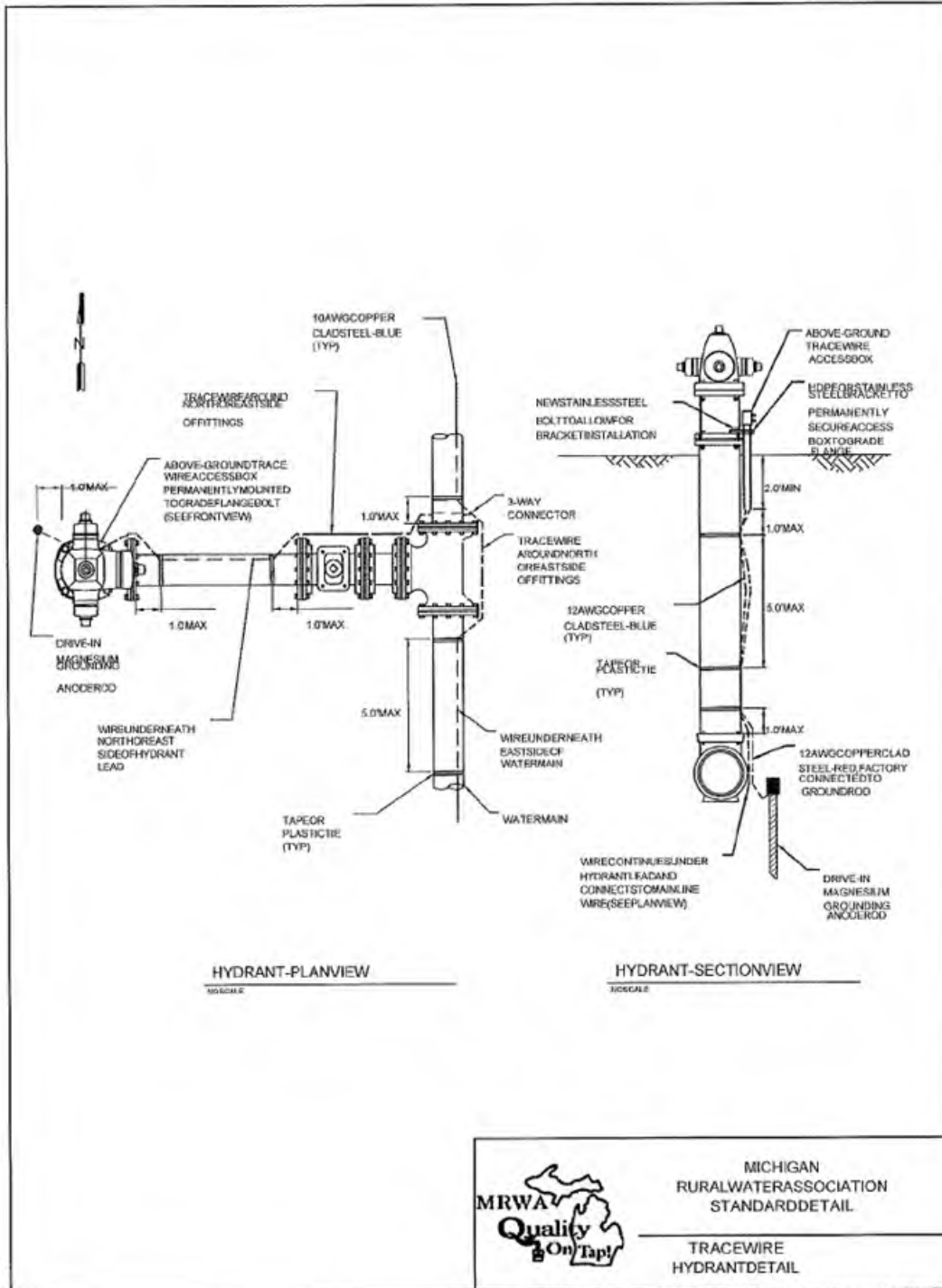
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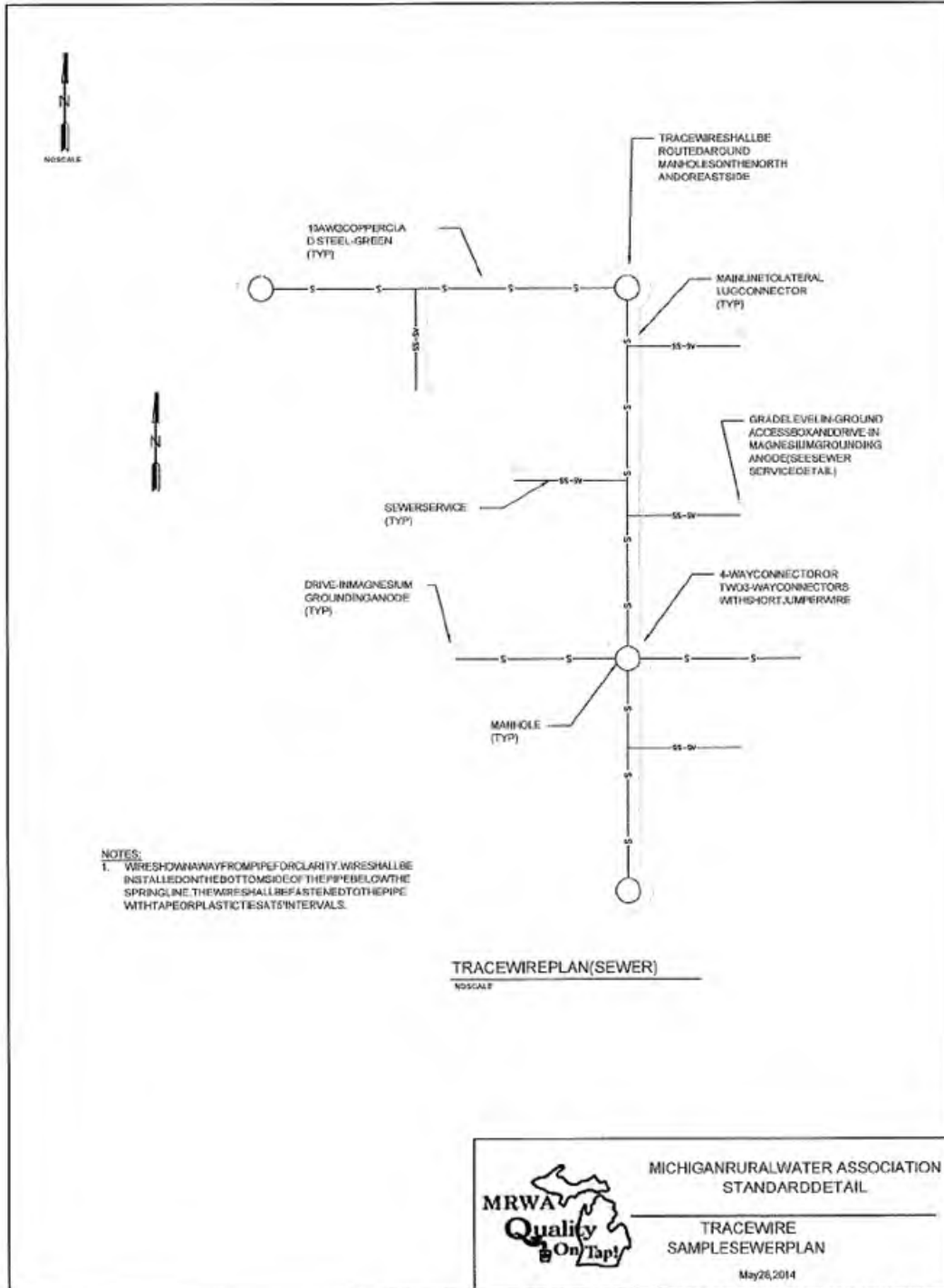
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	MICHIGAN RURAL WATER ASSOCIATION STANDARD DETAIL
	TRACE WIRE HYDRANT DETAIL

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CITY OF HILLSDALE SPECIAL PROVISION FOR SEWER/WATER UTILITY – TRACER WIRE



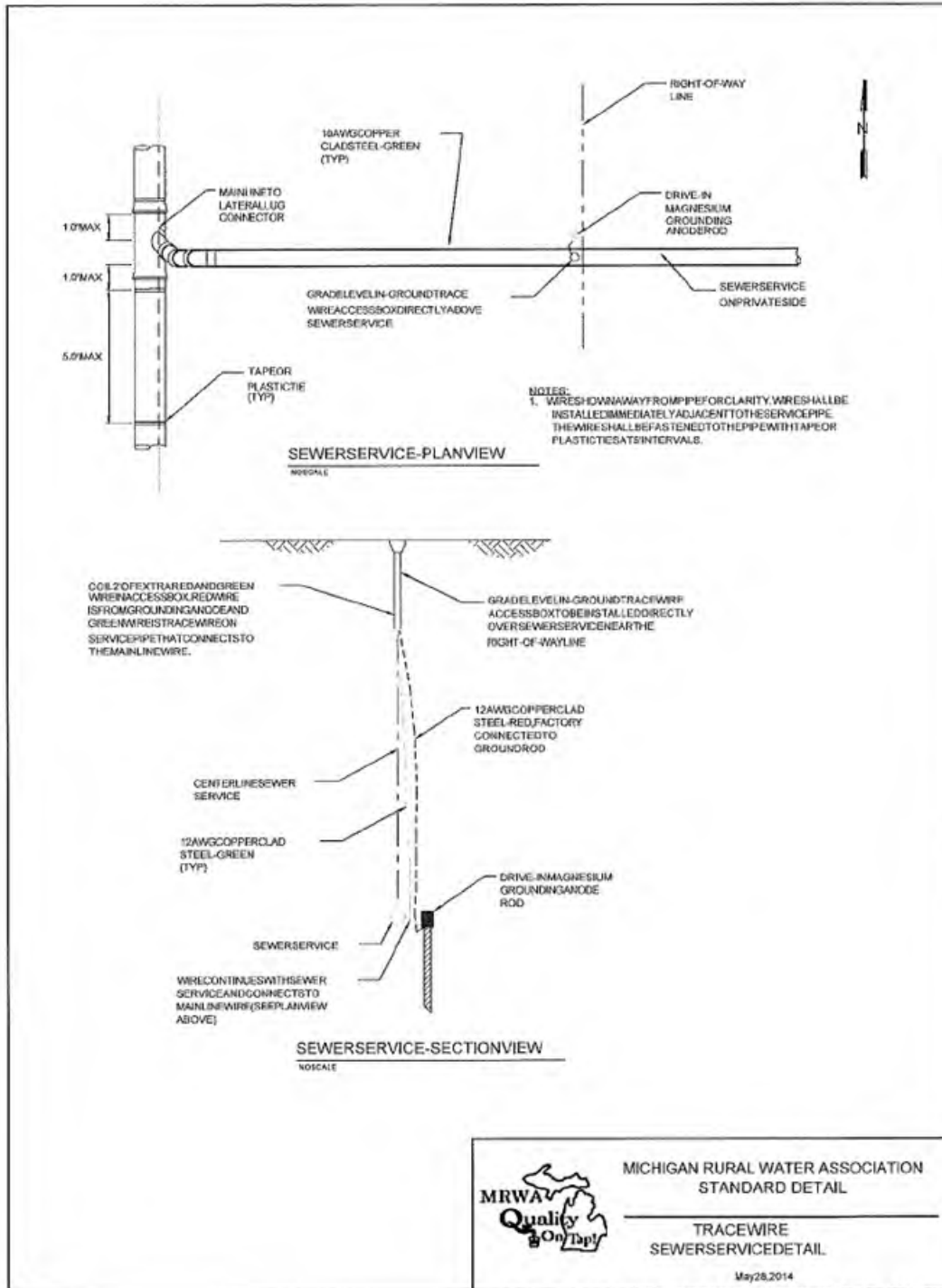
MICHIGAN RURAL WATER ASSOCIATION
STANDARD DETAIL

TRACE WIRE
SAMPLE SEWER PLAN

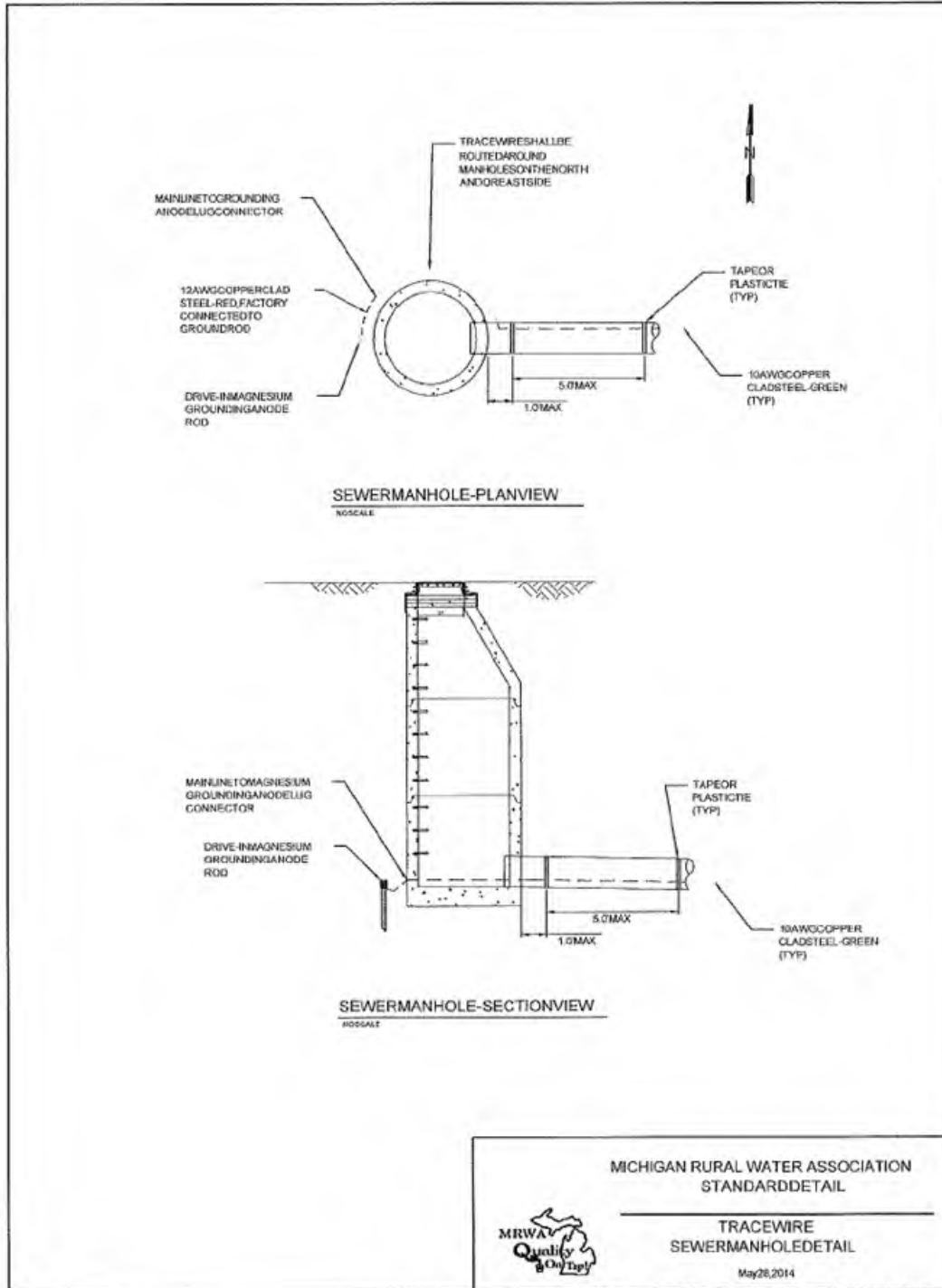
May 26, 2014

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**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
SEWER/WATER UTILITY – TRACER WIRE**



**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
SEWER/WATER UTILITY – TRACER WIRE**



MICHIGAN RURAL WATER ASSOCIATION
STANDARD DETAIL

TRACE WIRE
SEWER MANHOLE DETAIL

May 28, 2014

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**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
CURED-IN-PLACE PIPE (CIPP) LINING**

DESCRIPTION

It is the intent of this special provision to provide for the reconstruction of pipelines and conduits by the installation of a resin-impregnated flexible tube, which is formed to the original conduit by use of a hydrostatic head. The resin is cured using hot water under hydrostatic pressure within the tube. The Cured-In-Place Pipe (CIPP) will be continuous and tight fitting.

REFERENCED DOCUMENTS

This specification references ASTM F1216 (Rehabilitation of pipelines by the inversion and curing of a resin-impregnated tube), ASTM F1743 (Rehabilitation of pipelines by pulled-in-place installation of a cured-in-place thermosetting resin pipe), and ASTM D790 (Test methods for flexural properties of non-reinforced plastics) which are made a part hereof by such reference and shall be the latest edition and revision thereof. In case of conflicting requirements between this specification and these referenced documents, this specification will govern.

PRODUCT, MANUFACTURER, CONTRACTOR QUALIFICATION REQUIREMENTS

Since sewer products are intended to have a 50-year design life, and in order to minimize the Owner's risk, only proven products with substantial successful long term track records will be approved.

Products and Contractors seeking approval must meet all of the following criteria to be deemed Commercially Acceptable:

For a Product to be considered Commercially Proven, a minimum of 1,000,000 linear feet or 4,000 manhole-to-manhole line sections of successful wastewater collection system installations in the U.S. must be documented to the satisfaction of the Owner to assure commercial viability. In addition, at least 100,000 linear feet of the product shall have been in successful service within the State for a minimum of five years.

For a Contractor to be considered as Commercially Proven, the Contractor must satisfy all insurance, financial, and bonding requirements of the Owner, and must have had at least 5 (five) years active experience in the commercial installation of the product bid. In addition, Contractor must have successfully installed at least 500,000 feet of the product bid in wastewater collection systems.

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Field Supervisor/Foreman: Minimum five (5) years as a foreman/superintendent for a cured-in-place lining crew (installing actual product included with this bid/project), and a minimum of 300,000 lineal feet of cured-in-place lining, diameters up to, and including, twenty-three (23) inch.

Ensure the Owner all installed products will meet the minimum product quality control standards set forth by the manufacture, all CIPP liners shall be impregnated by the approved product's licensed installer that is performing the work.

Sewer rehabilitation products submitted for approval must provide Third Party Test Results supporting the long term performance and structural strength of the product and such data shall be satisfactory to the Owner. Test samples shall be prepared so as to simulate installation methods and trauma of the product. No product will be approved without independent third party testing verification.

Both the rehabilitation manufacturing and installation processes shall operate under a quality management system which is third-party certified to ISO 9001. Proof of certification shall be required for approval.

Documentation for products and Contractors may be requested prior to the award of the contract. Please be prepared to submit all product and qualification information upon request.

MATERIALS

Tube - The sewn Tube shall consist of one or more layers of absorbent non-woven felt fabric and meet the requirements of ASTM F1216 or ASTM F1743, Section 5. The tube shall be constructed to withstand installation pressures, have sufficient strength to bridge missing pipe, and stretch to fit irregular pipe sections.

The wet out Tube shall have a uniform thickness that when compressed at installation pressures will meet or exceed the Design thickness.

The Tube shall be sewn to a size that when installed will tightly fit the internal circumference and length of the original pipe. Allowance should be made for circumferential stretching during inversion. Overlapped layers of felt in longitudinal seams that cause lumps in the final product shall not be utilized.

The outside layer of the Tube (before wet out) shall be coated with an impermeable, flexible membrane that will contain the resin and facilitate monitoring of resin saturation during the resin impregnation (wet out) procedure.

The Tube shall be homogeneous across the entire wall thickness containing no intermediate or encapsulated elastomeric layers. No material shall be included in

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
CURED-IN-PLACE PIPE (CIPP) LINING**

the Tube that may cause delamination in the cured CIPP. No dry or unsaturated layers shall be evident.

The wall color of the interior pipe surface of CIPP after installation shall be a light reflective color so that a clear detailed examination with closed circuit television inspection equipment may be made.

Seams in the Tube shall be stronger than the non-seamed felt.

The outside of the Tube shall be marked for distance at regular intervals along its entire length, not to exceed 5 ft. Such markings shall include the Manufacturers name or identifying symbol. The tubes must be manufactured in the USA.

Resin - The resin system shall be a corrosion resistant polyester, vinyl ester, or epoxy and catalyst system that when properly cured within the tube composite meets the requirements of ASTM F1216 and ASTM F1743, 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 the structural and chemical resistance requirements of this specification.

STRUCTURAL REQUIREMENTS

The CIPP shall be designed as per ASTM F1216, Appendix X.1. The CIPP design shall assume no bonding to the original pipe wall.

The Contractor must have performed long-term testing for flexural creep of the CIPP pipe material installed by his Company. Such testing results are to be used to determine the Long-term, time dependent flexural modulus to be utilized in the product design. This is a performance test of the materials (Tube and Resin) and general workmanship of the installation and curing. A percentage of the instantaneous flexural modulus value (as measured by ASTM D-790 testing) will be used in design calculations for external buckling. The percentage, or the long-term creep retention value utilized, will be verified by this testing. Values in excess of 50% will not be applied unless substantiated by qualified third party test data. The materials utilized for the contracted project shall be of a quality equal to or better than the materials used in the long-term test with respect to the initial flexural modulus used in Design.

The Enhancement Factor 'K' to be used in 'Partially Deteriorated' Design conditions shall be assigned a value of 7. Application of Enhancement (K) Factors in excess of 7 shall be substantiated through independent test data.

The layers of the cured CIPP shall be uniformly bonded. It shall not be possible to separate any two layers with a probe or point of a knife blade so that the layers separate cleanly or the probe or knife blade moves freely between the layers. If separation of the

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SPECIAL PROVISION
FOR
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layers occurs during testing of field samples, new samples will be cut from the work. Any reoccurrence may cause rejection of the work.

The cured pipe material (CIPP) shall conform to the structural properties, as listed below.

MINIMUM PHYSICAL PROPERTIES

<u>Property</u>	<u>Test Method</u>	<u>Cured Composite min. per ASTM F1216</u>	<u>Cured Composite (400,000 psi Resin)</u>
Modulus of Elasticity	ASTM D-790 (short term)	250,000 psi	400,000 psi
Flexural Stress	ASTM D-790	4,500 psi	4,500 psi

The required structural CIPP wall thickness shall be based as a minimum, on the physical properties listed above and in accordance with the Design Equations in the appendix of ASTM F 1216, and the following design parameters:

Design Safety Factor = 2.0

Retention Factor for Long-Term Flexural Modulus to be used in Design = 1% - 60%
(As determined by Long-Term tests described above)

Ovality* = 2%

Enhancement Factor, k = per above

Groundwater Depth (above invert) = 0 ft.

Soil Depth (above crown) = 6 ft.

Soil Modulus = unknown

Soil Density = 120 pcf

Live Load = H20 Highway

Design Condition (partially or fully deteriorated) = ***

Based on review of video logs, conditions of pipeline can be fully or partially deteriorated.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
CURED-IN-PLACE PIPE (CIPP) LINING**

Refer to the attached Dimensional Ratio table for specific pipe section requirements, based on the pipe condition, depth, ovality, etc. as computed for the conditions shown, using ASTM F 1216 Design Equations.

Any layers of the tube that are not saturated with resin prior to insertion into the existing pipe shall not be included in the structural CIPP wall thickness computation.

TESTING REQUIREMENTS

Chemical Resistance - The CIPP shall meet the chemical resistance requirements of ASTM F1216, Appendix X2. CIPP samples for testing shall be of tube and resin system similar to that proposed for actual construction. It is required that CIPP samples with and without plastic coating meet these chemical testing requirements.

Hydraulic Capacity - Overall, the hydraulic profile shall be maintained as large as possible. 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.

CIPP Field Samples - When requested by the Owner, the Contractor shall submit test results from field installations in the USA 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 the Structural Requirements Section have been achieved in previous field applications. Samples for this project shall be made and tested as described in the inspection section.

INSTALLATION RESPONSIBILITIES FOR INCIDENTAL ITEMS

It shall 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 Owner shall institute the actions necessary to do this for the mutually agreed time period. The owner shall also provide free access to water hydrants for cleaning, inversion and other work items requiring water.

Cleaning of Sewer Lines - The Contractor, when required, shall remove all internal debris out of the sewer line that will interfere with the installation of CIPP. The Owner shall also provide a dump site for all debris removed from the sewers during the cleaning operation. Unless stated otherwise, it is assumed this site will be at or near the sewage treatment facility to which the debris would have arrived in absence of the cleaning operation. Any hazardous waste material encountered during this project will be considered as a changed condition.

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FOR
CURED-IN-PLACE PIPE (CIPP) LINING**

Bypassing Sewage - The Contractor, when required, shall provide for the flow of sewage around the section or sections of pipe designated for repair. 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 Owner may require a detail of the bypass plan to be submitted.

Inspection of Pipelines - Inspection of pipelines shall be performed by experienced personnel trained in locating breaks, obstacles and service connections by close circuit television. The interior of the pipeline shall be carefully inspected to determine the location of any conditions which may prevent proper installation of CIPP into the pipelines, and it shall be noted so that these conditions can be corrected. A video tape and suitable log shall be kept for later reference by the Owner.

Line Obstructions - It shall be the responsibility of the Contractor to clear the line of obstructions such as solids and roots that will prevent the insertion of CIPP. If pre-installation inspection reveals an obstruction such as a protruding service connection, dropped joint, or a collapse that will prevent the inversion process, that was not evident on the pre-bid video and it cannot be removed by conventional sewer cleaning equipment, then the Contractor shall make a point repair excavation to uncover and remove or repair the obstruction. Such excavation shall be approved in writing by the Owner's representative prior to the commencement of the work and shall be considered as a separate pay item.

Public Notification - The Contractor shall make every effort to maintain service usage throughout the duration of the project. In the event that a service will be out of service, the maximum amount of time of no service shall be 8 hours for any property served by the sewer. A public notification program shall be implemented, and shall as a minimum, require the Contractor to be responsible for contacting each home or business connected to the sanitary sewer and informing them of the work to be conducted, and when the sewer will be off-line. The Contractor shall also provide the following:

- A. Written notice to be delivered to each home or business the day prior to the beginning of work being conducted on the section, and a local telephone number of the Contractor they can call to discuss the project or any problem which could arise.
- B. Personal contact with any home or business, which cannot be reconnected within the time stated in the written notice.

The Contractor shall be responsible for confirming the locations of all branch service connections prior to installing and curing the CIPP.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
CURED-IN-PLACE PIPE (CIPP) LINING**

INSTALLATION

CIPP installation shall be in accordance with ASTM F1216, Section 7, or ASTM F1743, Section 6, with the following modifications:

Resin Impregnation - The quantity of resin used for tube impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the loss of resin through cracks and irregularities in the original pipe wall. A vacuum impregnation process shall be used. To insure thorough resin saturation throughout the length of the felt tube, the point of vacuum shall be no further than 25 feet from the point of initial resin introduction.

After vacuum in the tube is established, a vacuum point shall be no further than 75 feet from the leading edge of the resin. The leading edge of the resin slug shall be as near to perpendicular as possible. A roller system shall be used to uniformly distribute the resin throughout the tube. If the Installer uses an alternate method of resin impregnation, the method must produce the same results. Any alternate resin impregnation method must be proven.

Tube Insertion – The wet out tube shall be positioned in the pipeline using either inversion or a pull-in method. If pulled into place, a power winch should be utilized and care should be exercised not to damage the tube as a result of pull-in friction. The tube should be pulled-in or inverted through an existing manhole or approved access point and fully extend to the next designated manhole or termination point.

Temperature gauges shall be placed inside the tube at the invert level of each end to monitor the temperatures during the cure cycle.

Curing shall be accomplished by utilizing hot water under hydrostatic pressure or steam in accordance with the manufacturer's recommended cure schedule.

REINSTATEMENT OF BRANCH CONNECTIONS

It is the intent of these specifications that branch connections to buildings be reopened without excavation, utilizing a remote controlled cutting device, monitored by a video TV camera. The Contractor shall certify he has a minimum of 2 complete working cutters plus spare key components on the site before each inversion. Unless otherwise directed by the owner or his authorized representative, all laterals will be reinstated. No additional payment will be made for excavations for the purpose of reopening connections and the Contractor will be responsible for all costs and liability associated with such excavation and restoration work.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
CURED-IN-PLACE PIPE (CIPP) LINING**

INSPECTION

For each work order released, one CIPP sample for each diameter shall be prepared and physical properties tested in accordance with ASTM F1216 or ASTM F1743, Section 8, using either method proposed. The flexural properties must meet or exceed the values listed in Table 1 of the applicable ASTM.

Wall thickness of samples shall be determined as described in paragraph 8.1.6 of ASTM F1743. The minimum wall thickness at any point shall not be less than 87½% of the design thickness as calculated in the Structural Requirements Section of this document.

Visual inspection of the CIPP shall be in accordance with ASTM F1743, Section 8.6.

The Contractor, upon completion of all work, perform a final video inspection of the newly lined sewer to be provided to the owner in digital format for the Owner's records.

CLEAN-UP

Upon acceptance of the installation work and testing, the Contractor shall restore the project area affected by the operations to a condition at least equal to that existing prior to the work.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
CURED-IN-PLACE PIPE (CIPP) LINING**

**CIPP WALL THICKNESS
PARTIALLY DETERIORATED DESIGN (PD)**

		Required DR (D / t)			
		Ei = 250,000 psi		Ei = 400,000 psi	
		Ground Water Depth			
Ovality	Range of Depth to invert (feet)	50% Depth	Full Depth	50% Depth	Full Depth
2 % *	4 - 8	78	62	92	73
	8 - 12	69	55	80	64
	12 - 16	62	50	73	58
	16 - 20	58	46	68	54
	20 - 24	55	44	64	51
5 %	4 - 8	72	57	84	67
	8 - 12	63	50	73	58
	12 - 16	57	46	67	53
	16 - 20	53	42	62	49
	20 - 24	50	40	58	47
8 %	4 - 8	66	52	77	61
	8 - 12	58	46	67	54
	12 - 16	52	42	61	49
	16 - 20	49	39	57	45
	20 - 24	46	37	54	43

PD wall thickness varies with the height of the groundwater above the invert of the host pipe. The table assumes the height of the groundwater equal to half or full depth to the pipe invert. The table represents CIPP pipe wall thickness for a host pipe range of 8 to 48 inches. This is a guideline only. Specific calculations should refer to ASTM F-1216, Appendix X.1.

Design Parameters:

Poisson's Ratio = 0.3

Factor of Safety = 2.0

Enhancement Factor = 7

DR = Dimension Ratio = Diameter / thickness $\Rightarrow t = D / DR$

Effective reduction of Ei modulus to approximate effects of creep = 50 %

Ovality % = 100 x (Mean Dia. - Minimum Dia.) / Mean Dia.

- 2% ovality is typically assumed when the host pipe measurements have not been field verified.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
CURED-IN-PLACE PIPE (CIPP) LINING**

**CIPP WALL THICKNESS
FULLY DETERIORATED DESIGN (FD)**

		Required DR (D / t)			
		Ei = 250,000 psi		Ei = 400,000 psi	
		Ground Water Depth			
Ovality	Range of Depth to invert (feet)	50% Depth	Full Depth	50% Depth	Full Depth
2 % *	4 - 8	49	43	58	51
	8 - 12	49	43	58	51
	12 - 16	44	39	52	46
	16 - 20	40	36	47	41
	20 - 24	37	33	44	38
5 %	4 - 8	41	37	48	43
	8 - 12	41	36	48	43
	12 - 16	37	33	44	38
	16 - 20	34	30	40	35
	20 - 24	31	27	37	32
8 %	4 - 8	35	31	40	36
	8 - 12	35	30	41	36
	12 - 16	31	27	37	32
	16 - 20	28	25	33	29
	20 - 24	26	23	31	27

FD wall thickness considers groundwater, soil and live loads upon the CIPP pipe. The table assumes two heights of groundwater, 120-lbs/cu. ft. of soil density and an AASHTO H20 highway load. The table represents CIPP pipe wall thickness for a host pipe range of 8 to 48 inches. This is a guideline only. Specific calculations should refer to ASTM F-1216, Appendix X.1.

Design Parameters:

Factor of Safety = 2.0

DR = Dimension Ratio = Diameter / thickness $\Rightarrow t = D / DR$

Effective reduction of Ei-modulus to approximate effects of creep = 50 %

Soil Modulus = 1,000 psi, assumed for highway loads or depths ≥ 10 feet (all others 700 psi).

Ovality % = 100 x (Mean Dia. - Minimum Dia.) / Mean Dia.

* 2% ovality is typically assumed when the host pipe measurements have not been field verified.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
HMA APPLICATION ESTIMATE**

a. Materials.

- City Streets:

Water Valve Replacement Locations (Estimated 8' x 8' area)

- HMA, LVSP (Top Course) shall have a yield of 220 pounds per square yard (2 inches).
- HMA, LVSP (Base Course) shall have a yield of 220 pounds per square yard (2 inches).

Sanitary Sewer Full Replacement Trenches – 11' minimum width

- HMA, LVSP (Top Course) shall have a yield of 220 pounds per square yard (2 inches).
- HMA, LVSP (Base Course) shall have a yield of 220 pounds per square yard (2 inches).

Sanitary Sewer Spot Replacement (Estimated 8' x varied lengths)

- HMA, LVSP (Top Course) shall have a yield of 220 pounds per square yard (2 inches).
- HMA, LVSP (Base Course) shall have a yield of 220 pounds per square yard (2 inches).

- MDOT M-99 Locations:

S. Broad St. -- Sanitary Sewer Spot Replacement, 12" thick (Est. 12' x 45' and 12' x 20')

- HMA, LVSP (Top Course) shall have a yield of 330 pounds per square yard (3 inches).
- HMA, LVSP (Leveling Course 2) shall have a yield of 330 pounds per square yard (3 inches).
- HMA, LVSP (Leveling Course 1) shall have a yield of 330 pounds per square yard (3 inches).
- HMA, LVSP (Base Course) shall have a yield of 330 pounds per square yard (3 inches).

- Binder Performance Grade shall be PG 58-28.

- Minimum Top Course AWI shall be 220, Top Course HMA.

- Bituminous Bond Coat shall be applied between successive courses of HMA (Payment considered incidental to HMA, LVSP). Application rate shall be 0.05 – 0.15 Gal/SY of SS-1H.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
HMA APPLICATION ESTIMATE**

b. Measurement and Payment. The completed work for HMA will be measured by the Ton. All materials, equipment and labor required to complete the work as described in this Special Provision shall be included in the contract unit price for the following pay items:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
HMA, LVSP (Sanitary Full Replacement Trenches).....	TON
Hand Patching, LVSP (at Water Valve and Sanitary Spot Replacements).....	TON
MDOT, HMA, LVSP (on S. Broad St – M-99).....	TON

Final restorations of all street openings for valve replacements and spot sewer replacement locations shall be completed, at a minimum, once per month.

MDOT final restorations shall be completed immediately upon acceptance of the work.

Final restorations of Sanitary Full Replacement Trenches associated with sewer replacement locations shall be completed immediately upon acceptance of the work.

CITY OF HILLSDALE
SPECIAL PROVISION
FOR
CONC PAVEMENT REPAIR, NON-REINFORCED, 12 INCH, MODIFIED

a. Description. This work consists of constructing a non-reinforced concrete base course with load transfer devices in accordance with the standard specifications, except as modified by the details on the plans and this special provision.

b. Materials. Provide materials in accordance with subsection 603.02 of the Standard Specifications for Construction.

Concrete Grade shall be Grade P-NC with a Minimum Flexural Strength of 300 PSI in <72 hours. Refer to Table 603-1 in the 2012 MDOT Specification. Do not use calcium chloride admixture. Provide coarse aggregate with no greater than 2.5 percent absorption in accordance with ASTM C 127.

Use Grade P-NC concrete patching mixture containing 658 lbs/CY (7 sack) when the forecasted air temperature is above 59°. Use 752 lbs/CY (8 sack) when the forecasted air temp is 59° of less.

The contractor may provide a non-chloride, Type C, or Type E, set accelerating admixture, from the Qualified Products List, with the required cement content to achieve the flexural strength of 300 psi by the require opening-to-traffic time.

c. Construction. Construct the concrete pavement repairs, 50 feet long, or less, in accordance with 602 except as modified by section 603.03 of the Standard Specifications for Construction, the details on the plans, and this special provision.

1. Epoxy anchor proposed concrete pavement to existing adjacent concrete pavement with Epoxy Anchored Lane ties in accordance with Standard Plan R-44-F.
2. Lane ties shall be #5 x 1'-6" long epoxy coated deformed bars drilled 7" into the adjacent concrete pavement and grouted in place. Lane ties shall be spaced 12" o.c. around the perimeter of the concrete patch location. Place the dowel in the middle of the concrete pavement thickness.
3. Finish the concrete base course in accordance with subsection 603.03.B.7 of the Standard Specification for Construction.
4. Texture the concrete base course in accordance with subsection 602.03.K of the Standard Specification for Construction.
5. Apply a transparent membrane curing compound to the concrete base course in accordance with subsection 903.06.B of the Standard Specification for Construction.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
CONC PAVEMENT REPAIR, NON-REINFORCED, 12 INCH, MODIFIED**

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay items:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
Pav't Repr, Non-Reinf Conc, 12" Modified.....	Square Yard (SY)

Pav't Repr, Non-Reinf Conc, 12" Modified includes all labor, equipment, and materials necessary to complete the work as described including all required epoxy anchored ties required per this Special Provision.

MDOT final restorations shall be completed immediately upon acceptance of the work.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
TURF RESTORATION**

DESCRIPTION

This work shall consist of the establishment of a durable, permanent, weed free, mature, perennial turf including, but not limited to, fine grading, top soiling, seeding, fertilizer nutrient, mulching, mulch anchoring, watering, weed control, maintenance and repair of turf during the life of the contract.

MATERIALS

Selection of materials unless otherwise noted shall be the responsibility of the Contractor with the following minimum conditions;

- **Topsoil:** Shall be furnished or salvaged supporting vigorous growth. Topsoil shall be humus bearing and free from all foreign material, vegetation clumps and stones greater than 1/2" diameter. Topsoil shall be placed at a depth of 4 inches.
- **Seed:** Mixture shall be MDOT TDS per Table 917-1 of the 2012 MDOT Standard Specification and provided by an MDOT approved certified vendor. Furnish seed in durable bags, each marked by the supplier of the blended mix with a tag giving name, lot number, and net weight of contents, purity and germination.
- **Mulch:** Mulch seeded areas with the appropriate materials for site conditions to promote germination and growth of seed and to mitigate soil erosion and sedimentation.
- **Herbicides:** Comply with all federal, state and local laws. Herbicides shall be furnished and applied as required to control weed growth. The Contractor shall select the herbicide and rate of application in accordance with the manufacturer's recommendations. The Contractor shall comply with all federal, state and local laws as noted in Section 107 of the Standard Specifications for Construction. Notify the Engineer at least 48 hours prior to any applications being made. Furnish and apply herbicide(s) as needed. Obtain the Engineer's approval of work methods and herbicide(s) selected prior to the application of the herbicide(s). Complete a spray log and submit to the Engineer each day an application is made.
- **Fertilizers:** Furnish and apply fertilizer(s) as needed. It is the Contractor's responsibility to select the fertilizer(s) and the rate at which it is used. Phosphorus is allowed for use only at the time of planting and when required by soil conditions. Obtain the Engineer's approval of work methods and fertilizer(s) prior to the application of the fertilizer(s).
- **Water:** Furnish and apply water from an approved source at a rate to promote healthy growth.

CONSTRUCTION METHOD

The Contractor is responsible for all work and construction methods used in completing the work. Standard seeding or Hydroseeding are both acceptable methods for restoration per the below methods.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
TURF RESTORATION**

Standard Seeding:

- After the areas to be seeded have been brought to the required grade and properly trimmed, bring soil to a friable condition by disking, harrowing, or otherwise loosening and mixing to a depth of 3 inches to 4 inches. Thoroughly break all lumps and clods.
- If the prepared seedbed is not fertilized, satisfactorily seeded, and mulched before the friable condition is lost through compaction or crusting, repeat the seedbed preparation prior to seeding or reseeding.
- Rake prepared seedbed before seeding.
- Broadcast fertilizer on the surface as the first step of the seeding process. Work fertilizer into the soil to a depth of 1 to 2 inches. Apply uniformly at a rate equivalent to 240 pounds per 1,000 square feet of 16-32-4.
- Sow seeds following or in conjunction with the fertilizer and while the beds are in friable condition, do not sow seeds through mulch.
- Apply seeds at a minimum rate of 5 pounds per 1,000 square feet. Do not seed when wind velocity exceeds 5 miles per hour.
- Float and lightly compact areas to incorporate the seed into the uppermost ½ inch of the soil.
- Visually inspect the seeded areas for uniformity of application; areas in which visual inspection fails to reveal an average of 2 seeds per square inch shall be reseeded at no additional cost to the owner.
- Apply mulch immediately after seeding, provide uniform distribution and allow sunlight to penetrate mulch.
- Small grain mulch shall be applied at a rate of 2.5 bales per 1000 square feet. Mulch shall be anchored.
- Hydro mulch must be applied at a rate of 2,000 pounds per acre. Do not apply if rain is anticipated within 24 hours. Reapplication is required after rain damage at the contractor's expense.
- Mulch blankets can be utilized in accordance with the Manufacturer's guidelines.

Hydroseeding:

- After the areas to be seeded have been brought to the required grade and properly trimmed, bring soil to a friable condition by disking, harrowing, or otherwise loosening and mixing to a depth of 3 inches to 4 inches. Thoroughly break all lumps and clods.
- If the prepared seedbed is not fertilized, satisfactorily seeded, and mulched before the friable condition is lost through compaction or crusting, repeat the seedbed preparation prior to seeding or reseeding.
- Rake prepared seedbed before seeding.
- Apply fertilizer with seed at a rate equivalent to 6.25 pounds per 1,000 square feet of 16-32-4.
- Use equipment only specifically designed for hydraulic seeding application.
- Mix seed, fertilizer and pulverized mulch in water until uniformly blended into homogeneous slurry. Continue mixing during application.
- Float and lightly compact areas to incorporate the seed into the uppermost ½ inch of the soil.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
TURF RESTORATION**

- Visually inspect the seeded areas for uniformity of application; areas in which visual inspection fails to reveal an average of 2 seeds per square inch shall be reseeded at no additional cost to the owner.
- Apply mulch immediately after seeding, provide uniform distribution and allow sunlight to penetrate mulch.
- Small grain mulch shall be applied at a rate of 2.5 bales per 1000 square feet. Mulch shall be anchored.
- Hydro mulch must be applied at a rate of 2,000 pounds per acre. Do not apply if rain is anticipated within 24 hours. Reapplication is required after rain damage at the contractor's expense.
- Mulch blankets can be utilized in accordance with the Manufacturer's guidelines.

Maintenance:

- If an area washes out after work has been properly completed and approved by the city, make required corrections to prevent future washouts and replace the topsoil, fertilizer, seed and mulch. This replacement will be paid for as additional work using applicable contract items.
- If an area washes out for reasons attributable to the Contractor's activity or failure to take proper precautions, replacement will be at the Contractor's expense.
- If the seeded turf is not well established at the end of the first growing season, the Contractor is responsible to re-seed until turf is well established and approved by the city. Any failure on the part of the property owner to properly care for the restored lawn area prior to achieving a good catch of grass shall in no way relieve the Contractor of his responsibility as set forth above.
- If weeds are determined by the city to cover more than 10% of the total area of turf restoration, the Contractor must provide weed control in accordance with subsection 816.03.J of the MDOT Standard Spec. Weed control will be at the Contractor's expense with no additional charges to the project.

MEASUREMENT AND PAYMENT

The completed work, as described, will be measured and paid for at the contract unit price for the following pay items. If the contract does not include these pay items, the cost of this work will be considered to be included in the contract unit prices for other relevant pay items:

PAY ITEM

PAY UNIT

Turf Restoration.....LUMP SUM (LS)

Payment for **Turf Restoration** will be in Lump Sum for restoration of the grass areas disturbed by the work items. Upon completion of work a 50% payment will be made with the additional payment made upon completion final acceptance of the established turf.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
PROJECT CLEANUP**

DESCRIPTION

This work consists of removing and disposing of debris; including fences, fallen timber, logs, guardrail sections and posts, rocks, boulders, and other rubbish from the Contractor's operations within the project limits in accordance with section 201 and section 205.

CONSTRUCTION

Provide project cleanup as an ongoing operation. Perform project cleanup within the right-of-way, but over an area no greater than 50 feet beyond the limits of earth disturbance for the length of the project.

Fill holes and ruts, resulting from construction operations, with approved material, in any areas within the right-of-way (ROW) and any areas outside the ROW as a result of project work and/or storage of materials or equipment. Compact and level filler materials and restore ruts and holes to the surrounding contour in accordance with section 816, or as directed by the Project Manager.

Clean existing culverts, sewers, or drainage structures that contain sediment or debris from the construction operation.

MEASUREMENT AND PAYMENT

Pay Item

Pay Unit

Project Cleanup Lump Sum

The City will pay for Project Cleanup upon completion of the cleanup operation.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
MAINTAINING TRAFFIC AND TRAFFIC CONTROL**

a. Description. Construction is throughout the City of Hillsdale and work includes replacement of identified water valves, replacement of certain sections of existing sanitary sewers, sanitary sewer CIPP Lining and other miscellaneous work. Set up traffic control and/or detour routes per traffic control plans in the project drawings. Side street and commercial and residential access shall be maintained at all times unless otherwise coordinated with the City of Hillsdale staff. Traffic control shall be provided as shown on the plans, attachments and in accordance with Sections 104.07, 104.11, 812 and 922 of the Michigan Department of Transportation Standard Specifications for Highway Construction, 2012 Edition including any supplemental Specifications and any special provisions in this proposal. All traffic devices and their usage shall conform to the current edition of the Michigan Manual on Uniform Traffic Control Devices (MMUTCD).

b. Construction Influence Area (CIA). The CIA shall include the right-of-way of the following roadways where the work is to be completed.

In addition, the CIA includes the area within the right-of-way of all crossroads within the project limits and designated detour routes, to the furthest placed construction sign, which includes any advance informational signs related to the project.

The Contractor shall coordinate operations with other contractors performing work on other projects within or adjacent to the Construction Influence Area (CIA).

City Maintenance crews may perform maintenance work within or adjacent to the Construction Influence Area (CIA). The City maintenance crews will coordinate their operations with the Engineer to minimize the interference to the Contractor. No additional payment will be made to the Contractor for the joint use of the traffic control items.

c. Traffic Restrictions. No work will be allowed during the Good Friday, Memorial Day, Fourth of July, Labor Day, Veterans Day, Thanksgiving, the day after Thanksgiving, Christmas Eve, Christmas Day, New Year's Eve, and the New Year's Day holiday periods as defined and directed by the Engineer. Prior to ceasing operations for a given holiday period, the Contractor shall ensure that all traffic control devices required for the current construction stage are in place, cleaned, and fully operational.

All work shall be conducted between 7:00 a.m. and 6:00 p.m., Monday through Saturday. Night or weekend work will not be permitted without written approval of the City Manager.

Refer to the General Information for identified work restrictions.

Maintain local and emergency traffic at all times as possible.

Maintain and protect pedestrian traffic at all times.

Maintain access to all businesses to the best of your ability. If a business has multiple drives, one shall remain open at all times.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
MAINTAINING TRAFFIC AND TRAFFIC CONTROL**

Walks, driveway and entrances to buildings shall not be unnecessarily blocked. Ingress, egress and maintenance of drive approaches, sidewalks, crosswalks, parkways and open and unopen street subgrade shall be the responsibility of the Contractor throughout construction. Construction shall be completed in such a manner as to maintain the required entrance width for traffic at all times. When partial widths of new pavement area available to local traffic, access to drive shall be provided immediately. Temporary ramps shall be constructed where necessary as directed by the Engineer to maintain access to properties and shall not be pay for as a separate pay item.

d. Traffic Control Devices. All traffic control devices and their usage shall conform to the Michigan Manual on Uniform Traffic Control Devices (MMUTCD), 2011 Edition, as revised and as specified herein.

Distances shown between construction warning, regulatory, and guide signs shown on the plans are approximate and may require field adjustment, as directed by the Engineer.

All construction warning signs, unless otherwise noted, shall be 48" x 48" mounted at 7 feet bottom heights.

Temporary signs shall be erected only when in use. Where signs are no longer applicable, they shall be removed or have their legends completely covered with plywood.

Temporary traffic control devices not in use shall be kept at the Contractor's lay down area. Signs, plastic drums and barricades may be laid down and stored in the parkway for a maximum of 24 hours.

Sign covers shall be used to cover any non-applicable existing signs. Covers shall not leave any marks on, or mark in any way, signs or sign surfaces. Notify the Engineer at least 24 hours in advance of erection or removal of sign covers.

All channelizing devices shall be Plastic Drums, High Intensity. Taper spacing of plastic drums shall conform to MDOT Maintaining Traffic Typical M0020a. The maximum recommended distance(s) between channelizing devices should be equal in feet to the posted speed in miles per hour on taper(s) and twice the posted speed in the parallel area(s).

Place channelizing devices, lighted arrow panels, and other traffic control devices as shown on the plans, or as directed by the Engineer to fit a specific condition.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
MAINTAINING TRAFFIC AND TRAFFIC CONTROL**

e. Flagger Control. Flaggers shall wear retroreflective clothing appropriate for the speed of the roadway where the project is located.

Flaggers shall utilize hand-signaling devices, such as STOP/SLOW paddles. STOP/SLOW paddles shall be at least 18" wide with 6" letters.

Advance warning signs (W20-7 or W20-7a) shall be provided at each prior to each flagger location, 2 minimum.

Flaggers will be paid utilizing the Traffic Control – Flaggers w/ Advance Warning Signs by the unit for each 4 hours they are working on the project site.

f. Measurement and Payment. This pay item will be paid as a Lump Sum item as identified below:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
Traffic Control – Water Daily Closure (Project Drawing W16)	Per Hole
Traffic Control – Water Overnight Closure (Project Drawing W16)	Per Hole
Traffic Control – Water Detour (Project Drawing W16)	Per Detour
Traffic Control – Flaggers w/ Advance Warning Signs	Per 4 Hours
Traffic Control – Willow Street (Project Drawing SAN 13)	Lump Sum (LS)
Traffic Control – W St Joe Street (Project Drawing SAN 13)	Lump Sum (LS)
Traffic Control – Mechanic Street (Project Drawing SAN 14)	Lump Sum (LS)
Traffic Control – Marion Street (Project Drawing SAN 15)	Lump Sum (LS)
Traffic Control – Sanitary Spot Replacement (Project Dwg SAN 16)	Per Site
Traffic Control – Sanitary Lining (Project Drawing SAN 16)	Per Site
Traffic Control – MDOT Lane Closure (Project Drawing SAN 17)	Lump Sum (LS)
Traffic Control – MDOT Lane Shift (Project Drawing SAN 17)	Lump Sum (LS)

TRAFFIC CONTROL pay items shall include all material, labor, and equipment needed to accomplish the traffic control as specified per site and shall including furnishing, placement, operation and maintenance of all traffic control devices required for completion of the required work.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
TEMPORARY PEDESTRIAN TYPE II BARRICADE**

a. Description. This work consists of furnishing, installing, maintaining, relocating, and removing a temporary pedestrian Type II barricade section as identified in the proposal or on the plans. Use temporary pedestrian Type II barricades to close non-motorized facilities including sidewalks, bicycle paths, pedestrian paths, and shared use paths that are not part of the roadway. One pedestrian Type II barricade is defined as a barricade section at least 43 inches wide, including all supports, ballast, and hardware.

b. Materials. Provide a temporary pedestrian Type II barricade that meets the requirements of *National Cooperative Highway Research Program Report 350 (NCHRP 350)* or *Manual for Assessing Safety Hardware (MASH)*, in addition to meeting the following requirements:

1. Provide barricade sections at least 43 inches wide, designed to interconnect to ensure a continuous *Americans with Disabilities Act (ADA)* compliant tactile barrier. Ensure the connection includes provisions to accommodate non-linear alignment as well as variations in elevation at the installation area.
2. Ensure the top surface of the barricade is designed to function as a hand-trailing edge, and has a height between 32 and 38 inches. Ensure the lower edge of the barricade is no more than 2 inches above the surface of the non-motorized facility. Ensure the top edge of the bottom rail of the barricade is a minimum of 8 inches above the surface of the non-motorized facility. The barricade may have a solid continuous face. Finally, all features on the front face of the barricade (the face in contact with pedestrians) must share a common vertical plane.
3. Equip both sides of the barricade with bands of alternating 6-inch wide orange and white vertical stripes of reflective sheeting. Two bands of sheeting 6 inches tall and a minimum of 36 inches long containing at least two orange and two white stripes each are required. One band placed near the top and one near the bottom if the barricade section has a solid face. If the barricade consists of two rails, affix one band of sheeting to each rail. Ensure the stripes of reflective sheeting are aligned vertically. Ensure this sheeting meets or exceeds the requirements of *ASTM D 4956* Type IV sheeting.

c. Construction. Construct the temporary pedestrian Type II barricade in accordance with the manufacturer's recommendations, Michigan Manual on Uniform Traffic Control Devices (MMUTCD), the plans, and the following requirements:

1. Install the barricade as shown on the plans and as directed by the Engineer. Interconnect all barricade sections using hinge components if necessary to ensure a continuous detectable edge for the entire installation. Ensure the barricade is ballasted according to the manufacturer's recommendations to ensure stability during wind events and contact with pedestrians.

**CITY OF HILLSDALE
SPECIAL PROVISION
FOR
TEMPORARY PEDESTRIAN TYPE II BARRICADE**

2. When the barricade is installed near motor vehicle traffic, ensure reflective sheeting is visible to motorists.

3. When pedestrian Type II barricades are used to close a non-motorized facility, ensure a sufficient number of barricade sections are used to block the entire width of the facility. The barricade may extend outside the edge of the non-motorized facility but must not be less than the full width of the facility.

4. If sections of multiple colored barriers are used (i.e. safety orange and white) install the sections such that the colors alternate to increase conspicuity.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
TRAFFIC CONTROL QUALITY AND COMPLIANCE

OPR:JJG

1 of 2

APPR:CER:DBP:01-20-11
FHWA:APPR:06-20-11

Delete the subsection 812.03.C, Deficient Traffic Control Operations on page 601 of the Standard Specifications for Construction in its entirety, and replace with the following.

C. Deficient Traffic Control Operations.

1. Traffic Control Quality and Compliance. The following applies to all aspects of the traffic control plan and traffic control devices except the Type D lights on plastic drums which are covered elsewhere in the contract.

a. Traffic Control not Anticipated in Design. If at any time during the project, including the time during the seasonal suspension, the Engineer documents that the traffic control requires improvements beyond the scope of the Traffic Control Plan, the Engineer will provide written instructions to the Contractor and traffic control supplier what improvements are required. The Contractor must develop and submit to the Engineer for approval, a written implementation schedule for improvements. If the schedule is not approved, or if the schedule is approved but is not followed, the Department will adjust the contract according to subsection 812.03.C.1.c.iii. If the implementation schedule is not followed, the Engineer will notify the Contractor and traffic control supplier in writing that they are in violation of this subsection. The work of making traffic control improvements directed by the Engineer that are beyond the scope of the Traffic Control Plan will be paid for as extra work.

b. As Designed Traffic Control. If at any time during the project, including the time during the seasonal suspension, the Engineer documents that the traffic control is deficient, inadequate or improperly placed, the Engineer will provide written notification with instructions for corrective action to the Contractor and traffic control supplier. Upon receipt of the notification of corrective action, the Contractor has 4 hours to correct the traffic control. If the traffic control cannot be corrected within the 4 hour time period, the Contractor will develop a written implementation schedule for the corrective action and submit the schedule to the Engineer for approval within 1 hour of receiving the written notification. If the schedule is not approved, or if the schedule is approved but is not followed, the Department will adjust the contract according to subsection 812.03.C.1.c.iii. If the implementation schedule is not followed, the Engineer will notify the Contractor and traffic control supplier in writing that they are in violation of this subsection.

c. Corrective Action. The Engineer will give written notification to the Contractor as identified above. Failure to make corrections within the timeframe required may result in the following actions by the Engineer:

- i. Stop work on the project until the Contractor completes corrective action,
- ii. Order corrective action by others in accordance with subsection 107.07, subsection 108.02, subsection 812.03.B, and in the interest of public safety.
- iii. A contract price adjustment will be made in the amount of \$100 per hour for every hour or portion thereof the improvements or corrective action remains incomplete as described herein. If improvements or corrections have not been made to the satisfaction of the Department, the contract will be adjusted until the traffic control is acceptable.

CITY OF HILLSDALE, MICHIGAN CONTRACTOR SAFETY POLICY

Good communication is a necessary element of maintaining safety. Everyone working at a jobsite must work cooperatively to identify safety hazards and communicate prevention practices that will improve the safety and health of everyone involved. Therefore, the City of Hillsdale, has implemented the following contractor safety program for our worksites so that on the job injuries are minimized and work practices may be standardized.

Purpose

A written contractor safety policy establishes guidelines to be followed for contractors working for the City of Hillsdale. The rules established:

- Provide a safe working environment.
- Govern facility relationships with outside contractors.
- Ensure that Contractor employees and our employees are trained to protect themselves from all potential and existing hazards.

The effectiveness of the contractor safety program depends upon the active support and involvement of all employees. This plan is intended to ensure that all contractor work practices are carried out safely to minimize the possibility of injury or harm to the contractors' employees or our own employees. It is intended to serve as an additional tool in safeguarding the health and safety of employees.

The very nature of utility construction and operation places employees and contractors in hazardous situations. Workers should always exercise extreme caution when at a jobsite.

This document is provided to ensure that all appropriate City of Hillsdale safety plans, policies and procedures are communicated to all participating contractors. It also provides an avenue for contractors to communicate their safety plans, policies and procedures to the City of Hillsdale. This program aims to prevent personal injuries and illnesses.

Safety Coordinator Duties

The Safety Coordinator is responsible for developing and maintaining the program. Employees may review a copy of the plan. It is located at 45 Monroe St. safety office and in the Safety Dept. folder of the computer system. In addition, the Safety Coordinator is responsible for maintaining any records related to the contractor safety program.

If after reading this program, you find that improvements can be made, please contact the Safety Coordinator. We encourage all suggestions because we are committed to the success of our contractor safety program. We strive for clear understanding, safe behavior, and involvement from every level of our company.

Explanation of Responsibilities

City of Hillsdale Responsibilities

The City of Hillsdale has specific safety responsibilities when hiring contractors, which include the following listed steps:

1. Take steps to protect contract workers who perform work on or near a potentially hazardous process, facility, or area.
2. Obtain and evaluate information regarding the contract employer's safety performance and programs.
3. Inform the contractor of known potential electrical, fire, explosion, or chemical release hazards related to the contractor's work.
4. Develop and implement safe work practice procedures to control contract employee entry into hazardous work areas and operation or repair of utility facilities.
5. Require contractors to provide appropriate personal protective equipment to their employees at all times.
6. Periodically evaluate the contract employer's fulfillment of his or her responsibilities under this policy.
7. Hire and use only contractors who meet Contractor Selection Criteria as listed in the next section of this policy.

Contractor Responsibilities

Contract employees must perform their work safely. Considering that contractors often perform very specialized and potentially hazardous tasks, such as confined space entry activities and non-routine repair activities, their work must be controlled. Contractor responsibilities when accepting contracts with the City of Hillsdale include the following listed steps. The contract employer will:

1. Assure that the contract employee is trained in the work practices necessary to safely perform his or her job.
2. Instruct the contract employee in the potential electrical, fire, explosion, or chemical release hazards related to his or her job and the process.
3. Document contract employee training.
4. Inform contract employees of and then enforce safety rules of the facility, particularly those implemented to control the hazards of the contracted process during operations.
5. Require that all subcontractors abide by the same rules to which the contractor is bound.
6. Abide by the facility smoking rules.

7. Notify plant operators, foremen, or managers of any operations that could interrupt utility services. Also, immediately notify said individuals if an unexpected utility interruption has occurred.

Guidelines for Contractor Safety

The following listed steps are the standard procedures for evaluating and choosing contractors who will work on-site at the City of Hillsdale.

To determine that past safety performance, the group or individual selecting the contractor may consider the contractor's:

- OSHA log, which includes the injury and illness rates (number of lost-time accident cases, number of recordable cases, number of restricted workday cases, number of fatalities) for the past three years.
- Written safety program and training system.

Contractor work methods and experience should be evaluated. Ensure that for the job in question the contractor and its employees have the appropriate:

- Job skills.
- Equipment.
- Knowledge, experience, and expertise.
- Permits, licenses, certifications, or skilled tradespeople necessary to perform the work in question.

The contractor must be willing and able to provide a current certificate of insurance for workers' compensation and general liability coverage with the City of Hillsdale.

Each contractor must be responsible for ensuring that its employees comply with all applicable local, state, and federal safety requirements, as well as with any safety rules and regulations set forth by the City of Hillsdale, at which it is performing the contracted work.

Possible ways to determine past compliance with such safety regulations include:

- Requesting copies of any citations for violations occurring within the last three years, to determine the frequency and type of safety laws violated.
- Having all bidders on jobs describe in detail their safety programs, infractions, accidents, and workers' compensation claims within the last three years.

This information will provide the City of Hillsdale with a solid background on that contractor's safety performance and adherence to safety rules and regulations.

Guidelines for Information Exchange

City of Hillsdale Guidelines for Information Exchange

Before contract work begins, the City of Hillsdale must:

Designate a representative to coordinate and communicate all safety and health issues with the contractor. The designated representative will have a copy of the work document, be thoroughly familiar with its contents, and with the safety and health aspects of the work, or know whom to call to obtain this information. The designated representative is responsible for ensuring that all company responsibilities listed below are carried out.

1. Provide a copy of the applicable safety policies and procedures to the contractor.
2. Inform the contractor of any emergency signals and personnel clearance procedures that may be put into operation in areas where the contractor's employees are working.
3. The contractor should be given the telephone numbers of any appropriate City of Hillsdale Project manager, the nearest hospital, ambulance service, and fire department.
4. Work directly with the contractor's designated representative, with whom all contacts should be made.
5. Review all contract requirements related to safety and health with the contractor's designated representative, including, but not limited to, rules and procedures, personal protective equipment (PPE), and special work permits or specialized work procedures.
6. Inform contractor's designated representative of the required response to employee alarms and notices.
7. Communicate thoroughly with the contractor's designated representative any safety and health hazards (particularly non-obvious hazards and hazard communication issues) known to be associated with the work, including those in areas adjacent to the worksite. Tell them it is the contractor's responsibility to convey this information to its employees.
8. Ensure that all affected employees of the city receive training on all hazards which the contractor may introduce.

During the contract work, the city must:

1. Limit, as necessary, the entry of city employees into contractor work areas.
2. Monitor the contractor's compliance with the contract throughout the duration of the work. When checking contractor work during the project, note any negligent or unlawful act or condition in violation of safety standards or requirements. Any items noted should be brought immediately to the attention of the contractor's designated representative. However, if an unsafe act or a condition is noted that creates an imminent danger of serious injury, immediate steps should be taken to stop the unsafe act or condition. Do not allow work that is in violation of a regulation to continue.
3. Document all discussions, including place, time, and names of contractor employees involved.

4. For work for which the city has developed specific and generally applicable procedures, make sure contractors and their subcontractors follow the same procedures.
5. Obtain a copy of each OSHA recordable injury report from the contractor and subcontractor. Investigate and report to the BPU Director and/or City Manager all personal injuries to contractor and subcontractor employees.
6. Investigate and report any property damage caused by a safety accident. Maintain a contractor accident report file.

Contractor Guidelines for Information Exchange

Before the contract work begins, the contractor must:

1. Designate a representative to coordinate all safety and health issues and communicate with the City of Hillsdale's designated representative.
2. Provide information to the designated representative on the safety and health hazards that may arise during the course of the contractor's work at the City of Hillsdale BPU and the means necessary to avoid danger from those hazards, including Hazard Communication and all other potential hazards.
3. Obtain from the City of Hillsdale any safety rules and regulations in effect at the site or potential hazards present that may affect the contractor's work.
4. Be certain to be informed of any emergency signals and personnel clearance procedures that may be put into operation in areas where the contractor's employees are working.
5. The contractor should be certain to have the telephone numbers of any appropriate City of Hillsdale Project Manager/Designee, the nearest hospital, ambulance service, and fire department.
6. Advise and train its employees on hazards associated with the work to be performed, including any Hazard Communication or other hazard information provided the contractor by the City of Hillsdale.
7. Keep the designated representative of the City of Hillsdale fully informed of any work that may affect the safety of the City of Hillsdale's employees or property. This includes complying with the state and federal right-to-know legislation and providing the designated representative appropriate material safety data sheets (MSDSs) or other required information about chemicals the contractor will bring onto the site.
8. Know who to call and what to do in emergencies, including where first aid and medical services are located and train employees on this.

During the contract work, the contractor will:

1. Have a designated site safety coordinator present and attentive to the work being carried out at all times that the contractors and/or subcontractors are working at the site.
2. Ensure that all subcontractors are abiding by the terms of this plan.

3. Perform its work while the plant or system is operating, if necessary, and establish necessary safe practices to permit work under operating conditions without endangering

Any person or property. This includes but is not limited to barricading, sign-posting, grounding, lockout/ tagout, etc.

4. Make sure that any equipment, chemicals, or procedures used by the contractor to perform contracted work meet all OSHA requirements.

5. Be held responsible and accountable for any losses or damages suffered by the City of Hillsdale and/or its employees as a result of contractor negligence.

6. Provide its employees with medical care and first-aid treatment.

7. Use only the plant or building entrance designated, and follow the facility access control practice, as applicable. The contractor also will ensure that each contractor employee is issued and wears some form of easily seen identification.

8. Provide supervisors and employees who are competent and adequately trained, including training in all health and safety aspects of the work involved in the contract.

9. Provide all tools and equipment for the work, including personal protective equipment (PPE), and ensure the equipment is in proper working order and employees are instructed in its proper use.

10. Maintain good housekeeping in the workplace.

11. Follow specific instructions supplied by this company should emergency alarms be activated.

12. Notify the designated representative immediately of any OSHA recordable injury or illness to contractor employees or subcontractor employees occurring while on the site of this company. Provide a copy of each accident report to the designated representative.

13. Receive and use a copy of any applicable City of Hillsdale written safety policies and procedures.

14. After conclusion of the contract work, the contractor is responsible for cleaning all work areas and disposing of any discarded materials in a proper and legal manner.

Training Requirements

City of Hillsdale Requirements

City of Hillsdale makes sure that affected City employees receive training on all hazards to which they will be introduced by a contractor. In addition, we emphasize to the contractor that it is the contractor's responsibility to convey to its employees any safety information provided by the City of Hillsdale to the contractor.

Contractor Requirements

The contractor must:

- Train all workers on all safety and health hazards and provisions applicable to the type of work being done, and provide documentation of such training to this company's designated representative.
- Train employees on where to obtain first aid and medical services.
- Train employees on appropriate lockout/tagout procedures and the confined space program.

Recordkeeping Requirements

City of Hillsdale Requirements:

The designated representative will:

1. Have a copy of the contract on file and be thoroughly familiar with its contents, and with the safety and health aspects of the work.
2. Keep records of all training done with company workers regarding hazards to be caused by the contracting company.
3. Keep copies of any OSHA recordable injury and illness logs for the project, as well as copies of accident reports on all accidents that occur in the course of the project.
4. Keep records of all documentation of any sort given to you by the contractor, including records of training done, MSDSs, accident reports, etc.
5. Keep records of all documentation of any sort you give to the contractor, including list of hazards to train their employees on, MSDSs, etc.
6. Document all discussions, letters, memos, or other communications made to the contractor regarding safety issues, including place, time, and names of people involved.
7. Compile a report to the director of utilities if there arise any safety or health concerns with the project.

Contractor Requirements:

The contractor will:

1. Keep records of all training done with contract workers and all documentation provided to the contracting company regarding such training.
2. Have on file the telephone numbers of the appropriate City of Hillsdale manager, the nearest hospital, ambulance service, and fire department.

3. Have copies on-site of all material safety data sheets (MSDSs) or other required information about chemicals relevant to the work on-site.
4. Keep an OSHA recordable injury and illness log for the project, as well as copies of accident reports on all accidents that occur in the course of the project.
5. Assist utility workers in completing utility outage reports related to the contractor's actions.

LIFT STATION TECHNICAL SPECIFICATION

This Technical Specification pertains to ALL ITEMS related to the lift station. Other specification in this document shall not be considered when developing the LUMP SUM bid for this work.

SECTION 01110 - SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY

- A. The Project is located at the intersection of Marion Street and Ellen Street in Hillsdale, MI
- B. The Work consists of furnishing labor, material and equipment including the provision of new wetwell, dry pit, pumps, piping, valves, vents, access hatches, concrete, manhole, sewer pipe, fencing, electrical equipment, standby generator and connection to the existing force main for a complete installation.

1.02 WORK SEQUENCE

- A. CONTRACTOR shall arrange its Work so that at no time shall it cause unnecessary interruption to the operation of existing facilities. CONTRACTOR shall prepare and submit to ENGINEER for approval, a complete detailed working schedule setting forth the sequence of operations CONTRACTOR proposes to follow.

1.03 CONTRACTOR USE OF PREMISES

- A. Limit use of the premises to construction activities in areas indicated; allow for OWNER occupancy and use by the public. Confine operations to areas within Contract limits indicated. Portions of the Site beyond areas in which construction operations are indicated are not to be disturbed.
- B. Keep driveways and entrances serving the premises clear and available to OWNER, OWNER's employees, and private property owners at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on Site. Areas for CONTRACTOR's trailers, equipment, and material storage, and CONTRACTOR's employee parking shall be as indicated on Drawings or agreed by OWNER prior to the start of construction.

1.04 MISCELLANEOUS PROVISIONS

- A. CONTRACTOR shall notify all Owners of public utilities within the right-of-way or easement for the purpose of establishing the approximate locations of the utilities in accordance with the requirements of Act No. 53 Public Acts of 1974 of the State of Michigan. CONTRACTOR shall notify MISS DIG-Utility Communication System, 1-800-482-7171, three working days prior to starting any excavation with power equipment.
- B. CONTRACTOR shall be responsible for verifying the location of all underground utilities by magnetic or other type instruments before beginning excavation Work.

LIFT STATION TECHNICAL SPECIFICATION

- C. Time and Sequence of Work: In general, it is the intention and understanding that CONTRACTOR shall have control over the sequence or order of execution of the several parts of the Work to be done under the Contract and over the method of accomplishing the required results, except as some particular sequence or method may be distinctly demanded by the Drawings and Project Manual or by the expressed provisions of the Contract. ENGINEER may, however, make such reasonable requirements as may, in ENGINEER's judgment, be necessary for the proper and effective protection of Work partially or wholly completed, and to these requirements CONTRACTOR shall conform.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 01210 - ALLOWANCES

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements for processing Allowances. Selected materials and equipment, and in some cases their installation, are shown and specified in the Contract Documents by Allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. Additional requirements, if necessary, will be issued by Change Order.

1.02 DEFINITIONS

- A. Lump Sum Allowance: A monetary sum that includes, as part of the Contract Price, the associated costs and requirements to complete the specified Allowance.
- B. Unit-cost Allowance: A specified quantity of a product or assembly, as part of the Contract Price, that is to be included in the Work even though the location of the product or assembly is not indicated on Drawings or shown in the specifications.
- C. Contingency Allowance: A monetary sum that, as part of the Contract Price, is to be utilized as directed by OWNER, through a Change Order, to cover minor changes in the Work.
- D. Provisionary Allowance: A monetary sum that, as part of the Contract Price, is to be utilized as directed by OWNER, through a Change Order, to cover minor changes in the Work.

1.03 SUBMITTALS

- A. Submit invoices or delivery slips to indicate actual quantities of materials delivered to the Site for use in fulfillment of each Allowance.

1.04 OWNER'S INSTRUCTIONS

- A. At the earliest feasible date after Contract Award, advise ENGINEER of the date when the final selection and purchase of each product or system described by an Allowance must be completed in order to avoid delay in performance of the Work.
- B. When requested by ENGINEER, obtain Bids for each Allowance for use in making final selections; include recommendations that are relevant to performance of the Work.
- C. Purchase products and systems as selected by ENGINEER from the designated supplier.
- D. Use Allowances only as directed for OWNER's purposes, and only by Change Orders which designate amounts to be charged to the Allowance.
- E. If the actual price for the specified Allowance is more or less than the stated Allowance, the Contract Price shall be adjusted accordingly by Change Order. The adjustment in Contract Price shall be made in accordance with Paragraph 11.02 of the General Conditions.

LIFT STATION TECHNICAL SPECIFICATION

- F. Change Orders authorizing use of funds from the Contingency or Provisionary Allowances will include CONTRACTOR's related costs and reasonable overhead and profit margins.
- G. At Project closeout, any amounts remaining in Allowances will be credited to OWNER by Change Order.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 INSPECTION

- A. Inspect products covered by an Allowance promptly upon delivery for damage or defects.

3.02 PREPARATION

- A. Coordinate materials and their installation for each Allowance with related materials and installations to ensure that each Allowance item is completely integrated and interfaced with related construction activities.

LIFT STATION TECHNICAL SPECIFICATION

SCHEDULE OF ALLOWANCES

1. Lump Sum Allowance for New Gas Service. Michigan Gas Utilities will install new natural gas service to the new standby generator as shown on Drawings. An Allowance of \$5,000 shall be included in the Contract Price for this Work. CONTRACTOR shall make all arrangements for and shall pay for this Work under this Contract. For further information contact:

Name

Company – Michigan Gas Utilities

Address – 899 S Telegraph Rd, Monroe, MI 48161

Phone – 800-401-6402

NOTE: Standby Generator requires 7-inches to 11-inches W.C. and 2983 ft³/hour fuel supply.

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 01310 - PROJECT COORDINATION

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:
 - 1. Coordination of Work under this Contract.
 - 2. Administrative and supervisory personnel.
 - 3. Pre-Construction Conference.
 - 4. Progress meetings.
 - 5. General installation provisions.
 - 6. Cleaning and protection.

- B. Related Sections Specified Elsewhere:
 - 1. Equipment installation check, and operation, maintenance, and training of OWNER's personnel are included in Section 01600 and Sections for specific equipment items.
 - 2. Requirements for CONTRACTOR's Construction Schedule are included in Section 01330.

1.02 DEFINITIONS

- A. Monument: The term "monument" shall be considered as any object defining the location of a property corner, street location, section line, fractional section line, right-of-way marker, or other delineation of land ownership or division.

1.03 SUBMITTALS

- A. Within 15 days of Notice to Proceed, submit a list of CONTRACTOR's principal staff assignments, including the Superintendent and other personnel in attendance at Site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers.

1.04 SCHEDULING

- A. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair. Make adequate provisions to accommodate items scheduled for later installation.

- B. CONTRACTOR shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at Site in accordance with Laws or Regulations. CONTRACTOR shall train CONTRACTOR's employees on use of these sheets and shall keep a master copy on hand at Site.

- C. Coordination with Other Contractors:
 - 1. CONTRACTOR shall so conduct CONTRACTOR's operations as not to interfere with or injure the Work of other Contractors or workmen employed on adjoining or related Work, and

LIFT STATION TECHNICAL SPECIFICATION

CONTRACTOR shall promptly make good any injury or damage which may be done to such Work by CONTRACTOR or CONTRACTOR's employees or agents.

2. Should a contract for adjoining Work be awarded to another CONTRACTOR and should the Work on one of these contracts interfere with that of the other, ENGINEER shall decide which contract shall cease Work for the time being and which shall continue, or whether Work on both contracts shall continue at the same time and in what manner.

- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of schedules.
 2. Installation and removal of temporary facilities.
 3. Delivery and processing of submittals.
 4. Progress meetings.
 5. Project closeout activities.

1.05 PRE-CONSTRUCTION CONFERENCE

- A. ENGINEER will schedule a Pre-Construction Conference and organizational meeting at the Site or other convenient location prior to commencement of construction activities to review responsibilities and personnel assignments.
- B. Attendees: OWNER, ENGINEER and ENGINEER's consultants, CONTRACTOR and its superintendent, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.
- C. Agenda: Discuss items of significance that could affect progress including such topics as:
1. Tentative Construction Schedule.
 2. Critical Work sequencing.
 3. Designation of responsible personnel.
 4. Procedures for processing field decisions and Change Orders.
 5. Procedures for processing Applications for Payment.
 6. Distribution of Contract Documents.
 7. Submittal of Shop Drawings, product data, and samples.
 8. Preparation of Record Documents.
 9. Use of the premises.
 10. Office, Work, and storage areas.
 11. Equipment deliveries and priorities.
 12. Safety procedures.
 13. First aid.
 14. Security.
 15. Housekeeping.
 16. Working hours.

LIFT STATION TECHNICAL SPECIFICATION

1.06 PROGRESS MEETINGS

- A. Attendees: In addition to representatives of OWNER and ENGINEER, each subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to conclude matters relating to progress.
- B. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project.
- C. CONTRACTOR's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to CONTRACTOR's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
- D. Reporting: ENGINEER will prepare and distribute copies of minutes of the meeting to each party present and to other parties who should have been present. The minutes will include a brief summary, in narrative form, of progress since the previous meeting and report.
- E. Schedule Updating: CONTRACTOR shall revise Construction Schedule after each progress meeting where revisions to Schedule have been made or recognized. Issue revised Schedule no later than 3 days after the progress meeting date to ENGINEER for distribution concurrently with the progress meeting minutes.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 LAND SURVEY WORK

- A. Monuments:
 - 1. During the progress of Work, CONTRACTOR may encounter monuments within CONTRACTOR's working area.
 - 2. All probable monument points, as so far as known, have been indicated on Drawings as property, street, and/or section line intersection points.
 - 3. CONTRACTOR, prior to actual construction, shall erect protective barricades around all ascertained monuments that are in or adjacent to the construction area. Any other monument uncovered or located during progress of the Work shall be protected from damage or loss and ENGINEER shall be notified in writing as to the exact location.
 - 4. Any monuments damaged or destroyed by CONTRACTOR that are not within the normal Work area as determined by ENGINEER shall be replaced, and CONTRACTOR shall pay all costs of the replacement survey. The replacement survey shall be performed by, or under, the direct supervision of a Registered Land Surveyor, licensed in the State in which the Work is performed.

LIFT STATION TECHNICAL SPECIFICATION

B. CONTRACTOR Performance:

1. Existing Utilities and Equipment:

- a. The existence and location of underground and other utilities and construction as shown on Drawings as existing are not guaranteed. Before beginning Site Work, CONTRACTOR shall investigate and verify the existence and location of underground utilities and other construction.
- b. Furnish information necessary to adjust, move, or relocate existing structures, utility poles, lines, services, or other appurtenances located in or affected by construction. Coordinate with local authorities having jurisdiction.
- c. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water service piping.

3.02 CLEANING AND PROTECTION

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 01330 - SUBMITTALS

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements for submittals, including, but not necessarily limited to, the following:
1. CONTRACTOR's Construction Schedule.
 2. Submittal Schedule.
 3. Shop Drawings.
 4. Product data.
 5. Progress photographs.
 6. Record photographs.
- B. Topics covered elsewhere include, but are not limited to:
1. Permits.
 2. Applications for payment.
 3. Performance and payment bonds.
 4. Insurance certificates.
 5. List of subcontractors.

1.02 SUBMITTALS

- A. Bonds and Insurance Certificates shall be submitted to and approved by OWNER and ENGINEER prior to the initiation of any construction on Site.
- B. Permits, Licenses, and Certificates: For OWNER's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents; correspondence and records established in conjunction with compliance with standards; and regulations bearing upon performance of the Work.

1.03 SUBMITTAL PROCEDURES

- A. Coordination:
1. Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
 2. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 3. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
 4. ENGINEER reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- B. Processing:
1. Allow sufficient review time so that installation shall not be delayed as a result of the time required to process submittals, including time for resubmittals.
 2. ENGINEER will review and return submittals with reasonable promptness, or advise CONTRACTOR when a submittal being processed must be delayed for coordination or receipt

LIFT STATION TECHNICAL SPECIFICATION

of additional information by putting the submittal "On Hold" and returning a transmittal identifying the reasons for the delay.

3. No extension of Contract Time will be authorized because of failure to transmit submittals to ENGINEER sufficiently in advance of the Work to permit processing.

C. Submittal Preparation:

1. Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
2. Provide a space approximately 4 inches by 5 inches on the label or beside the title block on submittals not originating from CONTRACTOR to record CONTRACTOR's review and approval markings and the action taken.
3. Include the following information on the label for processing and recording action taken.
 - a. Project name.
 - b. Date.
 - c. Name and address of ENGINEER.
 - d. Name and address of CONTRACTOR.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Number and title of appropriate Specification Section.
 - i. Drawing number and detail references, as appropriate.
4. Any markings done by CONTRACTOR shall be done in a color other than red. Red is reserved for ENGINEER's marking.
5. The number of copies to be submitted will be determined at the pre-construction conference. Reproduces may be submitted and will be marked and returned to CONTRACTOR. Blue or black line prints shall be submitted in sufficient quantity for distribution to ENGINEER and OWNER recipients.

D. Submittal Transmittal:

1. Package each submittal appropriately for shipping and handling. This shall include an index either on the transmittal or within the submittal itself. Transmit each submittal from CONTRACTOR to ENGINEER using a transmittal form. Submittals received from sources other than CONTRACTOR will be returned without action. Use separate transmittals for items from different specification sections. Number each submittal consecutively. Resubmittals should have the same number as the original, plus a letter designation for each resubmittal (i.e., 7-A, 7-B, etc.).
2. Indicate on the transmittal relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include CONTRACTOR's certification that information complies with Contract Document requirements. On resubmittal, all changes shall be clearly identified for ease of review. Resubmittals shall be reviewed for the clearly identified changes only. Any changes not clearly identified will not be reviewed and original submittal shall govern.

1.04 CONSTRUCTION SCHEDULE

A. Bar Chart Schedule:

1. Prepare a fully developed, horizontal bar chart type Construction Schedule. Submit within 30 days of the date established for "Commencement of the Work."
2. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the Work as indicated on Schedule of Values.

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3. Prepare Schedule on a sheet, or series of sheets, of stable transparency or other reproducible media, of sufficient width to show data for the entire construction period.
4. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on Schedule with other construction activities; include minor elements involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the Work.
5. Coordinate Construction Schedule with Schedule of Values, list of subcontracts, Submittal Schedule, progress reports, payment requests, and other schedules.
6. Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on Schedule to allow time for ENGINEER's procedures necessary for certification of Substantial Completion.

B. Schedule Updating: Revise Schedule after each meeting or activity where revisions have been recognized or made within 2 weeks following the meeting or activity.

1.05 SUBMITTAL SCHEDULE

- A. After development and acceptance of Construction Schedule, prepare a complete Schedule of Submittals. Submit Schedule within 10 days of the date required for establishment of Construction Schedule.
- B. Coordinate Submittal Schedule with the list of subcontracts, Schedule of Values, and the list of products, as well as Construction Schedule.
- C. Prepare Schedule in chronological order; include submittals required during the first 90 days of construction. Provide the following information:
 1. Scheduled date for the first submittal.
 2. Related Section number.
 3. Submittal category.
 4. Name of subcontractor.
 5. Description of the part of the Work covered.
 6. Scheduled date for resubmittal.
 7. Scheduled date ENGINEER's final release or approval.
- D. Following response to initial submittal, print and distribute copies to ENGINEER, OWNER, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.
- E. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- F. Schedule Updating: Revise Schedule after each meeting or activity where revisions have been recognized or made within 2 weeks following the meeting or activity.

1.06 SHOP DRAWINGS

- A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.

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- B. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings. Include the following information:
 - 1. Dimensions.
 - 2. Identification of products and materials included.
 - 3. Compliance with specified standards.
 - 4. Notation of coordination requirements.
 - 5. Notation of dimensions established by field measurement.
- C. Nameplate data for equipment including electric motors shall be included on Shop Drawings. Electric motor data shall state the manufacturer, horsepower, service factor, voltage, enclosure type, oversize wiring box, etc.
- D. Shop Drawings shall indicate shop painting requirements to include type of paint and manufacturer.
- E. Standard manufactured items in the form of catalog work sheets showing illustrated cuts of the items to be furnished, scale details, sizes, dimensions, quantity, and all other pertinent information should be submitted and approved in a similar manner.
- F. Measurements given on Shop Drawings or standard catalog sheets, as established from Contract Drawings and as approved by ENGINEER, shall be followed. When it is necessary to verify field measurements, they shall be checked and established by CONTRACTOR. The field measurements so established shall be followed by CONTRACTOR and by all affected trades.
- G. Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 inches by 11 inches but no larger than 36 inches by 48 inches.
- H. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.

1.07 PRODUCT DATA

- A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as Shop Drawings.
- B. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:
 - 1. Manufacturer's printed recommendations.
 - 2. Compliance with recognized trade association standards.
 - 3. Compliance with recognized testing agency standards.
 - 4. Application of testing agency labels and seals.
 - 5. Notation of dimensions verified by field measurement.
 - 6. Notation of coordination requirements.
- C. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.

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1.08 ENGINEER'S ACTION

- A. Except for submittals for record, information or similar purposes, where action and return is required or requested, ENGINEER will review each submittal, mark to indicate action taken, and return promptly.
 - 1. Compliance with specified characteristics is CONTRACTOR's responsibility.
- B. Action Stamp: ENGINEER will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:
 - 1. Final Unrestricted Release: Where submittals are marked "No Exceptions Taken," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
 - 2. Final-But-Restricted Release: When submittals are marked "Furnish as Corrected," that part of the Work covered by the submittal may proceed, provided it complies with notation or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
 - 3. Returned for Resubmittal: When submittal is marked "Rejected" or "Revise and Resubmit," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
 - a. Do not permit submittals marked "Rejected" or "Revise and Resubmit" to be used at Site, or elsewhere where Work is in progress.
 - 4. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked "Acknowledge Receipt."
 - 5. The approval of ENGINEER shall not relieve CONTRACTOR of responsibility for errors on Drawings or submittals as ENGINEER's checking is intended to cover compliance with Drawings and Specifications and not enter into every detail of the shop work.

1.10 PROGRESS PHOTOGRAPHS

- A. During the process of the Work, photographs shall be taken at the rate of at least 4 every month from start of construction until acceptance by OWNER. These photographs shall be taken from points and at the times directed by ENGINEER.
- B. Two copies of a CD/DVD with high resolution digital photos in JPEG format shall be submitted to ENGINEER. Each photo shall be labeled with date and a description of photo .

1.11 RECORD PHOTOGRAPHS

- A. After final acceptance of the Work, 12 photographs shall be taken of the Project as directed by ENGINEER. These photographs shall be taken from points and at times directed by ENGINEER.
- B. Two copies of a CD/DVD with high resolution digital photos in JPEG format shall be submitted to ENGINEER. Each photo shall be labeled with date and a description of photo.

PART 2 - PRODUCTS

NOT USED

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PART 3 - EXECUTION

NOT USED

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 01420 - DEFINITIONS AND STANDARDS

PART 1 - GENERAL

1.01 DEFINITIONS

- A. Basic Contract definitions are included in the General Conditions.
- B. Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, either at the Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.02 INDUSTRY STANDARDS

- A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents. Such standards are made a part of the Contract Documents by reference. Individual Sections indicate which codes and standards CONTRACTOR must keep available at Site for reference.
- B. Updated Standards: At the request of ENGINEER, CONTRACTOR, or authority having jurisdiction, submit a Change Order proposal where an applicable code or standard has been revised and reissued after the date of the Contract Documents and before performance of Work affected. ENGINEER will decide whether to issue a Change Order to proceed with the updated standard.
- C. Minimum Quantity or Quality Levels: In every instance the quantity or quality level shown or specified shall be the minimum to be provided or performed. The actual installation may comply exactly, within specified tolerances, with the minimum quantity or quality specified, or it may exceed that minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum values, as noted, or appropriate for the context of the requirements. Refer instances of uncertainty to ENGINEER for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed for performance of a required construction activity, CONTRACTOR shall obtain copies directly from the publication source.
- E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations as referenced in Contract Documents are defined to mean the associated names. Names and addresses are subject to change and are believed to be, but are not assured to be, accurate and up to date as of date of Contract Documents.

AA Aluminum Association
900 19th St., NW; Washington, D.C. 20006

AABC Associated Air Balance Council
1518 K St. NW, Suite 503; Washington, D.C. 20005

AASHTO American Association of State Highway and

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Transportation Officials
444 North Capitol St., NW, Suite 249; Washington, D.C. 20001

- ACI American Concrete Institute
P.O. Box 9094; Farmington Hills, MI 48333-9094
- ACPA American Concrete Pipe Association
222 West Las Colinas Blvd., Suite 641; Irving, TX 75039-5423
- AFBMA Anti-Friction Bearing Manufacturing Association
- AFPA American Forest & Paper Association
1111 19th St., NW, Suite 800; Washington, D.C. 20036
- AGA American Gas Association
400 N Capitol St., NW; Washington, D.C. 20001
- AGMA American Gear Manufacturers Association
- AI Asphalt Institute
Research Park Dr., P.O. Box 14052; Lexington, KY 40512-4052
- A.I.A. American Insurance Association
1130 Connecticut Ave., NW, Suite 1000; Washington, D.C. 20036
- AISC American Institute of Steel Construction
One East Wacker Dr., Suite 3100; Chicago, IL 60601-2001
- AISI American Iron and Steel Institute
1101 Seventeenth St., NW; Washington, D.C. 20036
- AITC American Institute of Timber Construction
7012 S. Revere Parkway, Suite 140; Englewood, CO 80112
- ALI Associated Laboratories, Inc.
P.O. Box 152837; Dallas, TX 75315
- ALSC American Lumber Standard Committee
P.O. Box 210; Germantown, MD 20875-0210
- AMCA Air Movement and Control Association
30 W. University Dr.; Arlington Heights, IL 60004-1893
- ANSI American National Standards Institute
25 West 43rd St.; New York, NY 10036
- API American Petroleum Institute
1220 L St., NW; Washington, D.C. 20005-4070
- AREA American Railway Engineering Association
50 F Street, NW, Suite 7702, Washington, D.C. 20001

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ASCE	American Society of Civil Engineers 1801 Alexander Bell Dr.; Reston, VA 20191-4400
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers 1791 Tullie Circle, NE; Atlanta, GA 30329
ASME	American Society of Mechanical Engineers 345 East 47th St.; New York, NY 10017
ASSE	American Society of Safety Engineers 1800 East Oakton Street, Des Plaines, IL 60018
ASTM	American Society for Testing and Materials 100 Barr Harbor Dr.; West Conshohocken, PA 19428-2959
AWPA	American Wood-Preservers' Association P.O. Box 5690; Granbury, TX 76049
AWS	American Welding Society 550 NW Le Jeune Rd.; Miami, FL 33126
AWWA	American Water Works Association 6666 W. Quincy Ave.; Denver, CO 80235
CISPI	Cast Iron Soil Pipe Institute 1499 Chain Bridge Rd.; Suite 203; McLean, VA 22101
CRSI	Concrete Reinforcing Steel Institute 933 North Plum Grove Rd.; Schaumburg, IL 60173
CSA	Canadian Standards Association
FM	Factory Mutual Engineering and Research 1151 Boston-Providence Turnpike; Norwood, MA 02062-9102
H.I.	Hydraulic Institute 9 Sylvan Way; Parsippany, NJ 07054
IEEE	Institute of Electrical and Electronic Engineers 3 Park Ave., 17 th Floor; New York, NY 10016-5997
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrument Society of America 67 Alexander Dr.; Research Triangle Park, NC 27709
MBMA	Metal Building Manufacturers Association 1300 Summer Ave.; Cleveland, OH 44115-2851

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NAPA	National Asphalt Pavement Association 5100 Forbes Blvd.; Lanham, MD 20706-4413
NCPI	National Clay Pipe Institute P.O. Box 759; Lake Geneva, WI 53147
NEC	National Electrical Code (by NFPA)
NESC	National Electrical Safety Code
NEMA	National Electrical Manufacturers Association 1300 North 17 th St., Suite 1847; Rosslyn, VA 22209
NFPA	National Fire Protection Association 1 Batterymarch Park; Quincy, MA 02269-9101
NPCA	National Precast Concrete Association 10333 North Meridian St., Suite 272; Indianapolis, IN 46290
PCA	Portland Cement Association 5420 Old Orchard Rd.; Skokie, IL 60077-1083
PCI	Precast/Prestressed Concrete Institute 209 W. Jackson Blvd.; Chicago, IL 60606-6938
PDI	Plumbing and Drainage Institute 800 Turnpike Street, Suite 300, North Andover, MA 01845
PTI	Post-Tensioning Institute 1717 W. Northern Ave., Suite 114; Phoenix, AZ 85021
RIS	Redwood Inspection Service 405 Enfente Dr., Suite 200; Novato, CA 94949
SAE	Society of Automotive Engineers 400 Commonwealth Dr.; Warrendale, PA 15096-0001
SDI	Steel Deck Institute P.O. Box 25; Fox River Grove, IL 60021-0025
SJI	Steel Joist Institute 3127 10 th Ave. North Ext.; Myrtle Beach, SC 29577-6760
SMACNA	Sheet Metal & Air Conditioning Contractors' National Association 4201 Lafayette Center Dr.; Chantilly, VA 20151-1209
SPIB	Southern Pine Inspection Bureau 4709 Scenic Highway; Pensacola, FL 32504-9094
SSPC	The Society for Protective Coatings

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40 24th St., 6th Floor; Pittsburgh, PA 15222-4565

TPI Truss Plate Institute
583 Donofrio Dr., Suite 200; Madison, WI 53719

UL Underwriters Laboratories
333 Pfingsten Rd.; Northbrook, IL 60062-2096

WCLIB West Coast Lumber Inspection Bureau
P.O. Box 23145; Portland, OR 97281

WWPA Western Wood Products Association
522 SW Fifth Ave., Suite 500; Portland, OR 97204-2122

- F. Government Agencies. Names and titles of state and Federal Government standard or Specification producing agencies are frequently abbreviated. The following acronyms or abbreviations referenced in the Contract Documents indicate names of standard or Specification producing agencies of the Federal government. Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up to date as of the date of the Contract Documents.

CE Corps of Engineers
(U.S. Department of the Army)
Chief of Engineers - Referral
Washington, D.C. 20314

CFR Code of Federal Regulations
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DOT Department of Transportation
400 Seventh Street, SW
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EDA Economic Development Administration
U.S. Department of Commerce
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Chicago, IL 60606

EPA Environmental Protection Agency
401 M Street, SW
Washington, D.C. 20460

MDEQ Michigan Department of Environmental Quality

MDOT Michigan Department of Transportation

MIOSHA State of Michigan OSHA

OSHA Occupational Safety and Health Administration

LIFT STATION TECHNICAL SPECIFICATION

(U.S. Department of Labor)
Government Printing Office
Washington, D.C. 20402

1.03 GOVERNING REGULATIONS/AUTHORITIES

- A. ENGINEER has contacted authorities having jurisdiction where necessary to obtain information necessary for the preparation of Contract Documents; that information may or may not be of significance to CONTRACTOR. Contact authorities having jurisdiction directly for information and decisions having a bearing on the Work.

1.04 SUBMITTALS

- A. Permits, Licenses, and Certificates: For OWNER's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 01450 - QUALITY CONTROL SERVICES

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements for quality control services.
- B. Quality control services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and CONTRACTOR. They do not include Contract enforcement activities performed by ENGINEER.
- C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve CONTRACTOR of responsibility for compliance with Contract Document requirements.
- D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
- E. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.
- F. Inspections, tests, and related actions specified are not intended to limit CONTRACTOR's quality control procedures that facilitate compliance with Contract Document requirements.
- G. Requirements for CONTRACTOR to provide quality control services required by ENGINEER, OWNER, or authorities having jurisdiction are not limited by provisions of this Section.

1.02 CONTRACTOR RESPONSIBILITIES

- A. Provide inspections, tests, and similar quality control services, specified in individual Specification Sections and required by governing authorities, except where they are specifically indicated to be OWNER's responsibility, or are provided by another identified entity; these services include those specified to be performed by an independent agency and not by CONTRACTOR. Costs for these services shall be included in the Contract Price.
- B. Employ and pay an independent agency to perform specified quality control services.
- C. CONTRACTOR and each agency engaged to perform inspections, tests, and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition, CONTRACTOR and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
- D. Schedule times for inspections, tests, and similar activities.
- E. Retesting: CONTRACTOR is responsible for retesting where results of required inspections, tests, or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was CONTRACTOR's responsibility.

LIFT STATION TECHNICAL SPECIFICATION

1. Cost of retesting construction revised or replaced by CONTRACTOR is CONTRACTOR's responsibility, where required tests were performed on original construction.
- F. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:
1. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
 2. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.

1.03 OWNER RESPONSIBILITIES

- A. Provide inspections, tests, and similar quality control services specified to be performed by independent agencies and not by CONTRACTOR, except where they are specifically indicated as CONTRACTOR's responsibility or are provided by another identified entity. Costs for these services are not included in the Contract Price.
- B. Engage and pay for the services of an independent agency to perform inspections and tests specified as OWNER's responsibility.
- C. OWNER will employ and pay for the services of an independent agency, testing laboratory, or other qualified firm to perform services which are OWNER's responsibility.

1.04 TESTING AGENCY RESPONSIBILITIES

- A. Where OWNER has engaged a testing agency or other entity for testing and inspection of a part of the Work, and CONTRACTOR is also required to engage an entity for the same or related element, CONTRACTOR shall not employ the entity engaged by OWNER, unless otherwise agreed in writing with OWNER.
- B. The independent testing agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Specification Sections shall cooperate with ENGINEER and CONTRACTOR in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.
- C. The agency shall notify ENGINEER and CONTRACTOR promptly of irregularities or deficiencies observed in the Work during performance of its services.
- D. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.
- E. The agency shall not perform any duties of CONTRACTOR.

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1.05 SUBMITTALS

- A. The independent testing agency shall submit a certified written report of each inspection, test, or similar service to ENGINEER in triplicate, unless CONTRACTOR is responsible for the service. If CONTRACTOR is responsible for the service, submit a certified written report of each inspection, test, or similar service through CONTRACTOR in triplicate.
- B. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
- C. Written reports of each inspection, test, or similar service shall include, but not be limited to:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making the inspection or test.
 - 6. Designation of the Work and test method.
 - 7. Identification of product and Specification Section.
 - 8. Complete inspection or test data.
 - 9. Test results and an interpretation of test results.
 - 10. Ambient conditions at the time of sample taking and testing.
 - 11. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 REPAIR AND PROTECTION

- A. Upon completion of inspection, testing, sample taking, and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes.
- B. Protect construction exposed by or for quality control service activities and protect repaired construction.
- C. Repair and protection is CONTRACTOR's responsibility regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION

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SECTION 01500 - TEMPORARY FACILITIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: This Section specifies procedural and administrative requirements for temporary services and facilities.
- B. Temporary Utilities include, but are not limited to:
 - 1. Water service and distribution.
 - 2. Temporary electric power.
 - 3. Public and private utilities coordination.
 - 4. Storm and sanitary sewer.
- C. Temporary Construction and Support Facilities include, but are not limited to:
 - 1. Sanitary facilities.
 - 2. Dewatering facilities and drains.
- D. Security and Protection Facilities required include, but are not limited to:
 - 1. Barricades, warning signs, lights.
 - 2. Environmental protection.
 - 3. Control of noise.
 - 4. On-site burning.
 - 5. Dust control.
- E. Sedimentation Control Facilities required include, but are not limited to:
 - 1. Soil erosion and sedimentation control.
 - 2. Stormwater discharge control.
 - 3. Final topography protection.

1.02 REFERENCES

- A. Natural Resources and Environmental Protection Act, P.A. 451 (Act 451) of 1994.
- B. Guidebook of Best Management Practices for Michigan Watersheds.
- C. Local Soil Erosion Control Ordinance or requirements.
- D. Codes and Standards:
 - 1. Comply with NFPA Code 241, "Building Construction and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library, "Temporary Electrical Facilities."
 - 2. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services," prepared jointly by AGC and ASC, for industry recommendations.
 - 3. Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).

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1.03 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:
1. Soil Erosion and Sedimentation Control Program prepared by CONTRACTOR, as specified in this Section, shall be reviewed and have received at least preliminary concurrence from the local Enforcing Agent before it will be presented and discussed at the Pre-Construction Conference, at which time final revisions may be made. Copies of the final agreed program, and Act 451 Permit, shall be delivered to ENGINEER a minimum of 2 weeks prior to beginning any Work on Site.
 2. Temporary Utilities: Submit a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to OWNER, change over from use of temporary service to use of the permanent service.

1.04 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to:
1. Building Code requirements.
 2. Health and Safety regulations.
 3. Utility Company regulations.
 4. Police, Fire Department, and Rescue Squad rules.
 5. Environmental Protection regulations.
 6. State and Local Soil Erosion and Sedimentation Control regulations.
- B. Inspection: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.05 PROJECT CONDITIONS

- A. Unless otherwise provided in these Specifications, CONTRACTOR shall make CONTRACTOR's own arrangements for electricity, gas, water, and sewer services for use during the construction of the Work and shall pay for all temporary facilities, connections, extensions, and services.
1. Cost or use charges for temporary facilities are not chargeable to OWNER or ENGINEER, and will not be accepted as a basis of claims for a Change Order.
- B. Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities or permit them to interfere with progress. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on Site.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Provide new materials; if acceptable to ENGINEER, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.
- B. Water: Provide potable water approved by local health authorities.

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- E. Seed: Consisting of, per acre, 10 pounds Kentucky 31 fescue, 3 pounds Birdsfoot Trefoil, and 3 pounds white clover.
- F. Fertilizers: Consisting of, at least, 200 pounds per acre 12:12:12, or equivalent.
- G. Mulches: Consisting of 2 tons per acre of straw or hay. Chemical mulch or other approved material may be used.
- H. Sod: Shall be as specified in Division 2.

2.02 EQUIPMENT

- A. Provide new equipment; if acceptable to ENGINEER, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.
- B. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 110 to 120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.
- C. Electrical Power Cords: Provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.
- D. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.
- E. Temporary Offices: Provide prefabricated or mobile units or similar on-site construction with lockable entrances, operable windows, and serviceable finishes. Provide heated and air conditioned units on foundations adequate for normal loading.
- F. Temporary Toilet Units: Provide self-contained single-occupant toilet units, properly vented and fully enclosed with a glass fiber-reinforced polyester shell or similar nonabsorbent material.
- G. First Aid Supplies: Comply with governing regulations.
- H. Fire Extinguishers: Provide hand-carried, portable, UL rated, Class "A" fire extinguishers for temporary offices and similar spaces.
 - 1. In other locations, provide hand-carried, portable, UL rated, Class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.
 - 2. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.
- I. Bulletin Board: Provide a weather-protected enclosed bulletin board at Site. The bulletin board shall be mounted in a conspicuous and public outside location.

PART 3 - EXECUTION

3.01 INSTALLATION

City of Hillsdale
Marion Ellen Pump Station
200-12761-23002

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- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they shall serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed, or are replaced by authorized use of completed permanent facilities.

3.02 TEMPORARY UTILITY INSTALLATION

- A. Engage the appropriate local utility company to install temporary service or to connect to existing service. Where the company provides only part of the service, provide the remainder with matching, compatible materials and equipment; comply with the company's recommendations.
 - 1. Arrange with the company and existing users for a time when service can be interrupted, where necessary, to make connections for temporary services.
- B. Water Service and Distribution: CONTRACTOR shall at all times provide for CONTRACTOR's employees an abundant and convenient supply of cool drinking water taken from a potable source.
- C. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload protected disconnects, automatic ground fault interrupters, and main distribution switchgear.
 - 1. Except where overhead service must be used, install electric power service underground.
 - 2. Install wiring overhead, and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 volts, AC 20 ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.
- D. Public and Private Utilities: Where any utilities, water, sewer, gas, telephone, or any other either public or private, are encountered, CONTRACTOR must provide adequate protection for them, and CONTRACTOR shall be held responsible for any damages to such utilities arising from CONTRACTOR's operations.
 - 1. When it is apparent that construction operations may endanger the foundation of any utility conduit or the support of any structure, CONTRACTOR shall notify the utility Owner of this possibility and CONTRACTOR shall take such steps as may be required to provide temporary bracing or support of conduits or structures.
 - 2. Where it is the policy of utility Owners to make repairs to damaged conduit or other structures, CONTRACTOR shall cooperate to the fullest extent with the utility, and CONTRACTOR shall see that CONTRACTOR's operations interfere as little as possible with those operations.
 - 3. When it is necessary to carry out the Work, that an electric, telephone, or light pole be moved to a new location, or moved and replaced after construction, CONTRACTOR shall arrange for the moving of such poles and the lines thereof, and shall pay any charges therefor.
 - 4. Where existing utilities are encountered along the line of Work, CONTRACTOR shall perform CONTRACTOR's operations in such a manner that service will not be interrupted, and shall, at CONTRACTOR's own expense, make all temporary provisions to maintain service.
 - 5. Unless otherwise indicated on Drawings, CONTRACTOR shall replace any disturbed sewer or drain, or relay same at a new grade to be established by ENGINEER, such that sufficient clearance for the sewer will be provided.

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6. CONTRACTOR will receive no extra compensation for replacement of sewers or drains encountered, or for relaying at a new grade and/or line where necessary, except where specifically noted otherwise on Drawings or Specifications.
7. Where existing gas mains and services are encountered, CONTRACTOR shall arrange with the gas company for any necessary relaying, and shall pay for the cost of such work.
8. Materials used in repairing or relaying utilities shall be the same type and strength as the existing Work.

E. Storm and Sanitary Sewers: If sewers are available, CONTRACTOR may provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide portable units.

1. If gas is present in existing sewers or tanks where CONTRACTOR must work, they shall be cleared of gas before entering. If the gas cannot be removed by natural ventilation by the removal of covers, CONTRACTOR shall maintain forced draft to render the area safe as determined by gas detection equipment.
2. Filter out excessive amounts of soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
3. Connect temporary sewers to the municipal system as directed by the sewer department officials.
4. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.
5. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of stormwater from heavy rains.

3.03 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION

A. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.

1. Maintain temporary construction and support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to OWNER.
2. Provide incombustible construction for offices, shops, and sheds located within the construction area, or within 30 feet of building lines. Comply with requirements of NFPA 241.

B. Temporary Heating Facilities: Provide temporary heat required by construction activities for curing or drying of completed installations or protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.

1. Except where use of the permanent system is authorized, provide vented self-contained LP gas or fuel oil heaters with individual space thermostatic control.
2. Use of gasoline-burning space heaters, open flame, or salamander-type heating units is prohibited.

3.04 CONSTRUCTION BUILDINGS AND FACILITIES INSTALLATION

A. Temporary Project Bulletin Board: As a minimum, the following items must be posted:

1. Wage Rates (when applicable).
2. Safety Poster (OSHA or State OSHA).
3. Nondiscrimination Poster.
4. Equal Employment Opportunity Statement signed by a Company official.

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5. Grading Permit (Soil Erosion and Sedimentation Control Act 451).

B. Ongoing Construction Cleanup: Project cleanup shall be an ongoing operation. CONTRACTOR shall maintain an order of neatness and good housekeeping comparable to that maintained by OWNER. Project cleanup applies to the Site and all areas affected by construction operations. CONTRACTOR shall:

1. Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 degrees F (27 degrees C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner.
2. Maintain dirt and debris resulting from CONTRACTOR's operations in designated spoil piles as approved by ENGINEER or remove from the Site daily. Dirt and debris shall not collect or interfere with OWNER's facility operations. Excess dirt and debris shall be removed from the Site as needed to confine spoil piles in designated areas.
3. Perform general cleanup inside of OWNER's buildings at least once every two weeks. Cleanup shall include consolidation of stored materials, removal of waste material and debris, and sweeping of flooring surfaces.
4. Maintain clear access to all properties affected by construction activities. Maintain unobstructed access to existing buildings, equipment, safety equipment, and other items requiring OWNER access for facility operation.
5. Keep tools, equipment, and materials in a neat and orderly arrangement.
6. Maintain culverts, sewers, and drainage structures by removing sediment and debris from construction operations.
7. Repair all holes and ruts resulting from construction operations that affect OWNER's use of property with approved material; compact, level, and restore.

C. Storage of Equipment and Material: Pumps and other machinery units shall be stored in weathertight structures provided by CONTRACTOR.

1. Motors, electrical switchgear, gauges, and other equipment of a delicate nature, as determined by ENGINEER, shall be stored in weathertight warehouses which are maintained at a temperature of at least 60 degrees F.
2. Structural steel, miscellaneous and cast iron items may be placed in open yard storage, but any such items having attached motors or other machinery units shall have such units well wrapped with waterproof paper or cloth for protection from the weather.
3. Painted surfaces shall be protected against impact, abrasion, discoloration, and other damage. All painted surfaces which are damaged prior to acceptance of equipment shall be repainted to the satisfaction of ENGINEER.
4. Materials and equipment distributed, stored, and placed upon or near the Site of the Work shall at all times be so disposed as not to interfere with work prosecuted by OWNER or other Contractors in the employment of OWNER or with drainage. Materials and equipment shall not be stored on public streets.

3.05 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Barricades, Warning Signs, and Lights: Comply with Standards and Code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.

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- B. Private Owner Fences: No fences shall be removed or destroyed by CONTRACTOR without the written permission of ENGINEER. CONTRACTOR shall be held fully responsible for any damages caused by CONTRACTOR's work to adjoining fences. Fences that have to be removed shall be preserved and replaced in a manner acceptable to ENGINEER. Damaged material shall be replaced by new material.
- C. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
 - 1. Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.
- D. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the Site.
- E. Control of Noise: CONTRACTOR shall eliminate noise to as great an extent as possible at all times. Air compressors shall be equipped with silencers, and the exhaust of all gasoline motors and other power equipment shall be provided with mufflers.
 - 1. In the vicinity of hospitals, libraries, and schools, special precautions shall be taken to avoid noise and other nuisance, and CONTRACTOR shall require strict observances of all pertinent ordinances and regulations. Any blasting permitted in such locations shall be done with reduced charges.
- F. On-Site Burning: Burning of waste materials resulting from the Work under this Contract will not be allowed unless authorized in writing by OWNER. Where burning is not allowed, CONTRACTOR shall haul all waste materials from Site and dispose of same in a manner acceptable to ENGINEER.
 - 1. The costs of hauling and disposal of waste materials shall be included in other items of the Work under this Contract.
- G. Dust Control: CONTRACTOR shall take all steps necessary for the alleviation or prevention of dust nuisance caused by or resulting from CONTRACTOR's operations and shall apply water or dust palliative, or both, as required. No direct payment will be made for any such Work performed or materials used to control dust from this Contract.
 - 1. In the event of CONTRACTOR's failure to comply with the foregoing provisions, OWNER may, with or without notice, cause the same to be done and deduct the cost of such Work from any monies due or to become due CONTRACTOR under this Contract; but the performance of such Work by OWNER, or at OWNER's insistence, shall serve in no way to release CONTRACTOR from CONTRACTOR's liability for the safety of the traveling public.

3.06 SEDIMENTATION CONTROL FACILITIES INSTALLATION

- A. Soil Erosion and Sedimentation Control: CONTRACTOR shall take all precautions necessary to prevent soil erosion of areas disturbed by the construction and shall ensure that all soil erosion be contained within the construction Site. CONTRACTOR shall provide temporary slope protection,

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temporary dikes, etc., as required to prevent eroded materials from entering any sewers or natural watercourses.

1. CONTRACTOR shall comply with Natural Resources and Environmental Protection Act, P.A. 451 (Act 451) of 1994, Part 91 of the Michigan Compiled Laws and local city or county soil erosion control programs.
2. CONTRACTOR shall prepare a Soil Erosion and Sedimentation Control Program for submittal to and approval by Local Soil Erosion and Sedimentation Control Agent prior to start of construction, as required in the following paragraphs. Copies of State guidelines "Better Environment through Soil Erosion and Sedimentation Control" and "Protection of Natural Resources" DEQ Handbook of Specifications may be obtained at no charge from the Michigan Department of Environmental Quality (MDEQ). The "Michigan Soil Erosion and Sedimentation Control Guidebook" and the "Guidebook of Best Management Practices for Michigan Watersheds" may also be obtained from MDEQ.
3. The Soil Erosion and Sedimentation Control Program, prepared by CONTRACTOR, shall be reviewed and have received at least preliminary concurrence from the local Enforcing Agent before it will be presented and discussed at the Pre-Construction Conference, at which time final revisions may be made. Copies of the final agreed program shall be made available for ENGINEER and the local Enforcing Agent. Should the local regulatory agency determine at any time during construction that the construction operation is in violation of the Act and cite OWNER, CONTRACTOR or subcontractor shall take immediate action, as directed by OWNER, to ensure compliance with the Act.

B. Stormwater Discharge Control:

1. CONTRACTOR shall comply with Natural Resources and Environmental Protection Act, P.A. 451 (Act 451) of 1994, Part 31 of the Michigan Compiled Laws and local city or county stormwater discharge control programs.
2. CONTRACTOR shall not begin any Work at Site until the stormwater discharge permit has been obtained for the Project.
 - a. CONTRACTOR shall indemnify OWNER against any and all fines for discharge permit violations which are assessed against OWNER, and which are due to CONTRACTOR's actions or failure to maintain the sedimentation control measures.
3. CONTRACTOR shall utilize the appropriate Best Management Practices to prevent any of CONTRACTOR's activities from resulting in an unlawful discharge of pollutants to the waters of the State. CONTRACTOR shall correct any deficiencies noted by ENGINEER, Local Enforcement Agency or MDEQ within 24 hours of receiving written notice that corrections are necessary. Should CONTRACTOR fail to take action within the allotted time, OWNER shall have the right to perform the work and deduct all costs from amounts due CONTRACTOR under this Contract.

3.07 FIELD QUALITY CONTROL

- A. Any unforeseen situations that may be encountered during the course of construction that may cause accelerated erosion and deposition of sediment into waterways and/or lakes shall be controlled by methods that may include sediment traps, sediment basins, or holding ponds. Any slope failures or development of gullies after construction has been completed shall be corrected immediately.
- B. Should the local Regulatory Agency determine at any time during construction that the construction operation is in violation of the Natural Resources and Environmental Protection Act, P.A. 451 (Act 451) of 1994 and cite OWNER, CONTRACTOR or Subcontractor shall take immediate action, as directed by OWNER, to ensure compliance with the Act.

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3.08 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour-day basis where required to achieve indicated results and to avoid possibility of damage.
- C. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- D. Termination and Removal: Unless ENGINEER requires that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of CONTRACTOR.
 - 2. At Substantial Completion, clean and renovate permanent facilities that have been used during the construction period including, but not limited to:
 - a. Replace lamps that are burned out or noticeably dimmed by substantial hours of use.

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 01600 - GENERAL EQUIPMENT STIPULATIONS

PART 1 - GENERAL

1.01 SUMMARY

- A. These General Equipment Stipulations apply, in general, to all equipment provided under other Specification Sections. They shall supplement the detailed equipment specifications, but in cases of conflict the equipment specifications shall govern.

1.02 OPERATION AND MAINTENANCE

- A. All equipment suppliers shall submit to ENGINEER, through CONTRACTOR, 4 bound copies and 1 electronic/digital format copy of a manual containing specifications, Drawings, and descriptions of equipment; installation instructions; operation, maintenance, and lubrication manuals; parts lists; emergency instructions; and where applicable, test data with curves, wiring diagrams and schematics. This information shall be submitted for each item of equipment furnished under this Contract and shall be specific to the exact equipment models complete with all appurtenances provided. It shall also include detailed, comprehensive directions for all required maintenance activities and for the repair or replacement of all wearing parts. Special attention shall be paid to necessary safety precautions that OWNER's staff should take when operating, maintaining, or repairing the equipment.

1. Bound copies of O&M Manuals shall be in addition to any instructions shipped with the equipment and shall be submitted only after ENGINEER has given final approval of Shop Drawings. All manuals shall be submitted to ENGINEER following final Shop Drawing approval and prior to the date of shipment of the equipment to the Site. Organize operation and maintenance manuals into suitable sets of manageable size, organized by section or process, as directed by ENGINEER. Bind properly indexed data in heavy-duty 2-inch, 3-ring vinyl-covered binders, with pocket folders for folded sheet information. Appropriate identification shall be noted on the front and spine of each binder.
2. Electronic Copy of O&M Manuals: Each equipment O&M manual shall be provided with an electronic disk, matching the content of the final approved printed O&M Manual. The information shall be saved in a single ".pdf" file, with bookmarks for each chapter, section, appendices, etc., as well as each piece of equipment. Where numerous pieces of equipment may be addressed within a section, a second tier of bookmarks shall be provided to allow quick access to each piece of equipment or key piece of information.
3. "Sample" Table of Contents:

Bookmarks

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LIFT STATION TECHNICAL SPECIFICATION

4. These manuals shall be in addition to any instructions shipped with the equipment and shall be submitted only after ENGINEER has given final approval of Shop Drawings. All manuals shall be submitted to ENGINEER following final Shop Drawing approval and prior to the date of shipment of the equipment to the Site. Organize operation and maintenance manuals into suitable sets of manageable size, organized by section or process, as directed by ENGINEER. Bind properly indexed data in heavy-duty 2-inch, 3-ring vinyl-covered binders, with pocket folders for folded sheet information. Appropriate identification shall be noted on the front and spine of each binder.

1.03 QUALITY ASSURANCE

- A. Compliance with OSHA: All equipment provided under this Contract shall meet all the requirements of the Federal and/or State Occupational Safety and Health Acts. Each equipment supplier shall submit to ENGINEER certification that the equipment furnished is in compliance with OSHA.
- B. Electrical Codes, Ordinances, and Industrial Standards: The design, testing, assembly, and methods of installation of the wiring materials, electrical equipment and accessories proposed under this Contract shall conform to the National Electrical Code and to applicable State and local requirements. UL listing and labeling shall be adhered to under this Contract. Any equipment that does not have a UL, FM, CSA, or other listed testing laboratory label shall be furnished with a notarized letter signed by the supplier stating that the equipment furnished has been manufactured in accordance with the National Electrical Code and OSHA requirements. Any additional cost resulting from any deviation from codes or local requirements shall be borne by CONTRACTOR.

1.04 SHIPPING AND HANDLING EQUIPMENT

- A. All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment and handling.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Anchor Bolts: Anchor bolts, nuts, and washers shall be hot-dipped galvanized in conformity with ASTM A 385 and be supplied with sleeves.
- B. Shop Painting:
 1. Non-submerged Applications: Tnemec Series 37H, Chem-Prime.
 2. Submerged, Non-potable Applications: Tnemec Series 66, Hi-Build Epoxoline.
 3. Submerged, Potable Applications: Tnemec Series 139, Pota-Pox II.
 4. Rust preventive compound shall be:
 - a. Dearborn Chemical, No-Ox-ID2W.
 - b. Houghton, Rust Veto 344.
 - c. Rust-Oleum R-9.

2.02 COMPONENTS

- A. Lubrication: Equipment shall be adequately lubricated by systems which require attention no more often than weekly during continuous operation. Lubrication system shall not require attention during start-up or shutdown and shall not waste lubricants.

LIFT STATION TECHNICAL SPECIFICATION

1. Lubrication point shall be easily accessible with all points of application provided with standard fittings for greasing or placing oil.
 2. Lubricants of the type recommended by the equipment manufacturer shall be provided in sufficient quantity for all consumption prior to completion of required testing and acceptance of equipment by OWNER.
- B. Anchor Bolts: All necessary anchor bolts shall be provided as per the manufacturer's recommendations for size, strength, and location and shall meet the requirements of Standard Details on Drawings. Substantial templates and working drawings for installation shall be provided. Two nuts shall be furnished.
1. Unless otherwise shown or specified, anchor bolts for items of equipment mounted on baseplates shall be long enough to permit 1-1/2 inches of grout beneath the baseplate and to provide adequate anchorage into structural concrete.
- C. Seals: Mercury seals will not be acceptable.
- D. Bearings: All antifriction bearings shall be designed per the Anti-Friction Bearing Manufacturers Association (AFBMA) recommendations with a rating life of B-10, 30,000 hours.
- E. Equipment Bases: A cast iron or welded steel baseplate shall be provided for all equipment and motor assemblies. Each baseplate shall support the unit and its drive assembly, shall be of a neat design with pads for anchoring the units, shall have a raised lip all around, and shall have a threaded drain connection. Bases shall be fully braced to withstand shock loads and resist buckling. Necessary safety guard mounting shall be provided as part of the equipment base.

2.03 FABRICATION

- A. Shop Painting: All iron and steel surfaces shall be protected by suitable paint or coatings applied in the shop or at point of fabrication. Surfaces which will be inaccessible after assembly shall be protected for the life of the equipment.
1. All iron and steel surfaces which will be totally or partially submerged or located in a continuously or intermittently moist atmosphere during normal operation shall be shop blast cleaned to a near-white finish, removing all dirt, rust-scale, and foreign matter by any of the recommended methods outlined in the Steel Structures Painting Council Specification SP-10.
 2. The cleaned surfaces shall be shop primed before any rust bloom forms. All other exposed surface shall be properly filed, scraped, sanded, etched, brushed, sandblasted, and/or cleaned to provide surfaces free from dirt, loose crystals, rust, scale, oil, and grease and shop primed.
 3. Shop primed surfaces shall be painted with one or more coats of a primer which meets the requirements of this Section. Minimum shop coat thickness shall be 1.5 dry mills.
- B. Electric motors, speed reducers, starters, pumps, motor control centers, control panels, and other self-contained or enclosed components shall be shop finished with 2 coats of an enamel paint as per manufacturer's recommendations.
- C. Where specified, steel and iron surfaces shall be hot-dipped galvanized in conformity with ASTM A 153 and A 385.
- D. Machined, polished, and nonferrous surfaces which are not to be painted or galvanized shall be coated with rust preventive compound.

PART 3 - EXECUTION

City of Hillsdale
Marion Ellen Pump Station
200-12761-23002

LIFT STATION TECHNICAL SPECIFICATION

3.01 EQUIPMENT BASES

- A. The baseplate shall be installed on a concrete base. Baseplates shall be anchored to the concrete base with suitable anchor bolts and grouted in place.

3.02 EQUIPMENT INSTALLATION CHECK

- A. An experienced, competent, and authorized representative of the manufacturer or supplier of each item of equipment shall visit Site of Work a minimum of 2 times, once prior to installation to review installation procedures with CONTRACTOR and once after installation to inspect, check, adjust if necessary, and approve the equipment's installation. The equipment supplier's representative shall revisit Site as often as necessary until all trouble is corrected and the equipment installation and operation is satisfactory to ENGINEER.
- B. Manufacturer's representative shall provide all necessary tools and testing equipment required including noise level and vibration sensing equipment.
- C. Each equipment supplier's representative shall furnish to OWNER, through ENGINEER, a written report certifying that the equipment:
 - 1. Has been properly installed and lubricated;
 - 2. Is in accurate alignment;
 - 3. Is free from any undue stress imposed by connecting piping or anchor bolts;
 - 4. Has been operated under full load condition and that it operated satisfactorily to ENGINEER;
 - 5. That OWNER's Representative has been instructed in the proper maintenance and operation of the equipment; and
 - 6. Furnish OWNER a copy of all test data recorded during the installation check including noise level and vibration readings.

3.03 OPERATION AND MAINTENANCE TRAINING

- A. Provide services of manufacturer's service representative to instruct OWNER's personnel in operation and maintenance of equipment. Training shall include start-up and shutdown, servicing and preventative maintenance schedule and procedures, and troubleshooting procedures plus procedures for obtaining repair parts and technical assistance.
 - 1. Manufacturer's representative shall provide 1 day, 8 hours, on-Site training.
 - 2. Review operating and maintenance data contained in the operating and maintenance manuals.
 - 3. Schedule training with OWNER, provide at least 7-day prior written notice to ENGINEER.

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 01770 - CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements for Contract closeout including, but not limited to:
 - 1. Warranties and Bonds.
 - 2. Requirements for Substantial Completion.
 - 3. Project record document submittal.
 - 4. Equipment acceptance.
 - 5. Operating and maintenance manual submittal.
 - 6. Final cleaning.
- B. Refer to the General Conditions for terms of CONTRACTOR's special warranty of workmanship and materials.
- C. Specific requirements for warranties for the Work and products and installation that are specified to be warranted, are included in the individual Sections of Divisions 2 through 16.
- D. Certifications and other commitments and agreements for continuing services to OWNER are specified elsewhere in the Contract Documents.

1.02 WARRANTY REQUIREMENTS

- A. **Disclaimers and Limitations:** Manufacturer's disclaimers and limitations on product warranties do not relieve CONTRACTOR of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with CONTRACTOR.
- B. **Related Damages and Losses:** When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- C. **Reinstatement of Warranty:** When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- D. **Replacement Cost:** Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. CONTRACTOR is responsible for the cost of replacing or rebuilding defective Work regardless of whether OWNER has benefited from use of the Work through a portion of its anticipated useful service life.
- E. **OWNER's Recourse:** Written warranties made to OWNER are in addition to implied warranties, and shall not limit the duties, obligations, rights, and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which OWNER can enforce such other duties, obligations, rights, or remedies.

LIFT STATION TECHNICAL SPECIFICATION

- I. Rejection of Warranties: OWNER reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- J. OWNER reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.03 SUBSTANTIAL COMPLETION

- A. Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.
 - 1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete. Include supporting documents for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Price.
 - 2. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
 - 3. Advise OWNER of pending insurance changeover requirements.
 - 4. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
 - 5. Obtain and submit releases enabling OWNER unrestricted use of the Work and access to services and utilities; include occupancy permits, operating certificates, and similar releases.
 - 6. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.
- B. Inspection Procedures: On receipt of a request for inspection, ENGINEER will either proceed with inspection or advise CONTRACTOR of unfilled requirements.
 - 1. ENGINEER will prepare the Certificate of Substantial Completion following inspection, or advise CONTRACTOR of construction that must be completed or corrected before the certificate will be issued.
 - 2. ENGINEER will repeat inspection when requested and assured that the Work has been substantially completed.
 - 3. Results of the completed inspection will form the basis of requirements for final acceptance.
- C. The warranty period for specific portions of the Work will begin on the date established on Component Acceptance Form or at such other date as agreed by OWNER, ENGINEER, and CONTRACTOR.

1.04 FINAL ACCEPTANCE

- A. Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.
 - 1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
 - 2. Submit an updated final statement, accounting for final additional changes to the Contract Price.
 - 3. Submit a copy of ENGINEER's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by ENGINEER.

LIFT STATION TECHNICAL SPECIFICATION

4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion, or when OWNER took possession of and responsibility for corresponding elements of the Work.
 5. Submit consent of surety to final payment.
 6. Submit a final liquidated damages settlement statement.
 7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 8. Submit record drawings, maintenance manuals, final Project photographs, damage or settlement survey, property survey, and similar final record information.
 9. Deliver tools, spare parts, extra stock, and similar items.
 10. Make final changeover of permanent locks and transmit keys to OWNER. Advise OWNER's personnel of changeover in security provisions.
 11. Complete start-up testing of systems, and instruction of OWNER's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.
- B. Reinspection Procedure: ENGINEER will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to ENGINEER.
1. Upon completion of reinspection, ENGINEER will prepare a certificate of final acceptance, or advise CONTRACTOR of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
 2. If necessary, reinspection will be repeated.

1.05 SUBMITTALS

- A. Submit written warranties to ENGINEER prior to the date certified for Substantial Completion. If ENGINEER's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of ENGINEER.
- B. When a designated portion of the Work is completed and occupied or used by OWNER, by separate agreement with CONTRACTOR during the construction period, submit properly executed warranties to ENGINEER within 15 days of completion of that designated portion of the Work.
- C. When a special warranty is required to be executed by CONTRACTOR, or CONTRACTOR and a subcontractor, supplier, or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to OWNER through ENGINEER for approval prior to final execution.
- D. Refer to individual Sections of Divisions 2 through 16 for specific content requirements, and particular requirements for submittal of special warranties.

1.06 RECORD DOCUMENT SUBMITTALS

- A. Record Drawings:
 1. Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown.
 2. Mark whichever Drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on Contract

LIFT STATION TECHNICAL SPECIFICATION

Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

3. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.
 4. Mark new information that is important to OWNER, but was not shown on Contract Drawings or Shop Drawings.
 5. Note related Change Order numbers where applicable.
 6. Organize Record Drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates, and other identification on the cover of each set.
- B. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. 1. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to ENGINEER for OWNER's records.
- C. Operation and Maintenance Manuals: Submit in accordance with requirements of Section 01600, operation and maintenance manuals for items included under this Section.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 FINAL CLEANING

- A. General cleaning during construction is required by the General Conditions and included in Section 01500.
- B. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
- C. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.
 1. Remove labels that are not permanent labels.
 2. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
 3. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
 4. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
 5. Clean Site, including landscape development areas, of rubbish, litter, and foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth even-textured surface.

LIFT STATION TECHNICAL SPECIFICATION

- D. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.
- E. Comply with regulations of authorities having jurisdiction and safety standards for cleaning.
1. Do not burn waste materials. Do not bury debris or excess materials on OWNER's property.
 2. Do not discharge volatile, harmful, or dangerous materials into drainage systems.
 3. Remove waste materials from Site and dispose of in a lawful manner.
- F. Where extra materials of value remaining after completion of associated Work have become OWNER's property, arrange for disposition of these materials as directed.

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 02315 - EXCAVATION AND BACKFILL (SEWERS AND WATER MAIN)

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Excavation, trenching, complete and continual dewatering of excavation, sheeting, bracing and shoring of sides of excavation, backfilling around structures and over pipe lines, and disposal of excess excavated material.

1.02 REFERENCES

A. Reference Standards:

1. ASTM D 1557 Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) - Modified Proctor Test.
2. ASTM D 2487 Classification of Soils for Engineering Purposes.
3. MDOT Michigan Department of Transportation.
4. MDOT 6A Stone Refill.
5. MDOT 8.02.06 Granular Fill.

1.03 DEFINITIONS

- A. Earth: Earth, as a name for excavated material, shall include all glacial deposit whether cemented or not, except solid boulders 1/2 cubic yard or more in volume. It shall include all alluvial deposits and material of every kind that can be excavated with equal facility by the equipment and means used for other earth excavation in Work.
- B. Rock: Rock, as a name for excavated material, shall include pre-glacial solid ledge rock that can be removed most practically by blasting, barring, or wedging, or by some other standard method of quarrying solid rock. It shall include solid boulders of 1/2 cubic yard or more in volume, existing concrete, masonry with mortar joints, or other existing structural work that can be excavated practically only by methods of quarrying solid rock. It shall not include fragile, friable, or disintegrated materials of any kind that can be excavated with equal facility by equipment and means used for earth excavation.
- C. Site-excavated Backfill: Site-excavated backfill shall be defined as site-excavated material, free from frozen earth, boulders, rocks, stones larger than 6 inches in size, debris, and organic material.
- D. Granular Fill: Granular fill shall be defined as sharp sand, gravel, or crushed stone, free from lumps of clay, soft or flaky material and shall conform to MDOT Specification, "Granular Materials - Class III."
- E. Subgrade: The undisturbed earth or the compacted soil layer immediately below granular subbase, drainage fill, or topsoil materials.
- F. Subbase: The layer of specified materials of designed thickness placed on the subgrade as part of the pavement structure.
- G. Structure: Buildings, foundations, slabs, tanks, curbs, or other man-made stationary features occurring above or below ground surface.

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1.04 SUBMITTALS

- A. Test and Inspection Reports: Written reports shall be submitted to ENGINEER, with copy to CONTRACTOR, documenting testing and/or inspection results. The reports shall be prepared as noted under Section 01450. Tests shall include:
1. Test reports on borrow material.
 2. Gradation analysis for granular backfill and subbase materials.
 3. Field reports; in-place soil density tests will be performed by a representative of OWNER.

1.05 QUALITY ASSURANCE

- A. Codes and Standards: Perform excavation work in compliance with applicable requirements of authorities having jurisdiction. Construct subbase in accordance MDOT Standard Specifications for Construction.
- B. Testing and Inspection Service: OWNER will employ and pay for a qualified independent geotechnical testing and inspection laboratory to perform soil testing and inspection service during earthwork operations.

1.06 PROJECT CONDITIONS

- A. Existing Utilities: Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations.
- B. CONTRACTOR shall notify MISS-DIG, Utility Communications System, 1-800-482-7171, three working days prior to starting any excavation with power equipment.
1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility Owner immediately for directions. Cooperate with OWNER and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility Owner.
 2. Do not interrupt existing utilities serving facilities occupied by OWNER or others during occupied hours except when permitted in writing by ENGINEER, and then only after acceptable temporary utility services have been provided.
 3. Provide minimum of 2 working days notice to ENGINEER and receive written notice to proceed before interrupting any utility.
 4. Demolish and completely remove from Site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.
- C. Use of Explosives: Use of explosives is not permitted.
- D. Protection of Persons and Property: Barricade open excavations occurring as part of this Work and post with warning lights.
1. Operate warning lights as recommended by authorities having jurisdiction.
 2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
 3. Perform excavation by hand within drip line of large trees to remain. Protect root systems from damage or dryout to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap.

LIFT STATION TECHNICAL SPECIFICATION

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

- A. Satisfactory soil materials are defined as those complying with ASTM D 2487 soil classification Groups GW, GP, GM, SM, SW, and SP.
- B. Unsatisfactory soil materials are defined as those complying with ASTM D 2487 soil classification Groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.
- C. Bedding: MDOT Specification Granular Material 6A or Class I, except 100 percent must pass 1-1/2-inch sieve.
- D. Bedding for Thermoplastic Pipe, 6-inch Diameter or Less: Granular material with 100 percent passing the 1/2-inch sieve and less than 50 percent passing the No. 200 sieve.
- E. Granular Backfill: MDOT Specifications - Granular Materials Class III.
- F. Stone Refill: MDOT 6A Coarse Aggregate.
- G. Subbase Material: MDOT Specifications - Granular Materials Class II.
- H. Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, with 100 percent passing a 1-1/2-inch sieve and not more than 5 percent passing a No. 4 sieve.
- I. Backfill and Fill Materials: Satisfactory soil materials free of clay, rock, or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

PART 3 - EXECUTION

3.01 LIMITS OF EXCAVATION

- A. Trenches for pipes shall be excavated so that there shall be a minimum clearance of 6 inches on each side of the pipe barrel, and a maximum width at the level on the top of the pipe of not more than O.D. of the pipe, plus 12 inches on each side. Trenches shall be at all times of sufficient width to permit the pipe to be laid by first-class construction methods. Sufficient space shall be provided in the trench to permit the joints to be properly made. Before excavation is started in either bituminous or concrete paved streets, the paving shall be cut by means specified under this Section.
- B. The bottom of the trench in granular material shall be loosened to a depth of 4 inches below bottom of the pipe. Where the trench excavation for pipe is in rock, the trench bottom shall be undercut a minimum of 6 inches below the final location of the pipe and bedding material, herein specified, shall be placed and compacted along the haunch of the pipe.
- C. Excavation for structures shall be made to the outside lines and surfaces of such structures wherever it is practicable to build directly against the sides or bottoms of excavations. In such cases, care shall be taken not to disturb the original foundation or backing, with the final excavation or trimming being done by hand work just before the construction Work. If excess excavation is made, or the

LIFT STATION TECHNICAL SPECIFICATION

material becomes disturbed so as to require removal beyond the prescribed limits, the resulting space shall be refilled with bedding, as specified in this Section, solidly machine tamped into place, to the required compaction, before construction work proceeds.

- D. Excavation for structures shall be extended sufficiently beyond the limits of the structure to provide ample room for form construction and other construction methods to be followed, wherever necessary.

3.02 LENGTH OF TRENCH OPENING

- A. In excavating for pipelines, the excavation shall at all times be finished to the required grade for an adequate distance in advance of the completed pipeline. Unless otherwise permitted by ENGINEER, not more than 50 feet of trench shall be open at one time in advance of the pipe. The length of the street which may be occupied by the construction work at any one time will be based on the requirements of use of the street by the public. No more than 600 consecutive feet of length of the street shall be occupied at one time, and vehicle traffic through the street shall not be entirely stopped without the permission of ENGINEER.

3.03 METHOD OF EXCAVATION IN EARTH

- A. All excavation shall be by open cut from the surface, except in special cases where tunneling under pavement or structures may be required or where tunneling under the root system shall be required for tree root protection. All excavation shall be made in such a manner and to such depth, length, and width as shall give ample room for building the structures, for bracing, sheeting, and supporting the sides of the excavation, for pumping and drainage of groundwater and sewage which may be encountered, and for the removal of all materials excavated. Special care shall be taken so that the soil below the bottom of structures to be built shall be left undisturbed to provide a firm bed for construction.

3.04 STABILITY OF EXCAVATIONS

- A. Comply with local codes, ordinances, and requirements of agencies having jurisdiction.
- B. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

3.05 STORAGE OF EXCAVATED MATERIALS

- A. Stockpile excavated materials acceptable for backfill and fill where directed. Place, grade, and shape stockpiles for proper drainage.
 1. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.
 2. Dispose of excess excavated soil material and materials not acceptable for use as backfill or fill.

3.06 BEDDING

- A. Place specified bedding materials under the pipe, in the haunches along the sides of the pipe, and over the pipe to a level 1 foot above the pipe. The material directly below the pipe shall be compacted. The material in the haunch area shall be placed in layers not to exceed 6 inches in depth,

LIFT STATION TECHNICAL SPECIFICATION

and shall be compacted to 95 percent of its maximum unit weight. The material placed above the haunch area shall be compacted to percentage maximum unit weight as specified in this Section under "Compaction."

3.07 BACKFILLING TRENCHES

- A. All trenches in paved streets, shoulders, traveled roadways, parking areas, and driveways shall be backfilled with site-excavated backfill or granular fill, as shown on Drawings, from the level 1 foot above the top of the pipe to the specified road surface subgrade. The site-excavated backfill or granular fill shall be placed in not more than 6-inch layers and thoroughly and uniformly compacted by machine tamping to required compaction. With the approval of ENGINEER, water jetting on granular fill may be accepted in lieu of tamping in 6-inch layers.
- B. Trenches under concrete sidewalks shall be backfilled from a level 1 foot above the top of the pipe to a level 4 inches below the finished grade of the sidewalk with site-excavated backfill or granular fill and compacted to the required density.
- C. Trenches not in paved streets, shoulders, traveled roadways, parking areas, driveways, and under sidewalks shall be backfilled from a level 1 foot above the top of the pipe to the ground surface with site-excavated backfill and tamped as required to prevent trench settlement.
- D. Any depression resulting from settlement of the trench backfill previous to the date of total acceptance of all Work under this Contract shall be brought to proper grade and surface and made to match the adjacent surface.
- E. Wherever gas mains, water mains, sewers, etc., are located in the trench area, granular fill shall be used for backfill from the bottom of the trench up to the spring line of these pipes. Granular fill shall be placed full trench width with two horizontal to one vertical side slopes, and compacted in 6-inch layers to 95 percent of its maximum unit weight so as to thoroughly support the pipe within the trench area. Granular fill so required shall be considered included in the unit prices bid for other items of the Work. When directed by ENGINEER, dry mix Class "C" concrete shall be substituted for granular fill. The installation of any dry mix Class "C" concrete will be considered a Change in Work.

3.08 STONE REFILL

- A. In locations where the soil at the bottom of the trench is unstable, when ordered by ENGINEER, CONTRACTOR shall excavate below the trench bottom and replace excavated material with stone refill.

3.09 BACKFILLING AROUND STRUCTURES

- A. As soon as practical after concrete structures have set, forms and debris shall be removed and the surface of the concrete pointed. After the structure has been inspected and approved, the excavated area around the structure shall be backfilled up to the specified subgrade with granular fill or site-excavated backfill, as called for on Drawings for the adjacent trench. The fill shall be made in layers not to exceed 6 inches in depth and thoroughly compacted by machine tamping. No large boulders or masonry shall be placed in backfilling. No backfilling will be placed against manhole walls within 24 hours after the plaster coat has been applied to the outside of the walls, nor shall backfilling be placed about concrete structures until the concrete has attained at least 75 percent of its design strength and approval of ENGINEER has been obtained.

LIFT STATION TECHNICAL SPECIFICATION

3.10 CONCRETE CUTS

- A. When the trench must be cut through pavement, driveway, or sidewalk, particular care shall be taken not to unnecessarily damage the adjoining areas of pavement, driveway, or sidewalk. All cuts through existing surfaces shall be made with a concrete saw, sawing deep enough to allow a straight cut parallel to longitudinal or transverse construction or contraction joints.
- B. The saw cuts shall not be nearer than 5 feet to a transverse joint, to the centerline of the pavement, or to the edge of pavement or curb, i.e., no replacement shall be less than 5 feet in width. If the damaged pavement is nearer than 5 feet to a joint, to the centerline of pavement, or to the edge of pavement, surfacing or curb, the removal and replacement shall be extended to said joint, centerline, edge of pavement, surfacing or curb. These same requirements with reference to existing joints shall also apply to the cutting and replacement of concrete driveways.
- C. If a square or block of sidewalk is cut, broken or cracked, the entire block or square shall be removed and replaced.

3.11 CROSSING EXISTING STRUCTURES

- A. During construction, it may be necessary to cross under certain sewers, drains, culverts, water lines, gas lines, electric conduits, and other underground structures. Every effort shall be made to prevent damage to such underground structures. Wherever such structures are disturbed or broken, they shall be restored to good condition by CONTRACTOR unless otherwise noted on Drawings.

3.12 COMPACTION

- A. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density, in accordance with ASTM D 1557:
 - 1. Under pavements, structures, and slabs, compact top 12 inches of subgrade and each layer of backfill or fill material at 95 percent maximum unit weight.
 - 2. Under lawn or unpaved areas, compact top 6 inches of subgrade and each layer of backfill or fill material at 90 percent maximum unit weight.
 - 3. Under walkways, compact top 6 inches of subgrade and each layer of backfill or fill material at 95 percent maximum unit weight.
- B. Moisture Control: Where subgrade or layer of soil material must be moisture-conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations.
 - 1. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

3.13 DISPOSAL OF EXCAVATED MATERIAL

- A. Excavated material, where suitable, shall be used in backfilling around pipelines and structures. All material in excess of the quantity required for backfilling or unsuitable material shall be disposed of by CONTRACTOR. CONTRACTOR shall obtain such spoil sites as may be required, except that ENGINEER may direct CONTRACTOR to dump materials at any site designated by OWNER within a 2-mile radius of Work area. CONTRACTOR shall provide all labor and equipment for

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spreading such material at the place of dumping, and shall leave the area in a neat condition satisfactory to ENGINEER.

3.14 TREE ROOT PROTECTION

- A. Machines shall freely excavate no closer to the base of a tree than the radius of the tree in inches converted to feet for trees less than 24 inches in diameter, and no closer than 12 feet if the tree is more than 24 inches in diameter. Tunneling under the root system will be required between the points so determined. Approaches closer than the previously stated distance, or tree removal, may be authorized by ENGINEER. Trees removed shall be disposed of at CONTRACTOR's expense.

3.15 ROADSIDE DITCHES AND CULVERTS

- A. All roadside ditches and driveway culverts shall be cleaned, repaired, and replaced to the same condition, or better, as existed before trenching operations commenced. Repair and/or replacement costs shall be included in other portions of the Work unless otherwise noted on Drawings.

3.16 FIELD QUALITY CONTROL

- A. Quality Control Testing during Construction: Allow testing service to inspect and approve each subgrade and fill layer before further backfill or construction work is performed.

3.17 EROSION CONTROL

- A. Provide erosion control methods in accordance with details shown on Drawings and/or requirements of authorities having jurisdiction.

3.18 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.
- D. Settling: Where settling is measurable or observable at excavated areas during general Project warranty period, remove surface (pavement, lawn, or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

END OF SECTION

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SECTION 02630 - SEWERS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Labor, materials, and equipment necessary for furnishing the fabrication, production, installation, or erection of the items specified in this Section as shown on Drawings or listed on Schedule.
- B. Excavation, trenching, and complete and continual dewatering of excavation; sheeting, bracing, or shoring of sides of excavation; furnishing and installing of the pipe and bedding; backfilling; placing, and maintaining temporary roadway surfaces over trenches in streets, drives, and parking areas; testing; and disposal of excess excavated materials are to be done under Division 2 Sections of the Specifications.

1.02 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:
 - 1. Design details of the joint before ordering any pipe.
 - 2. Boring and jacking methods of construction prior to performing any boring and jacking operation.
 - 3. Pressure grout design mix.
- B. Quality Control Submittals: All pipe delivered to Site shall be accompanied by certification papers showing that the pipe has been tested in accordance with applicable Specifications and that the pipe meets these Specifications.
- C. Test and Inspection Report: A written report shall be submitted to ENGINEER documenting testing and/or inspection results. The report shall be prepared as noted under Section 01600.
 - 1. The requirements for the necessary Infiltration/Exfiltration Tests are found in detail under "Laying Pipe" Article.
- D. Warranty: Submit in accordance with requirements of Section 01770, warranties covering the items included under this Section.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:
 - 1. Pipe Joints, Ductile Iron:
 - a. Tyton.
 - b. Bell Tite.
 - c. Fast Tite.
 - 2. Caulking Compound and Cold Mastic Compound:

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- a. "Sewertite," Philip Carey Mfg. Co.
- b. "No. 10-WM," DeWitt Product Co.
3. Connections, Couplings:
 - a. Logan LCP Coupling.
 - b. Fernco, Series 1001-66 w/ stainless steel shear ring.

2.02 SEWER PIPE

- A. Locations of various types of pipe are shown on Drawings. Sanitary sewer pipe shall be designed for air testing.
- B. Sewer pipe and fittings used in this Work shall meet requirements of referenced standard specifications. Sewer piping shall be of following types as noted on Drawings.
 1. Reinforced Concrete Sewer Pipe (RCSP): ASTM C 76, class as designated on Drawings or special design conforming to ASTM C 655.
 2. Polyvinyl Chloride Gravity Pipe (PVC): ASTM D 3034 or ASTM F 679, SDR 35 or SDR 26; ASTM D 2680, PVC truss pipe; ASTM F 949 PVC profile wall pipe (Contech A-2000). PVC compounds to meet ASTM D 1784, Cell Class 12454B or C.
 3. Polyvinyl Chloride Gravity Pipe (PVC): ASTM F 1803 PVC profile wall pipe (Lamson "Vylon Pipe"). PVC compounds to meet ASTM D 1784, Cell Class 12364A.
 4. Polyvinyl Chloride Pipe (PVC) and Fittings: ASTM D 1785, Schedules 40, 80, and 120; ASTM D 2466; ASTM D 2467; ASTM D 3036; PVC compounds to meet ASTM D 1784, Cell Class 12454B or C.

2.03 PIPE JOINTS

- A. Concrete or Reinforced Concrete Pipe:
 1. Sanitary Sewers:
 - a. For joints in concrete sanitary sewer pipe, provide bell and spigot or tongue and groove, with compression-type O-ring rubber gasket. Joints in circular gravity sewer pipe shall conform to ASTM C 361. Joints in pressure circular pipe shall conform to AWWA C 300, C 301, or C 302.
 - b. Modified groove tongue concrete pipe shall have compression type rubber gasket snapped into a groove cast into the tongue. Modified groove or bell end of pipe shall be made smooth and shall have not over a 3-degree slope tapered to fit gasket to tolerances as detailed by gasket manufacturer.
 - c. Rubber gaskets shall meet physical requirements of ASTM C 443.
 - d. Lubricant shall be supplied by manufacturer for use on the groove and tongue in making up joints, and joints shall be coupled in accordance with pipe manufacturer's requirements.
 - e. Around concrete pressure pipe joint, place a band at least 5-1/2 inches wide around outside of pipe as recommended by pipe manufacturer. This band shall serve as form for placing 1:2 cement mortar grout in external recess formed by face of bell and shoulder of spigot. If air temperature is below 40 degrees F, heat spigot, bell, and mortar. If reinforced paper joint band is used, draw it up tight around pipe and tamp backfill against it up to springline before pouring grout. If cloth band is used, wire it around outside of pipe and pour grout before backfilling.
 - f. As a substitute for concrete band, prefabricated joint protectors may be used. They shall be made from high-density polyester polyurethane foam containing at least the equivalent of 9 bags per cubic yard of unhydrated Portland cement. Protectors shall be of suitable cross-section to fully protect joint rings and shall be supplied in form of continuous rings.

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- g. Completely fill inside annular space between pressure pipe joints with pre-formed, cold applied, ready-to-use plastic joint-sealing compound and primer. Installation of joint materials shall be as recommended by its manufacturer. Trim excess joint materials smooth on inside of pipe.
- h. All exposed steel joint material shall have 4 mil factory applied galvanized, or equal, protective coating.
- i. Make joints in nonround concrete sewer pipe for which rubber gaskets are unavailable with flexible butyl rubber internal joint sealant conforming to AASHTO M 198 or external bands conforming to ASTM C 877. Use both internal sealant and external bands for pipe sizes equal to or greater than equivalent 48-inch diameter pipe.
- j. Materials used for joint-sealing compound shall be compatible with gasket.

B. Polyvinyl Chloride Pipe:

- 1. Joints in polyvinyl chloride pipe shall be bell and spigot type unless solvent weld joints are specified. Bell and spigot joints shall consist of spigot and formed bell complete with a factory installed flexible elastomeric gasket meeting ASTM F 477.
- 2. Joints for pressure pipe (PVCP) shall conform to ASTM D 3139. Joints for nonpressure pipe (PVC) shall conform to ASTM D 3212. Solvent weld joints shall conform to ASTM D 2855.
- 3. Joints in tee branches, wyes, fittings, riser pipes, and service laterals shall be similar to (including pressure rating) and compatible with joints furnished for sewer pipe. Joints shall be made using lubricant as recommended by pipe manufacturer. When necessary to field cut standard length of pipe, the new spigot end shall be prepared as recommended by pipe manufacturer.
- 4. Joints in Schedule 40, 80, or 120 pipe shall be solvent weld according to ASTM D 2564 and D 2855.

2.04 FLOWABLE FILL CONCRETE GROUT

- A. Flowable fill shall be a mixture of Portland cement thoroughly mixed with mortar sand and fly ash, as permitted by ENGINEER, with sufficient water to permit steady flow through grout pipes. The mix shall be 2 parts of sand to 1 part of cement, or an alternate mix with minimum compressive strength of 300 psi, to be approved by ENGINEER. Proportions may be varied at ENGINEER's order even to extent of enriching mix to neat cement. If necessary to speed up setting of grout, use approved admixtures of quick-setting cement as directed by ENGINEER.

PART 3 - EXECUTION

3.01 STORING FLEXIBLE PIPE

- A. After delivery, flexible pipe shall be stored on flat surface so that barrel is evenly supported. Pipe shall not be stored in piles higher than 4 feet. If pipe is to be stored for over 1 month, it shall be covered with opaque material so that it is protected from sun's rays; and bells shall be inverted in alternate rows so they are not supporting direct load. Deflection of pipe shall not exceed 5 percent. Follow manufacturer's instructions in storing and handling pipe during periods of temperature extremes.

3.02 DISPOSAL OF WATER AND SEWAGE

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- A. CONTRACTOR shall remove by well points, pumping, bailing, or other acceptable method any water which may accumulate or be found in the trenches or other excavations to be made. CONTRACTOR shall make all necessary provisions to keep the trenches and other excavations entirely free of water during construction of pipelines and structures. Newly laid concrete shall be adequately protected from injury resulting from groundwater or sewage or from the handling or disposal of water or sewage. No drainage ditches shall be placed within the area to be occupied by any structure except as permitted by ENGINEER.
- B. CONTRACTOR shall at all times have upon the Site sufficient pumping equipment ready for immediate use to carry out the intent of this Section. All cost for dewatering trenches shall be incidental to the Contract.

3.03 DIVERTING EXISTING SEWERS

- A. Where existing sewers or drains are encountered in Work, adequate provision shall be made for diverting the flow in the existing sewers so that the excavation will be kept dry during the progress of the construction Work. Upon completion of the construction Work, the existing sewers shall be restored or otherwise provided with an adequate outlet as directed by ENGINEER.

3.04 CROSSING EXISTING STRUCTURES

- A. During construction, it may be necessary to cross under certain sewers, drains, culverts, water lines, gas lines, electric conduits, and other underground structures. Every effort shall be made to prevent damage to such underground structures. Wherever such structures are disturbed or broken, they shall be restored to good condition by CONTRACTOR unless otherwise noted on Drawings.

3.05 LAYING PIPE

- A. Pipe shall be laid from downstream to upstream, starting at the most downstream end of a run, unless approved by ENGINEER.
- B. Lay pipe with bells upgrade and to line and grade called for on Drawings. Finished sewer shall be straight and free of dirt or debris between manholes.
- C. Install VCP pipe in accordance with ASTM C 12, plastic pipe in accordance with ASTM D 2321, and plastic pressure pipe in accordance with ASTM D 2774.
- D. Inspect each pipe for defects prior to being lowered into trench. Clean inside of pipe and outside of tongue and grooves of dirt or foreign matter. Place joint materials as recommended by manufacturer.
- E. Center pipe in grooves and push tight together to form smooth and continuous invert. Use mechanical means for pulling pipe home in making up joint and for holding pipe joints tight until completion of line. Mechanical means shall consist of a cable placed inside of pipe with a suitable winch, jack, or come-along for pulling pipe home and holding pipe in position.
- F. Use laser-aligning equipment for laying of sewers to specified lines and grades. Furnish equipment and personnel required to operate laser equipment.
 - 1. Rigidly mount laser beam projection to its support platforms in a manner approved by ENGINEER. This will ensure that ground equipment vibrations will be kept to minimum and

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will permit laser beam to be projected coaxially through center of pipe. Furnish units with equipment to control atmospheric conditions in pipe which could affect construction.

- G. ENGINEER will establish centerline stakes and offset stakes at each manhole and other centerline and offset stake as required for check points.
- H. Check short culverts not aligned by laser with grade pole and visual sighting through culvert to ensure straightness.
- I. Provide openings in pipe, as required for installation of laser equipment, at no additional cost to OWNER. Details of these openings will be approved by ENGINEER.
- J. After pipe is laid, carefully compact bedding under the haunches of pipe, and backfill trench to 12 inches above pipe. Place sufficient backfill after each joint is made along sides of pipe to offset conditions that might tend to move pipe off line and grade. Relay pipe found off grade or out of line.
- K. Regrade and channel ditch adjacent to culverts to provide unrestricted flow of surface water to the culvert.
- L. Allowable Tolerances in Sewer Grade: Construct and lay sewers to alignment and grade shown on Drawings or designated by ENGINEER. A variation greater than 1/4 inch from plan or designated grade is sufficient reason for rejection of sewer; and sewer shall be re-laid to proper grade if so directed by ENGINEER, at no cost to OWNER.

3.11 STUBS, BULKHEADS, AND MISCELLANEOUS WORK

- A. Furnish material and labor required to construct stubs, bulkheads, and miscellaneous Work shown on Drawings or called for in the Specifications. The cost of this Work shall be included in Unit Prices Bid for manholes, structures, catch basins, inlets, and/or sewers, if applicable.
- B. Where shown on Drawings, set stubs with bulkheads in manholes or structures for connections to future sewers. Stubs shall consist of 1 length of sewer pipe with watertight plug or brick and cement bulkhead. Stubs shall have size, material, and class shown on Drawings and/or specified herein under this Section.

3.12 CONNECTIONS TO EXISTING MANHOLES

- A. Provide labor and materials required for connection of sewers and catch basin leads under this Contract to existing manholes, structures, and catch basins as called for on Drawings. Wherever possible, core holes in manhole walls for new pipe connections and install resilient boots or NPC contour seal, if approved by ENGINEER. If coring is not possible, star-drill the opening and provide a smooth hand-troweled mortar finish in opening to allow installation of boot or seal. When making holes, take care to prevent debris from entering existing sewers or leads.
- B. After installation of pipe, seal manhole or catch basin around pipe, both on inside and outside of the manhole or catch basin, so that it is restored to a watertight condition. Install new flow channels in existing manholes where called for on Drawings.

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- C. Install pipes made of plastic or other nonporous materials with ENGINEER-approved waterstop at manhole entry and exit points to provide watertight seal. Receive ENGINEER approval on waterstop prior to laying pipe.

3.19 CONNECTIONS TO EXISTING SEWERS

- A. When service lateral sewer or other pipe is to be connected to existing sewer, use wye, Inserta Tee, or approved tapping saddle. Wyes shall be of the same material as pipe unless otherwise approved by ENGINEER, and shall be as set forth under "Wye Branch Connections" Article. Direct taps of rigid pipes, other than cored taps, shall not be permitted unless approved in writing by ENGINEER.
- B. When a new section of sewer or wye is to be installed in-line with an existing sewer, use compression-type coupling with shear rings. Adjustable rings are required in couplings 6 inches or larger. Clamps and shear ring shall be stainless steel.

3.20 FIELD QUALITY CONTROL

A. General:

1. Conduct acceptance tests for tightness on sanitary sewers and laterals. In areas where live leads have to be connected as Work progresses, only television inspection shall be required.
2. Test sewers 24 inches in diameter and smaller using low-pressure air. Also test sewers for infiltration where groundwater is above sewer invert. In areas where groundwater is more than 2 feet above the sewer crown at upstream end, air test with dewatering system in operation or use infiltration test after dewatering system is turned off and groundwater has returned to its normal level.
3. Test sewers above 24 inches in diameter using infiltration or exfiltration tests as directed by ENGINEER.
4. Make provisions for determining groundwater level prior to testing. ENGINEER shall be able to confirm level by visual inspection. Water level holes in manholes shall be sealed watertight after sewer has passed test.
5. CONTRACTOR may, at CONTRACTOR'S option, test any or all of the sewer lines prior to backfilling. However, such tests shall be in addition to required test following backfilling of trench.
6. Following completion of first section of sewer, if ENGINEER determines that there is some question as to installation of sewer, ENGINEER may direct CONTRACTOR to conduct a presumptive test to check installation for defective pipe or faulty joints before it is completely covered with backfill material.
7. Provide necessary materials, equipment, and personnel to conduct tests.
8. Acceptance test sections include entire length of sewer under Contract, including laterals.
9. Clean and flush pipe prior to conducting acceptance tests.
10. Make tests under supervision of ENGINEER. Submit testing schedule and procedures for CONTRACTOR and approval by ENGINEER prior to start of Work.
11. For those sections of sewer that cannot pass the acceptance test, make segmented TV testing or visual inspection to examine length of sewer being tested to locate possible cracks, breaks, bad joints, or misaligned pipe sections. Remove cracks and breaks, and replace bad joints or misaligned pipe sections located by inspection. Any sewers found with defects as listed above shall be repaired to like-new condition. ENGINEER may order reconstruction of defective portion of sewer. After all repair Work has been completed, repeat test. Final acceptance of the sewer being tested will not be made until satisfactory tests have been passed.

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12. Repair visible leakage in sewers or manholes even though acceptance tests have been satisfactory.

B. Air Testing:

1. Except for test times, air test concrete pipe sewers in accordance with ASTM C 924, vitrified clay pipe, in accordance with ASTM C 828, and all other sewers in accordance with ASTM F 1417. After pipe section to be checked is plugged, supply air to pipe section at a rate sufficient to maintain internal pressure of 4.0 psig. If the reach of pipe has not been backfilled, spray exposed surface of the pipe, fittings and plugs with foamable soap solution to detect by foam abnormal leakage due to cracks, holes, or improperly sealed joints. Correct sources of abnormal leakage. After all corrections are made, add air again until internal pressure of 4.0 psig is obtained. Then allow pressure to decrease to 3.5 psig, at which time a stopwatch shall be started to determine total time required for internal pressure to decrease to 2.5 psig.
2. Test equipment shall include source of compressed air, air hose, plugs, hose connections, shutoff valve, throttling valve, cage cock, monitoring pressure gauge, delicate 0.1 psi graduations pressure gauge, and stopwatch.
3. In all test pressures noted, add pressure adjustment of 0.433 psi pressure for each foot of groundwater level above invert of pipe being tested.
4. If section of sewer to be tested includes more than one pipe size, calculate test time for each size and add test times to arrive at total time for section.
5. Carefully observe safety precautions during air testing, recognizing the danger from plugs blowing out. Do not allow persons in manholes during testing.
6. Isolate pipe to be tested; plug section of pipe to be tested at each end. Plug ends of branches, laterals, and wyes which are included in test. Carefully brace plugs to prevent slippage and blowout due to the internal pressure.
7. Supply air to pipe section. Monitor air pressure so that pressure inside pipe does not exceed 5.0 psig, plus adjustment for groundwater.
8. Stabilize: When pressure reaches 4.0 psig, throttle air supply so that internal pressure is maintained between 4.0 and 3.5 psig, plus adjustment for groundwater, for at least 2 minutes. If plugs are found to leak, bleed off air, tighten plugs, and supply air again.
9. Determine rate of air loss. The control equipment consists of pressure gauges, valves, and pocket stopwatch. After allowing pressure to stabilize for 2-minute period, disconnect air supply and allow pressure to decrease to 3.5 psig. At 3.5 psig, start stopwatch to determine time required for pressure to drop to 2.5 psig. (NOTE: Make proper pressure adjustment for groundwater, where applicable, in determining beginning and end of period for 1.0 psig pressure drop). Pipeline shall be considered acceptable if time interval for 1.0 psi pressure drop is greater than holding time listed in Low Pressure Air Test Tables included in this Section. If CONTRACTOR's pressure gauge has minor graduation marks for 0.25 psi or greater, a pressure drop of only 0.5 psi will be permitted for all pipes but VCP or concrete pipe. Times for 0.5 psi drop are same as those given in this Section for VCP and concrete pipe at 1 psi drop.

C. Infiltration/Exfiltration Tests:

1. In sanitary sewers, place weirs temporarily for testing purposes in such manholes as necessary to measure amount of infiltration. Such tests at option of ENGINEER may be any length of sewer between two manholes, entire length of sewer under Contract, or any combination of sewer reaches.
2. The allowable amount of infiltration shall not be more than 200 gallons per inch diameter of sewer and laterals per mile of sewer per 24 hours. Allowable amount of infiltration shall include infiltration into manholes.

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3. If, in ENGINEER's opinion, there is not sufficient groundwater for infiltration testing of various sections of sewer, conduct exfiltration tests. The allowable amount of exfiltration shall not be more than 200 gallons per inch diameter of sewer and laterals per mile of sewer per 24 hours.
- D. Ring Deflection Testing:
1. A minimum of 30 days after the sewer has been installed, ring deflection testing shall be performed.
 2. Test all reaches of flexible pipe (excluding truss pipe with minimum pipe stiffness of 200 psi and trench depth less than 12 feet) for vertical ring deflection under load. Testing shall be performed by accredited independent testing company unless otherwise approved by ENGINEER. Testing shall be performed by Go-No Go Gauge method for compliance to maximum deflection limits or by instruments which measure and record actual pipe deflection. The maximum allowable pipe deflection shall be 5 percent of the average inside diameter.
 3. Replace sections of pipe which do not pass these tests at no cost to OWNER.

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LOW PRESSURE AIR TEST TABLES

TIME REQUIRED FOR 1.0 PSIG PRESSURE DROP

WHEN TESTING ONE PIPE DIAMETER ONLY FOR SIZE AND LENGTH OF PIPE INDICATED.

TABLE FOR PVC, PVCP, ABS AND DI PIPE

1 Pipe Diameter (in.)	2 Minimum Time (min:sec)	3 Length for Minimum Time (ft.)	4 Time for Longer Length	Test Time for Length (L) Shown (min:sec)							
				100 ft.	150 ft.	200 ft.	250 ft.	300 ft.	350 ft.	400 ft.	450 ft.
4	3:46	597	0.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	0.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

TABLE FOR VCP AND CONCRETE PIPE

1 Pipe Diameter (in.)	2 Minimum Time (min:sec)	3 Length for Minimum Time (ft.)	4 Time for Longer Length	Test Time for Length (L) Shown (min:sec)							
				100 ft.	150 ft.	200 ft.	250 ft.	300 ft.	350 ft.	400 ft.	450 ft.
4	1:53	597	0.190L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	0.427L	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8	3:47	298	0.760L	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10	4:43	239	1.187L	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12	5:40	199	1.709L	5:40	5:40	5:42	7:08	8:33	9:48	11:24	12:50
15	7:05	159	2.671L	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02
18	8:30	133	3.846L	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51
21	9:55	114	5.235L	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16
24	11:20	99	6.837L	11:24	17:57	22:48	28:30	34:11	39:53	45:35	51:17
27	12:45	88	8.653L	14:25	21:38	28:51	36:04	43:16	50:30	57:42	64:54
30	14:10	80	10.683L	17:48	26:43	35:37	44:31	53:25	62:19	71:13	80:07
36	17:00	66	15.384L	25:39	38:28	51:17	64:06	76:55	89:44	102:34	115:23
42	19:50	57	20.939L	34:54	52:21	69:48	87:15	104:42	122:09	139:36	157:03

Note: When testing two sizes of pipe simultaneously, time shall be computed by ratio of lengths involved.

Example: 400 feet of 8-inch PVC pipe and 150 feet of 6-inch VCP pipe.

$$\text{Time} = \frac{\text{Time} = \text{Length1} \times \text{Time1} + \text{Length2} \times \text{Time2}}{\text{Length1} + \text{Length2}}$$

$$= \frac{400 \times 10:08 + 150 \times 2:50}{400 + 150} = \frac{400 \times 608 + 150 \times 170}{400 + 150} = 489 \text{ seconds} = 8:09 \text{ (min:sec).}$$

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 02635 - MANHOLES AND CATCH BASINS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Labor, materials, and equipment necessary for furnishing the fabrication, production, installation, or erection of manholes and catch basins including inlets as detailed on Drawings and at the locations shown on Drawings. Concrete, excavation, and backfill shall be as specified here. Manholes and catch basins shall be complete with frames, covers, and steps. Adjustment of frames, inlets, etc., on new manholes and catch basins to meet new or existing pavement surfaces or sidewalks shall be included in Work under this Section.

1.02 REFERENCES

A. Reference Standards:

1. ASTM A 48 Gray Iron Castings.
2. ASTM A 536 Ductile Iron Castings.
3. ASTM C 55 Concrete Building Brick.
4. ASTM C 76 Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
5. ASTM C 139 Concrete Masonry Units for Construction of Catch Basins and Manholes.
6. ASTM C 443 Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
7. ASTM C 472 Test Method for Physical Testing of Gypsum, Gypsum Plasters, and Gypsum Concrete.
8. ASTM C 478 Precast Reinforced Concrete Manhole Sections.
9. ASTM C 923 Resilient Connectors Between Reinforced Concrete Manhole Structures and Pipes.

1.03 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:
1. Dimensions and reinforcement of precast concrete units, joint details, orientation and elevation of preformed openings in riser sections, pipe-to-manhole connection details, casting details, and certification papers.
- B. Warranty: Submit in accordance with requirements of Section 01770, warranties covering the items included under this Section.
- C. Quality Control Submittals: All precast concrete manhole sections, resilient connectors between manhole sections and pipes and castings delivered to Site shall be preceded or accompanied by certification papers or stamped markings showing that the materials have been tested in accordance with applicable standard testing procedures and that the materials meet the Specifications for this Contract.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

LIFT STATION TECHNICAL SPECIFICATION

- A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:
1. Cast Iron Manhole Steps:
 - a. James B. Clow and Sons.
 - b. East Jordan Iron Works.
 - c. Neenah Foundry Co.
 2. Steel-Reinforced Manhole Plastic Steps:
 - a. Cast-in-Place:
 - 1) M.A. Industries, Inc. PS1-PF.
 - 2) American Step Co., Inc. P1-10.
 - b. Masonry:
 - 1) M.A. Industries, Inc. PS1-B.
 - 2) American Step Co., Inc. MSN-10.
 - c. Mechanical Lock:
 - 1) M.A. Industries, Inc. PS1-PF.
 - 2) American Step Co., Inc. ML-10.
 3. Frames and Covers:
 - a. James B. Clow and Sons.
 - b. East Jordan Iron Works.
 - c. Neenah Foundry Co.

2.02 MANHOLES

- A. Manholes on new sanitary sewers of 48-inch diameter and smaller shall be precast reinforced concrete with flexible watertight connections between the manhole wall and the sewer pipe.
- B. Manholes on new sanitary sewers larger than 48 inches in diameter shall be precast reinforced concrete set on integrally cast pipe tee sections. Pipe reinforcement shall meet ASTM C 76 Specification with class as indicated on Drawings for the adjoining pipe. Vertical risers shall be set on the tangent of the horizontal pipe.
1. As an alternate, manholes may be constructed of Class A concrete according to details shown on Drawings.
- C. Manholes on existing sanitary sewers shall be precast reinforced concrete with pre-formed arched openings and the sewer pipe grouted into the opening and made watertight.
- D. Manholes on new or existing storm sewers, water mains, and pumping mains, shall be precast reinforced concrete or of concrete block or concrete brick unless otherwise noted on Drawings.
- E. Manhole slabs shall be constructed of Class B concrete; manhole channels and fillets shall be constructed of Class C concrete, as specified under Division 3, according to the details given on Drawings. Unless otherwise directed, all surfaces of concrete channels and fillets shall be screeded and floated to a smooth, uniform surface and troweled to a hard finish.

2.03 MANHOLE STEPS

- A. Manhole steps shall be asphalt-coated cast iron or be steel-reinforced, high-density polypropylene plastic meeting OSHA requirements. They shall be a minimum 10 inches wide and placed a maximum of 16 inches apart.

LIFT STATION TECHNICAL SPECIFICATION

2.04 FRAMES AND COVERS

- A. Cast iron frames and covers shall be furnished and placed on each manhole by CONTRACTOR. Casting materials shall conform to ASTM A 48, Class 30 or better for gray iron, or ASTM A 536 for ductile iron. Casting shall be free of defects and shall be smooth and well cleaned by shot blasting. Castings shall be of the size and type as called for on Drawings. Lids shall be self-sealing on all sanitary sewer manholes. Castings shall be set flush with sidewalk, pavement, or ground surface and shall be securely cemented in place. In gravel streets, covers shall be set 4 inches below the surface.
- B. Where noted on Drawings, bolted gasketed frames and covers shall be provided. The frames shall be anchored to the concrete manhole sections according to details shown on Drawings.

2.05 DROP CONNECTIONS

- A. Where shown on Drawings, directed by ENGINEER, or where a sanitary branch sewer is brought into a manhole more than 24 inches above the invert elevation in the manhole, a drop connection shall be provided according to the details shown on Drawings.

2.06 PRECAST REINFORCED CONCRETE MANHOLES

- A. Precast manhole base sections, riser sections, conical sections, flat slab tops, grade rings, manhole steps and ladders shall meet the requirements of ASTM C 478.
- B. Premium modified tongue and groove joints with rubber gaskets meeting the requirements of ASTM C 443 shall be provided for all sanitary sewer manholes. Joints in storm sewer, water main, and pumping main manholes shall be either premium joint as specified for sanitary manholes or shall be tongue and groove with a cold-applied plastic joint-sealing compound and primer.
 - 1. The joints around the inside circumference of the manhole shall be pointed with cement mortar.
All holes provided for handling and lifting shall be filled with mortar and made watertight.
- C. Foundations for precast manholes shall be constructed as a cast-in-place concrete slab, precast reinforced concrete slab, or precast reinforced concrete base riser section with integral floor as specified under Division 3 and as shown on Drawings. Steel reinforcing for precast base slabs shall meet the requirements of ASTM C 472.
- D. Pipe-to-manhole connections on new sanitary sewers shall be made with resilient connectors meeting the requirements of ASTM C 923 and shall be adequate for hydrostatic pressures of 10 psi, without leakage, when tested in accordance with ASTM C 923 Specifications.

PART 3 - EXECUTION

3.01 EXCAVATION AND BACKFILL

- A. Excavation and backfill shall be in accordance with Section 02315.
- B. The excavation shall be of sufficient dimensions to provide ample space for sheeting and bracing where sheeting and bracing are required, and ample space to perform Work in a satisfactory manner.

LIFT STATION TECHNICAL SPECIFICATION

- C. When the earth at the normal depth of the structure is unsuitable for a foundation for the structure, such unsuitable materials shall be removed as required by ENGINEER and replaced with MDOT Class II material.

3.02 BEDDING

- A. Precast base section shall be placed on a well-graded granular bedding course conforming to the requirements for sewer bedding, but not less than 4 inches in thickness and extending to the limits of the excavation. The bedding course shall be firmly tamped and made smooth and level to ensure uniform contact and support of the precast element.

3.03 PRECAST REINFORCED CONCRETE MANHOLES

- A. All lift holes and all joints between precast elements in manhole shall be thoroughly wetted and then completely filled with mortar, smoothed, and painted both inside and out to ensure watertightness.
- B. Precast sections shall be placed and aligned to provide vertical sides and vertical alignment of the manhole steps. The complete manhole shall be rigid, true to dimensions and watertight.

3.04 PLACING OF CASTINGS, GRADE RINGS, AND TOP SECTIONS

- A. Castings placed on concrete surface shall be set in full mortar beds. The mortar shall be mixed in proportion of 1 part Portland cement to 2 parts sand, by volume, based on dry materials. Castings shall be set accurately to the finished elevation so that no subsequent adjustment will be necessary, or unless otherwise specified by ENGINEER.
- B. Where Work is in paved streets or areas which have been brought to grade, not more than 15 inches shall be provided between the top of the cone or slab and the underside of the manhole casting for adjustment of the casting to street grade.
- C. Where Work is in unpaved streets or alleys, provide not less than 12 inches of adjusting rings between the top of the cone or slab and the underside of the manhole casting for adjustment of the casting to finished grade. Set the top of the manhole casting 5 inches below finished grade, unless otherwise directed by ENGINEER.
- D. Where Work is in cultivated agricultural areas, bury the top of the manhole casting 3 feet, and in noncultivated areas, set the casting flush with the finished grade, unless otherwise directed by ENGINEER.
- E. Where the last manhole section is a reducing cone and it is set to final grade as required by ENGINEER, if as part of the continuous Work it becomes necessary to lower this casting and the adjustment entails going below the cone, compensation to CONTRACTOR will be allowed for said adjustment and changing of the manhole stacks.
- F. Point up and make watertight adjusting rings used to set the casting to grade.

3.05 CHANNELS AND INVERTS

- A. Channels and inverts shall be made to conform accurately to the sewer characteristics and grades and shall be brought together smoothly with well-rounded junctions.

LIFT STATION TECHNICAL SPECIFICATION

3.06 PIPE CONNECTIONS

- A. Make pipe-to-manhole connections on sanitary sewers with properly sized watertight resilient connector. Fill other pipe joints firmly full of jointing materials to ensure watertightness. The pipes shall not protrude into the inside face of the manhole, measured along the horizontal center of the pipe unless the pipe is placed through the entire diameter of the manhole.
- B. Use rubber water stops, O-ring gaskets, or poured-in-place pipe sleeves for watertightness between the pipe and manhole. Core drill or star drill new holes in a circle of the required diameter. In no instance shall new holes be sledge hammered out.

3.07 REMOVALS, REPLACEMENTS, AND MODIFICATIONS

- A. Remove existing manholes where indicated on Drawings or as directed by ENGINEER. Remove frame and cover and deliver to OWNER. Bulkhead all abandoned pipes and either remove the manhole and backfill the area as specified under "Excavation and Backfill," or, if in good condition, remove to a depth of 24 inches below grade and fill with granular fill materials.
- B. Remove existing catch basins where indicated on Drawings or as directed by ENGINEER. Remove frame and cover and deliver to OWNER. Completely break up masonry, or pipe, and remove and dispose. Bulkhead all abandoned pipe connections at both ends where accessible. Backfill the area occupied by existing catch basins after their removal as specified under Section 02315.
- C. Where indicated on Drawings and/or as directed by ENGINEER, fit existing catch basins to be retained with a new frame and cover of the type noted on Drawings including all necessary work required to adjust to grade. Where indicated on Drawings or as directed by ENGINEER, fillet existing sumps with Class C concrete and bulkhead abandoned leads. Work shall be considered incidental to construction of the new catch basin lead.
- D. Where noted on Drawings and/or as directed by ENGINEER, remove existing manhole and/or catch basin castings and replace with a new casting as specified here before.

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 02740 - HOT MIX ASPHALT PAVING

PART 1 - GENERAL

1.01 SUMMARY

- A. Extent of hot mix asphalt (HMA) paving Work is shown on Drawings.

1.02 REFERENCES

- A. MDOT Standard Specifications for Construction, 2020 Edition:

1. 302 Aggregate Base Course.
2. 306 Aggregate Surface Course.
3. 501 Plant Mixed Hot Mix Asphalt.
4. 502 Hot Mix Asphalt Construction Practices.
5. 902 Aggregates.

- B. ASTM:

1. D 5581: Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus (6-inch Diameter Specimen).

1.03 DESIGN REQUIREMENTS

- A. HMA pavement restoration shall be one of the following types:

1. Type A: 2-inch, HMA leveling course over gravel base with 2-inch, HMA wearing course in trench areas.
2. Type B: 2-inch, HMA leveling course over gravel base in trench areas with 2-inch, HMA wearing course over entire width of pavement.
3. Type C: 2-inch, HMA wearing course on 8-inch concrete base in trench areas.
4. Type D: 2-inch, HMA wearing course in trench areas over 8-inch HMA base course.

- B. All HMA driveways shall be 1-1/2-inch HMA leveling course and 1-1/4-inch HMA wearing course on a 6-inch thick compacted gravel base. If an existing driveway has a thicker HMA cross-section, the difference shall be made up using HMA base.

1.04 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section.

- B. Quality Assurance Submittals:

1. Provide copies of materials certificates, signed by material producer and CONTRACTOR, certifying that each material item complies with or exceeds specified requirements.
2. Provide a laboratory-designed, Marshall mix design for all HMA mixtures. The mix design shall include, at a minimum, the asphalt content, compacted mixture specific gravity theoretical maximum specific gravity, air voids, voids filled with asphalt (VFA), voids mineral aggregate (VMA), mix proportions, stability, flow, aggregate gradation, crush content, and job mix formula.

1.05 QUALITY ASSURANCE

City of Hillsdale
Marion Ellen Pump Station
200-12761-23002

LIFT STATION TECHNICAL SPECIFICATION

- A. Codes and Standards: Comply with MDOT Standard Specifications for Construction, 2003 Edition.

1.06 SITE CONDITIONS

- A. Weather Limitations: Apply prime and tack coats when ambient temperature is above 50 degrees F (10 degrees C), and when temperature has not been below 35 degrees F (1 degree C) for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture.
1. Construct asphalt concrete surface course when atmospheric temperature is above 40 degrees F (4 degrees C), and when base is dry. HMA base course over 2 inches thick may be placed when air temperature is above 35 degrees F (-1 degree C) and rising. HMA may not be placed between November 15 and May 5.
- B. Establish and maintain required lines and elevations. Grade control shall be according to MDOT standards.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Use locally available materials and gradations which meet the specifications requirements and exhibit a satisfactory record of previous installations.
1. Base Course Aggregate: MDOT Specification 21AA, 21A, or 22A.
 2. Surface Course Aggregate: MDOT Specification 22A.
 3. Mineral Filler: MDOT Specification 3MF.
 4. Asphalt Cement: Asphalt penetration (viscosity) rate of 120 to 150.
 5. Bond Coat: MDOT Specification SS-1h or CSS-1h.
 6. Lane Marking Paint: Chlorinated rubber-alkyd type, AASHTO M 248 (FS TT-P-115), Type III.

2.02 ASPHALT-AGGREGATE MIXTURE

- A. HMA mixtures shall be MDOT 13A, furnished and placed in accordance with MDOT Specifications 501 and 502. Aggregate Wear Index shall be 220 for local roads and 260 for collection and major roads.
- B. When tested at the optimum asphalt content in accordance with ASTM D 5581, the bituminous mixture shall meet the requirements for stability, 1,100 pounds, flow, 8-16 hundredths of an inch, air voids 3.0 percent, and voids in mineral aggregate, 13.5 percent.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

- A. Proof roll prepared subbase surface to check for unstable areas and areas requiring additional compaction. Do not begin base construction or paving Work until deficient subbase areas have been corrected and are ready to receive paving.
- B. Pavement along edges of existing HMA surfaces shall be removed as directed by ENGINEER to construct butt joints.

LIFT STATION TECHNICAL SPECIFICATION

- C. Tack Coat: Apply to contact surfaces of previously constructed HMA or Portland cement concrete and surfaces abutting or projecting into HMA pavement. Distribute at rate of 0.10 gallon per square yard of surface. Apply to all edges of concrete curb and gutter.
 - 1. Allow to cure until at proper condition to receive paving.
- D. Exercise care in applying HMA materials to avoid smearing of adjoining concrete surfaces. Remove and clean damaged surfaces.

3.02 PLACING MIX

- A. Place HMA mixture on prepared surface, spread and strike-off in accordance with MDOT Specifications. Spread mixture at minimum temperature of 225 degrees F (107 degrees C). Place inaccessible and small areas by hand. Place each course to required grade, cross-section, and compacted thickness as shown on Drawings.
- B. Paver Placing: Place in strips to line up with lane lines in accordance with MDOT Specifications.
- C. Joints: Make joints between old and new pavements or between successive days' work, to ensure continuous bond between adjoining Work. Construct joints to have same texture, density, and smoothness as other sections of HMA course. Clean contact surfaces and apply tack coat. All joints on new pavement shall be vertical joints. Joints on old to new pavement shall be butt joints.

3.03 ROLLING

- A. Begin rolling when mixture will bear roller weight without excessive displacement.
 - 1. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.
- B. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling, and repair displaced areas by loosening and filling, if required, with hot material.
- C. Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.
- D. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density.
- E. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cutout such areas and fill with fresh, HMA. Compact by rolling to maximum surface density and smoothness.
- F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
 - 1. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.04 TRAFFIC AND LANE MARKINGS

- A. Sweep and clean surface to eliminate loose material and dust.

LIFT STATION TECHNICAL SPECIFICATION

- B. Striping: Use chlorinated-rubber base traffic lane-marking paint, factory-mixed, quick-drying, and nonbleeding; color Yellow or White.
- C. Do not apply traffic and lane-marking paint until layout and placement has been verified with ENGINEER.
- D. Apply paint with mechanical equipment to produce uniform straight edges. Apply in 2 coats at manufacturer's recommended rates.

3.05 FIELD QUALITY CONTROL

- A. In-place HMA courses will be tested for compliance with requirements for thickness and surface smoothness by OWNER. CONTRACTOR shall repair or remove and replace unacceptable paving as directed by ENGINEER.
 - 1. In-place compacted thickness will not be acceptable if exceeding following allowable variation from required thickness:
 - a. Base Course: 1/4 inch, plus or minus.
 - b. Surface Course: 1/4 inch, plus or minus.
 - 2. Surface Smoothness: Test finished surface of each HMA course for smoothness, using 10-foot straightedge applied parallel with, and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness.
 - 3. Base Course Surface:
 - a. Lower Courses: 3/4 inch.
 - b. Top Course: 3/8 inch.
 - 4. Leveling and Wearing Course Surface:
 - a. Multiple Course Construction:
 - 1) 1/8 inch for top course.
 - 2) 1/4 inch for lower course.
 - b. Single Course Construction: 1/4 inch.

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 03310 - CONCRETE WORK

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Labor, materials, and equipment necessary for fabrication, production, installation, and erection of items specified in this Section as shown on Drawings or listed on Schedules.
- B. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, including Section 01600, apply to Work of this Section.
- C. Products Installed but not Furnished under this Section:
 - 1. Anchor bolts.
 - 2. Miscellaneous metal embedments.

1.02 REFERENCES

- A. ASTM:
 - 1. A 185 Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement.
 - 2. A 497 Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
 - 3. A 615 Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - 4. C 31 Test Methods of Making and Curing Concrete Test Specimens in the Field.
 - 5. C 33 Concrete Aggregates.
 - 6. C 39 Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - 7. C 42 Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
 - 8. C 94 Ready-Mixed Concrete.
 - 9. C 143 Test Method for Slump of Hydraulic Cement Concrete.
 - 10. C 150 Portland Cement.
 - 11. C 157 Test Method for Length Change of Hardened Hydraulic Cement Mortar and Concrete.
 - 12. C 171 Sheet Materials for Curing Concrete.
 - 13. C 172 Practice for Sampling Freshly Mixed Concrete.
 - 14. C 173 Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
 - 15. C 231 Test Method for Air Content of Freshly Mixed Concrete by Pressure Method.
 - 16. C 260 Air-Entraining Admixtures for Concrete.
 - 17. C 309 Liquid Membrane-Forming Curing Compounds for Curing Concrete.
 - 18. C 494 Chemical Admixtures for Concrete.
 - 19. C 578 Preformed, Cellular Polystyrene Thermal Insulation.
 - 20. C 595 Blended Hydraulic Cements.
 - 21. C 618 Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
 - 22. C 845 Expansive Hydraulic Cement.
 - 23. C 881 Epoxy-Resin-Base Bonding Systems for Concrete.
 - 24. C 989 Ground Iron Blast-Furnace Slag for Use in Concrete and Mortars.
 - 25. C 1107 Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
 - 26. C 1116 Fiber-Reinforced Concrete and Shotcrete.
 - 27. C 1240 Silica Fume for Use as a Mineral Admixture in Hydraulic Cement Concrete.
 - 28. D 994 Preformed Expansion Joint Filler for Concrete (Bituminous Type).

LIFT STATION TECHNICAL SPECIFICATION

29. D 471 Test Method for Rubber Property – Effect of Liquids.
30. D 1751 Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextending and Resilient Bituminous Types).
31. D 1752 Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
32. D 3963 Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars.
33. E 1155 Test Method for Determining Floor Flatness and Levelness Using the F-Number System (Inch-Pound Units).
34. E 1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
35. E 1745 Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.

B. MDOT: Standard Specifications for Construction.

C. ACI:

1. 211.1 Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
2. 222.1 Provisional Standard Test Method for Water-Soluble Chloride Available for Corrosion of Embedded Steel in Mortar and Concrete Using the Soxhlet Extractor.
3. 301 Specification for Structural Concrete.
4. 304R Guide for Measuring, Mixing, Transporting, and Placing Concrete.
5. 305R Hot Weather Concreting.
6. 306R Cold Weather Concreting.
7. 309R Guide for Consolidation of Concrete.
8. 318R Building Code Requirements for Structural Concrete and Commentary.
9. 347R Guide to Formwork for Concrete.
 0. 350R Environmental Engineering Concrete Structures and Commentary.
 1. 503R Use of Epoxy Compounds with Concrete.
 2. SP-66 ACI Detailing Manual.

D. CRSI:

1. Manual of Standard Practice.
2. Placing Reinforcing Bars.

1.03 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01 33 00, Shop Drawings covering the items included under this Section.

1. Shop Drawings of Reinforcement: Submit original shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with Reinforcement Shop Drawing Checklist below.
 - a. Reinforcement Shop Drawing Checklist:
 - 1) Specify ASTM number and grade of reinforcing.
 - 2) Show bar spacings and quantities.
 - 3) Specify lap lengths using table in Tetra Tech, Inc. Structural Standard Details.
 - 4) Specify whether bars are inside and outside or near face and far face on walls.
 - 5) Specify clear coverages per Placing Reinforcement Specification in Part 3.
 - 6) Specify bar support spacings per Tetra Tech, Inc. Standard Detail for Concrete Slabs.
 - 7) Show stirrup spacing.

LIFT STATION TECHNICAL SPECIFICATION

- 8) Use closed stirrups and ties with 135-degree hooks.
- 9) Submit Bar Bending Schedule on Drawings.
- 10) Reference major Contract Drawings. Use same section cut numbers and letters when practical.
- 11) Show details for additional reinforcing items. Examples are reinforcing around openings, control joints, equipment pads, masonry reinforcement.
- 12) Show numeric elevation references on sections.
- 13) Locate expansion and control joints.
- 14) Organize and present sheets in logical sequence.
- 15) Submit "small" submittal packages when practical.
- 16) Immediately contact ENGINEER if Contract Documents are unclear.

B. Product Data: Submit data for proprietary materials and items, including admixtures, patching compounds, waterstops, joint systems, curing compounds, and other materials installed under this Section.

C. Mix Designs: Submit the following for all concrete classes:

1. Water/cement ratio (total gallons of water per cubic yard).
2. Brand, type, and quantity of cement.
3. Type and quantity of aggregates.
4. Type and quantity of admixtures.
5. Type, composition, and quantity of fly ash, slag (GGBFS), or silica fume.
6. Unit weight (wet density).
7. Compressive strength based on 28-day compression test.

D. Submit laboratory test reports for concrete mix design, aggregates (particularly deleterious materials in coarse aggregate) and fly ash, slag (GGBFS) and silica fume (if used) 4 weeks before scheduled pouring.

E. Quality Assurance Submittals:

1. Submit written reports to ENGINEER documenting testing and inspection results. Prepare report as noted in Section 01450.
2. Submit mill test reports on reinforcement.
3. Submit materials certificates in lieu of laboratory test reports on other materials. Manufacturer and CONTRACTOR shall sign material certificates certifying that each material item complies with, or exceeds, specified requirements. Submit certification from admixture manufacturers that chloride content complies with specification requirements.

1.04 PROJECT CONDITIONS

A. Protection of Footings against Freezing: Cover completed Work at footing level with sufficient temporary or permanent cover to protect footings and adjacent subgrade against possibility of freezing. Maintain cover for curing period or until temperatures cannot affect concrete footings.

B. Protect adjacent finish materials against spatter during concrete placement.

1.05 OWNER'S INSTRUCTIONS

LIFT STATION TECHNICAL SPECIFICATION

- A. Concrete Testing Service: Engage testing laboratories acceptable to ENGINEER to do material evaluation tests and to design concrete mixes.
- B. Materials and installed Work may require testing and retesting at any time during progress of Work. Tests, including retesting of rejected materials for installed Work, shall be done at CONTRACTOR's expense.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with specified requirements, products which may be incorporated in Work include:
 - 1. Nonstructural Fiber Reinforcement:
 - a. "Fibermesh," Propex Concrete Systems.
 - b. "Fiberstrand F," Euclid Chemical Co.
 - c. "Grace Fibers," Grace Construction Products.
 - 2. Air-Entraining Admixture:
 - a. "AEA-92" or "Air-Mix," Euclid Chemical Co.
 - b. "Darex II AEA" or "Daravair 1000 or 1400," Grace Construction Products.
 - c. "MB AE 90" or "Micro-Air," Master Builders.
 - 3. Water-Reducing Admixture:
 - a. "Eucon WR-75," Euclid Chemical Co.
 - b. "Pozzoloth 220-N," Master Builders.
 - c. "WRDA with Hycol" or "Daracem," Grace Construction Products.
 - 4. Mid-range Water-Reducing Admixture:
 - a. "Eucon MR," Euclid Chemical Co.
 - b. "Mira 70" or "Daracem 65 or 55," Grace Construction Products.
 - c. "Polyheed 997," Master Builders.
 - 5. High-range Water-Reducing Admixture (Superplasticizer):
 - a. "ADVA," "Daracem," Grace Construction Products.
 - b. "Eucon 37," Euclid Chemical Co.
 - c. "Rheobuild 1000 or 7161," Master Builders.
 - 6. Water Reducing, Nonchloride Accelerator Admixture:
 - a. "Accelguard 80 or 90," Euclid Chemical Co.
 - b. "Daraset," Grace Construction Products.
 - c. "Pozzutec 20" or "Pozzoloth NC 534," Master Builders.
 - 7. Water Reducing, Retarding Admixture:
 - a. "Daratard," Grace Construction Products.
 - b. "Eucon Retarder 75," Euclid Chemical Co.
 - c. "Pozzoloth Retarder," Master Builders.
 - 8. PVC Waterstops:
 - a. Greenstreak, Inc.
 - b. Vinylex Corp.
 - c. W.R. Meadows.
 - 9. Hydrophilic Waterstop:
 - a. "Akwastop Gasket Waterstop," Cetco-Colloid Environmental Technologies Co.
 - b. "Swellseal," De Neef Construction Chemicals, Inc.
 - 10. Expansion and Isolation Joint Filler:
 - a. "Sealtight Sponge Rubber," W.R. Meadows.
 - b. "1300 Series Sponge Rubber," Williams Products.

LIFT STATION TECHNICAL SPECIFICATION

11. Expansion and Isolation Joint Sealant:
 - a. "Dynaseal W-517 or 907," Williams Products.
 - b. "Sonolastic NP1," Sonneborn.
 - c. "Vulkem 45 or 116," Mameco International.
12. Cement-Polymer Patching Mortar:
 - a. "EUCO Poly-Patch," Euclid Chem. Co.
 - b. "Masterpatch 220" or "EMACO S88," Chemrex, Inc.
 - c. "Sikatop," Sika Chem. Corp.
 - d. "Thin Coat Concrete Coat," Euclid Chem. Co.
13. Nonshrink Grout:
 - a. "Crystex," L&M Construction Chemicals, Inc.
 - b. "Five Star Grout," U.S. Grout Corp.
 - c. "Master Flow," Chemrex, Inc.
 - d. "Multi-Purpose," Symons.
 - e. "NS Grout," Euclid Chemical Co.
 - f. "Sure-Grip Grout," Dayton-Superior.
14. Transparent Membrane Forming Curing Compound:
 - a. "Kurez DR," Euclid Chemical Co.
 - b. "L&M Cure R," L&M Construction Chemicals, Inc.
 - c. "Sealtight 1100-Clear," W.R. Meadows.
15. Epoxy Bonding Compound:
 - a. "Concresive Liquid LPL," Chemrex, Inc.
 - b. "Duralbond," Tamms Industries.
 - c. "Euco #452 or #620 Epoxy," Euclid Chemical Co.
 - d. "Rescon R606, R616, R631, R649," Symons Corp.
 - e. "Sikadur 32 Hi-Mod," Sika Chemical Corp.
 - f. "Thiopoxy," Grace Construction Products.

2.02 FORM MATERIALS

- A. Forms for Smooth Form Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel materials, to achieve continuous, straight, smooth, exposed surfaces. Furnish largest practicable sizes to minimize joints and to conform to joint system shown on Drawings.
- B. Forms for Rough Form Finish Concrete: Plywood, lumber, metal, or other acceptable material. Use lumber dressed on two edges and one side for tight fit.
- C. Form Coatings: Commercial formulation form-coating compounds with no more than 350 mg/ltr volatile organic compounds (VOCs) that do not bond with, stain, or adversely affect concrete surfaces, or prevent good bonding with later concrete surface treatments.
- D. Forms Ties: Factory fabricated, adjustable length, removable or snap-off metal form ties, designed to prevent form deflection and to prevent spalling concrete upon removal. Provide units which shall leave no metal closer than 1-1/2 inches to surface.
 1. Provide ties which, when removed, leave holes no larger than 7/8-inch or less than 1/2-inch in diameter in concrete surface.

2.03 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

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- B. Welded Wire Fabric: ASTM A 185.
- C. Welded Deformed Steel Wire Fabric: ASTM A 497.
- D. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar supports complying with CRSI specifications. The use of bricks is not permitted.
 - 1. For exposed-to-view concrete surfaces, where support legs are in contact with forms, use supports with legs that are plastic-protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).

2.04 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type II,.
- B. Use one brand of cement throughout Project, unless otherwise acceptable to ENGINEER.
- C. Fly Ash: ASTM C 618, Type C or Type F (corrosive environments) with loss on ignition not more than 6 percent.
- D. Ground Granulated Blast-Furnace Slag: ASTM C 989.
- E. Silica Fume: ASTM C 1240.
- F. Aggregates: ASTM C 33. Use aggregates from single source for exposed concrete.
 - 1. Fine aggregate: MDOT 2NS.
 - 2. Coarse aggregate: MDOT 6AA or 31A.
- G. Water: Potable.
- H. Nonstructural Fiber Reinforcement: Monofilament Polypropylene, Type F1 fibers designed as secondary reinforcing. Fibers to comply with ASTM C 1116, Type III, not less than 3/4-inch long.
- I. Air-Entraining Admixture: ASTM C 260, and certified by manufacturer to be compatible with other admixtures.
- J. Water-Reducing Admixture: ASTM C 494, Type A.
- K. High-range Water-Reducing Admixture (Superplasticizer): ASTM C 494, Type F or Type G.
- L. Water Reducing, Nonchloride Accelerator Admixture: ASTM C 494, Type E.
- M. Water Reducing, Retarding Admixture: ASTM C 494, Type D.
- N. Prohibited Admixtures: Calcium chloride thiocyanates or admixtures containing more than 0.1 percent chloride ions.

2.05 ACCESSORIES

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- A. Expansion and Isolation Joint Filler: Sponge rubber conforming to ASTM D 1752, Type I. Concrete shall be gray color with density not less than 30 pounds per cubic foot and compression deflection not more than 25 percent of thickness at 20 psi apply pressure.
- B. Expansion and Isolation Joint Sealant: One part polyurethane. Concrete shall be gray color unless otherwise required by ENGINEER. Before applying, wipe surface clean with solvent supplied by manufacturer.
- C. Granular Base: Evenly graded fine aggregate to provide smooth and even surface below slabs on grade. Minimum 6-inch thickness or as noted on Drawings.
- D. Nonshrink Grout: ASTM C 1107, factory pre-mixed, cementitious natural aggregate grout.
- E. Chemical Hardener: Colorless aqueous solution containing magnesium fluosilicate and zinc fluosilicate combined with wetting agent, containing not less than 2 pounds of fluosilicates per gallon.
- F. Moisture-Retaining Cover: Waterproof paper, polyethylene film, or polyethylene-coated burlap complying with ASTM C 171.
- G. Transparent Membrane-Forming Curing Compound: Liquid membrane-forming curing compound complying with ASTM C 309, Type 1, Class B. Formed membrane shall be suitable for later application of cementitious coating or topping.
- H. White Pigmented Membrane-Forming Curing Compound: Liquid membrane-forming curing compound complying with ASTM C 309, Type 2, Class B. Tests for moisture retention, reflectance, and drying time shall be based on a curing compound applied at 200 square feet per gallon.
- I. Epoxy Bonding Agent: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material Type, Grade, and Class to suit Project requirements.

2.06 PROPORTIONING AND DESIGN OF MIXES

- A. Prepare design mixes for each concrete class and strength by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method is used, use independent testing facilities acceptable to ENGINEER for preparing and reporting proposed mix designs. Testing facility shall not be identical to that used for field quality control testing.
- B. Fly ash shall be used to partially supplant cement content in Class A and Class S concrete, unless noted otherwise, and is optional in other classes. Replacement quantity of cement content by weight shall be not less than 15 percent for Class A and Class S concrete or more than 25 percent for all classes except Class F.
- C. For concrete Class A and Class S, concrete mix design with fly ash and silica fume shall be maximum 30 percent of cement content by weight, and shall constitute no more than 20 and 10 percent, respectively, of the total weight of cementitious materials.
- D. Coarse aggregate shall be MDOT 6AA, except for Class G concrete which shall use MDOT 31A.
- E. Design mixes to provide normal weight concrete for following classes and properties:
 - 1. Locations for concrete classes are as follows:

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- a. Class A Structural concrete (slabs, walls, columns, beams, equipment bases, and slab toppings 2 inches or greater in thickness).
- b. Class G Grout fill for use in sweeping in final surfaces in sanitary structures and slab toppings less than 2 inches in thickness.
- c. Class P Exterior pavements (unless otherwise indicated on Drawings).
- d. Class B Sidewalks and manhole bases (unless otherwise indicated on Drawings).
- e. Class C Fill within manholes, mud mats, fill under structures, encasement for piping below or adjacent to structures and encasement for floor drains, sewer inlets and similar items.
- f. Class F Flowable fill for filling spaces as permitted and directed by ENGINEER.

2. Properties for concrete classes are as follows:

Concrete Class		A	G	P	B	C	F
28-Day* Compressive Strength (f'c), psi		4,000	4,000	3,500	3,000	2,000	50-100
Cement Content per cubic yard of concrete, sacks minimum **		6	6	5.5	5	4	0.4-3.0
Water/Cement Ratio by weight, maximum		0.44	0.44	0.44	0.58	0.75	0.40-0.75
Air Content, percent by volume		5±1	5±1	6.5±±1.5	6.5±1.5	NA	NA
Slump at point of placement, inches.	WR***	2-4	2-4	2-4	3-5	3-6	NA
	MRWR	4-6	4-6	4-6	NA	NA	NA
	HRWR	6-8	6-8	6-8	NA	NA	NA
Monofilament Polypropylene, Type F1		Yes	Yes	NA	NA	NA	NA

* 7-day compressive strength for high-early-strength concrete.

** For concrete with fly ash, values are total of cement plus fly ash (except Class F concrete).

*** Slump prior to the addition of mid-range or high-range water reducers.

3. Adjustment of Concrete Mixes: Mix designs may be adjusted when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, when approved by ENGINEER, at no additional cost to OWNER. Submit laboratory test data for revised mix design and strength results to ENGINEER before using in work.
4. Admixtures:
 - a. Use water-reducing admixture or high range water-reducing admixture (superplasticizer) in concrete for placement and workability.
 - b. Use nonchloride accelerating admixture in concrete slabs placed at ambient temperatures below 50 degrees F (10 degrees C).
 - c. Add air-entraining admixture at manufacturer's prescribed rate to result in placed concrete having total air content specified.
 - d. Use nonstructural synthetic reinforcement, monofilament polypropylene Type F1 in Class A concrete for exposed exterior surfaces without earth covering, and as specified by ENGINEER for other concrete mix design. Bottom slabs of open concrete tanks do not require synthetic reinforcement. The synthetic reinforcing fibers shall be added to the

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concrete mix at the rate of 1.5 pounds per cubic yard and in accordance with manufacturer's recommendations.

2.07 CONCRETE MIXING

- A. Ready-Mix Concrete: Comply with ASTM C 94 requirements and as specified in this Section.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Coordinate installation of joint materials, perimeter insulation, and vapor retarders with placement of forms and reinforcing steel.

3.02 FORMS

- A. Design, build, support, brace, and maintain formwork to support vertical and lateral, static, and dynamic loads applied to formwork until concrete structure can support applied loads. Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation, and position. Deflection of form-facing material between supports, and deflection of form supports shall not exceed 1/4 inch per 10 feet of span.
- B. Design formwork to be removable without impact, shock, or damage to cast-in-place concrete surfaces and adjacent materials.
- C. Construct forms to sizes, shapes, lines, and dimensions shown, and to obtain accurate alignment, location, grades level and plumb for work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features in Work. Use selected materials to obtain specified finishes. Solidly butt joints and provide backup at joints to prevent leakage of cement paste.
- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, and recesses to prevent swelling and for easy removal.
- E. Provide temporary openings at base of wall and column forms and other interior areas of formwork where it is inaccessible for cleanout, for observation before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.
- F. Chamfer exposed corners and edges, 3/4 inch minimum, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- G. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing these items. Accurately place and securely support items built into forms.

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- H. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing after concrete placement to eliminate mortar leaks and to maintain proper alignment.

3.03 PLACING REINFORCEMENT

- A. Comply with CRSI recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports, and as specified in this Section.
 - 1. Avoid cutting or puncturing vapor retarder during reinforcement placement and concreting operations.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.
- C. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers.
- D. Place reinforcement to obtain clear cover space for concrete protection:
 - 1. Footings and slabs cast over mud mats, supported slabs, beams, girders, columns, and walls, both interior and exterior unless noted otherwise: 2 inches.
 - 2. Footings and slabs cast against and permanently exposed to earth: 3 inches.
- E. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Direct wire tie ends into concrete, not toward exposed concrete surfaces.
- F. Field bending of reinforcement:
 - 1. Field bending of plain reinforcement shall be performed using an approved and appropriate sized portable hydraulic device that makes ACI-approved radius bends. No other field bending method shall be permitted.
 - 2. No field bending shall be permitted for epoxy coated reinforcement.
- G. Install welded wire fabric in as long lengths as practical. Lap adjoining pieces one full mesh and lace splices with wire.

3.04 JOINTS

- A. Locate and install construction joints as shown or, if not shown, locate so as not to impair strength and appearance of structures, at intervals not to exceed 50 feet. For construction joints in water-containing structures or tanks or in water-restraining structures, use watertight joints.
- B. Continue reinforcement across construction joints, unless otherwise noted. Mechanical inserts with threaded studs are not accepted as substitutes for through-dowels.
- C. Locate construction joints in floor system at or near middle of span in slabs, beams, or girders unless beam intersects girders at this point. Then, where not shown on Drawings, joints in girders shall be offset distances twice the width of beams, and provisions made for shear by web reinforcement across joints.

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- H. Provide watertight joints to prevent water seepage. Take special care in finishing surfaces to which succeeding concrete is bonded. Provide waterstops in joints if shown. Install waterstops to form continuous diaphragm in each joint. Make provisions to support and protect exposed waterstops during progress of work. Fabricate field joints in waterstops according to manufacturer's printed instructions.
- I. Provide isolation joints in slabs-on-ground at points of contact between slabs-on-ground and vertical surfaces of column pedestals, foundation walls, and grade beams.
- J. Contraction (Control) Joints in Slabs-on-Ground: Construct contraction (control) joints in slabs-on-ground to form panels of patterns as shown. Use saw cuts 3/16 inch by 1/4 slab depth or inserts 1/4-inch wide by 1/4 of slab depth unless otherwise noted.
 - 1. If joint pattern is not shown, provide joints at 15 feet at most in either direction, with locations to conform to bay spacing wherever practical (at column centerlines, half-bays, third-bays).
 - 2. Form contraction joints by inserting pre-molded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.
 - 3. Cut contraction joints in unexposed floor slabs by saw cuts as soon as practical after slab finishing when it can be safely done without dislodging aggregate.

3.05 INSTALLATION OF EMBEDDED ITEMS

- A. Set and build into Work anchorage devices and other embedded items required for other work that are attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of attachment items.
- B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain set elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support screed strips by use of strike-off templates or accepted compacting screeds.
- C. Conduits and pipes of aluminum shall not be embedded in structural concrete unless they are effectively coated or covered to prevent aluminum-concrete reaction or electrolytic action between aluminum and steel.

3.06 PREPARATION OF FORM SURFACES

- A. Clean re-used forms of concrete matrix residue, repair and patch to return forms to acceptable surface condition.
- B. Coat contact surfaces of forms with form-coating compounds before placing reinforcement.
- C. Thin form-coating compounds only with acceptable thinning agents, quantity, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete is placed. Apply in compliance with manufacturer's instructions.
- D. Coat steel forms with non-staining, rust-preventive form oil to protect against rusting. Rust-stained steel formwork is not acceptable.

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3.07 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork installation, reinforcing steel, waterstop installation, and other embedded or cast-in items.
1. Notify other crafts to permit installation of their work.
 2. Cooperate with other trades in setting their work.
 3. Moisten wood forms immediately before placing concrete where form coatings are not used.
 4. Apply temporary protective covering to lower 2 feet of finished walls where adjacent floor slabs are poured to guard against spattering during slab placement.
- B. Comply with ACI 304R and as specified in this Section.
- C. Discharge Concrete at Site within 1-1/2 hours after cement is added to water or aggregates. When air temperature exceeds 85 degrees F, the discharge time shall be less than 45 minutes. The 45-minute requirement may be waived with the use of a water reducing, retarding admixture and approval of ENGINEER.
- D. Provide trip ticket in duplicate for each ready-mixed concrete load delivered, stating truck number, Project name, CONTRACTOR and producer, batching time, total yards of concrete and material contained therein. Show ticket to ENGINEER upon request. Fill in concrete discharge time and turn over to ENGINEER trip ticket copies at end of each day.
- E. Deposit concrete continuously or in layers so that no concrete is placed on concrete which has hardened sufficiently to cause seams or planes of weakness. If section cannot be placed continuously, provide construction joints as specified. Deposit concrete as nearly as practical to its final location to avoid segregation.
- F. When depositing by chute, provide equipment of size and design to ensure continuously flowing concrete. Provide discharge end of chute with baffle plate to prevent segregation. Position chute so that concrete need not flow more than 5 feet horizontally.
- G. Do not drop concrete from chute end distances greater than 3 times the deposited layer thickness, nor more than 5 feet. Where distance from chute end to surface of concrete exceeds these distances, use spout and maintain lower end as near to deposit surface as practical. When operations are intermittent, discharge chutes into hoppers.
- H. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24 inches to avoid inclined construction joints. Where placement involves several layers, place each layer while preceding layer is still plastic to avoid cold joints.
1. Fill bottom of wall space with 2 to 4 inches of cement slurry immediately before depositing concrete in walls. Use cement slurry composed of 1 part Portland cement, 2 parts fine aggregate, and sufficient water (but not to exceed 0.45 parts) for 7-inch slump mixture.
 2. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping. Use equipment and procedures for concrete consolidation in accordance with ACI recommended practices.
 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible machine effectiveness. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into concrete layers that have begun to set. At each insertion, limit duration to time necessary to

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consolidate concrete and complete reinforcement embedment and other embedded items without causing mix segregation. Keep vibrators away from waterstops to prevent displacement.

- I. **Placing Concrete Slabs:** Deposit and consolidate concrete slabs in continuous operations between construction joints until panel or section placement is complete.
1. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 2. Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces before beginning finishing operations.
 3. Maintain reinforcing in proper position during concrete placement operations.
 4. Maintain waterstop in proper position during concrete placement operations.
 5. Moisten soil when depositing concrete directly on granular soil.
- J. **Cold Weather Placing:** Protect concrete work from physical damage or reduced strength attributed to frost, freezing actions, or low temperatures by using techniques in ACI 306R and as specified in this Section.
1. When air temperature has fallen to, or is to fall below 40 degrees F, uniformly heat water and aggregates before mixing to obtain concrete mixture temperature not less than 50 degrees F, and not more than 80 degrees F at placement point.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.
- K. **Hot Weather Placing:** When air temperature is above 85 degrees F, conditions could exist that would seriously impair quality and concrete strength; place concrete in compliance with ACI 305R and as specified in this Section.
1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 85 degrees F. Chill mixing water or use chopped ice to control temperature. If using ice, water equivalent of ice is included in total mixing water quantity. Using liquid nitrogen to cool concrete is CONTRACTOR's option.
 2. Cover reinforcing steel with water-soaked burlap, if steel becomes too hot, to reduce steel temperature so not to exceed ambient air temperature immediately before embedment in concrete.
 3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete.
 4. Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

3.10 FINISH OF FORMED SURFACES

- A. **Rough Form Finish:** Use for formed concrete surfaces not exposed to view in finish Work during normal operation or maintenance, or by other construction and not covered with coating or covering material applied directly to concrete. This concrete surface has texture imparted by form-facing material. Tie holes and defective areas are repaired and patched, and fins and other projections exceeding 1/4-inch in height are rubbed down or chipped off.
- B. **Smooth Form Finish:** Use for formed concrete surfaces exposed-to-view, during normal operation or maintenance, or are covered with coating or covering material applied directly to concrete, including waterproofing, dampproofing, painting, or other similar system. This is as-cast concrete surface obtained with selected form material, arranged orderly and symmetrically with minimum seams.

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Repair and patch defective areas. Remove and smooth fins or other projections completely. Fill major air void holes.

- C. Grout Cleaned Finish: Provide grout-cleaned finish to scheduled formed concrete surfaces that are painted, stained, or waterproofed after receiving smooth form finish treatment.
1. Combine 1 part Portland cement to 1-1/2 parts fine sand by volume, and mix with water to consistency of thick paint. Proprietary additives may be used at CONTRACTOR's option. Blend standard Portland cement and white Portland cement, quantities determined by trial patches, so that dry grout color matches adjacent surfaces.
 2. Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for 36 hours after rubbing.
- D. Related Unformed Surfaces: At horizontal offsets and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with texture matching adjacent formed surfaces. Continue surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless shown otherwise.

3.11 CONCRETE CURING AND PROTECTION

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Start curing as soon as free water has disappeared from concrete surface after placing and finishing. Maintain curing as follows:
1. All concrete unless otherwise noted: 7 days.
 2. High-early-strength concrete: 3 days.
- B. Curing Methods: Cure concrete for water-retaining structures by moist curing. Cure concrete for other structures by curing compound, moist curing, moisture-retaining cover curing, or combinations thereof.
- C. Provide Moist Curing by following methods:
1. Keep concrete surface continuously wet by covering with water.
 2. Continuous water-fog spray.
 3. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to cover concrete surfaces and edges, with 4 inches lap over adjacent absorptive covers.
- D. Provide Moisture-Retaining Cover Curing as follows:
1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practical width with sides and ends lapped 3 inches and sealed by waterproof tape or adhesive.
 2. Immediately repair holes or tears during curing period using cover material and waterproof tape.
- E. Provide Curing Compound as follows:
1. Apply specified curing compound to concrete slabs as soon as last finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain coating continuity and repair damage during curing period.

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2. Transparent curing compound shall be used for structural concrete (Class A concrete). White curing compound shall be used for exterior pavements (Class P concrete) and sidewalks (Class B concrete).
 3. Do not use membrane curing compounds on surfaces that are covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring (ceramic or quarry tile, glue-down carpet), painting, and other coatings and finish materials, unless otherwise acceptable to ENGINEER.
- F. Curing Formed Surfaces: Cure formed concrete surfaces, including beam undersides, supported slabs and other similar surfaces by moist curing with forms in place for full curing period. If form removal occurs before curing period is up, continue curing by methods specified above as applicable.
- G. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by application of appropriate curing method.

3.12 FORM REMOVAL

- A. Vertical Forms not supporting concrete weight may be removed when concrete has sufficiently set to resist damage from removal operation.
- B. Other forms shall be left in place until concrete has attained strength to support its own weight and construction live loads, unless removed in sections, and each structural section immediately reshored.
- C. Time Periods: Forms remain in place as shown in table below. If form removal occurs before time shown in the table, apply curing procedures previously specified.

Minimum Time Forms are to Remain in Place:

Part of Structure	Average Air Temperature* During Period	
	40 - 50 degrees F	>50 degrees F
Walls, columns and sides of beam (hours)	72	24
Bottom forms for slabs, beams arches not reshored (days)	12	7
Bottom forms for slabs, beams and arches if reshored	7	4

* Air temperature near form.

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3.13 RE-USE OF FORMS

- A. Clean and repair surfaces of forms to be re-used in Work. Split, frayed, delaminated, or damaged form-facing materials are not acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.
- B. When extending forms for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces.

3.14 MISCELLANEOUS CONCRETE ITEMS

- A. Fill-in holes and openings left in concrete structures for work by other trades, unless otherwise shown or directed. Do fill in after other trades' work is in place. Mix, place, and cure concrete to blend with in-place construction. Provide other miscellaneous concrete filling shown to complete Work.
- B. Removal of Existing Concrete: Remove existing concrete where shown or required. Neatly finish concrete edges remaining in place and exposed to view in finished structure with cement mortar.
 - 1. Concrete cutting shall be done competently without injury to remaining portions of structures.
- C. Bonding New to Old Concrete: Where shown on Drawings, existing concrete surfaces against which new concrete is placed shall be thoroughly cleaned and brush-coated with bonding agent. Follow manufacturer's directions, especially on material working time.
- D. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with approved Shop Drawings from manufacturer-furnishing machines and equipment.
 - 1. Grout baseplates and foundations using specified and approved nonshrink grout.

3.15 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after form removal.
 - 1. Cut out honeycomb, rock pockets, voids over 1/4-inch in dimension, and holes left by tie rods and bolts, down to solid concrete but no less than 1 inch deep. Make cuts perpendicular to concrete surface. Thoroughly clean, dampen with water, and brush-coat patched area with specified bonding agent. Place patching mortar after bonding compound has set as recommended by manufacturer.
 - 2. For exposed to view surfaces, blend white Portland cement and standard Portland cement so, when dry, patching mortar matches surrounding color. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- B. Repair of Formed Surfaces: Remove and install new concrete having defective surfaces if defects are irreparable to satisfaction of ENGINEER. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins, and other projections on surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.

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1. Repair concealed formed surfaces, where practical, containing defects which affect concrete durability. If defects are irreparable, remove and install new concrete.

C. Repair of Unformed Surfaces: Test unformed surfaces for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as specified in this Section. Test unformed surfaces sloped to drain for slope trueness using templates having required slope.

1. Repair finished unformed surfaces containing defects which affect concrete durability. Defects include crazing, cracks more than 0.01-inch wide or which penetrate to reinforcement or completely through nonreinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.
2. Correct high areas in unformed surfaces by grinding, after concrete has cured 14 days.
3. Correct low areas in unformed surfaces during or immediately after surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to ENGINEER.
4. Repair defective areas, except random cracks and single holes not exceeding 1-inch diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with 3/4-inch clearance around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete to provide same concrete type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

D. Repair isolated random cracks and single holes not over 1-inch in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete. Clean out dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of 1 part Portland cement to 2-1/2 parts fine aggregate passing No. 16 mesh sieve, using only enough water as specified for handling and placing. Place dry-pack after bonding compound has set per manufacturer's instructions. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

E. Repair Leaking Cracks: Where practical, seal off cracks on water contact face with waterproofing or dampproofing material. If this is not practical or if leakage persists, then repair cracks on exposed faces by routing out square groove not less than 1-inch wide by 1-inch deep, applying slurry bond coat and filling with stiff nonshrink mortar. Bond coat and mortar shall be cementitious crystalline concrete waterproofing material. Follow manufacturer's application and curing instructions. Match repair patch finish in color and texture to original.

F. Structural Repairs: Do structural repairs with prior approval by ENGINEER for method and procedure using specified epoxy adhesive and mortar.

G. Repair Methods: ENGINEER may allow use of other nonspecified methods subject to review and acceptance by ENGINEER.

3.16 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. Provide qualified personnel and employ testing laboratory, approved by ENGINEER, to do tests and to submit test reports.
- B. Sampling Fresh Concrete: ASTM C 172, except modified for slump and air-content tests to comply with ASTM C 94.

LIFT STATION TECHNICAL SPECIFICATION

1. Slump: ASTM C 143, one each time compression test specimens are made; additional tests when concrete consistency seems to have changed.
 2. Air Content: ASTM C 231, pressure method, one each time compression test specimens made.
 3. Concrete Temperature: Test hourly when air temperature is 40 degrees F and below, and when 80 degrees F and above; and each time compression test specimens are made.
 4. Compression Test Specimen: ASTM C 31, four standard cylinders for each compressive strength test set, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens.
 5. Compressive Strength Tests: ASTM C 39, one set for each day's pour exceeding 5 cubic yards plus additional set for each 100 cubic yards over and above first 50 cubic yards of each concrete class placed in 1 day; 1 specimen tested at 7 days, 2 specimens tested at 28 days, and 1 specimen retained in reserve for later testing if required.
- C. Test Results: Report test results in writing to ENGINEER and CONTRACTOR within 24 hours after tests. Compressive strength test reports shall contain Project identification name and number, concrete placement date, concrete testing service name, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and break type for both 7-day tests and 28-day tests.
- D. Acceptance: Concrete strength shall be considered satisfactory if averages of 3 consecutive strength test results equal or exceed specified 28-day compressive strength ($f'c$), and no individual strength test result falls below specified compressive strength by more than 500 psi.
- E. Failure to Meet Requirements:
1. Should 7-day compressive strengths shown by test specimens fall below 65 percent of required 28-day strength ($f'c$), ENGINEER will have the right to require changes in proportions for remaining Work. Furthermore, ENGINEER will have the right to require additional curing, as specified in this Section, on those portions or structures represented by failed test specimens.
 2. Should 28-day compressive strengths ($f'c$) test results fail to meet required strength, core-boring tests conforming to ASTM Standard C 42 shall be made at CONTRACTOR's expense within 60 days of that concrete placement.
- F. At locations where concrete quality is deemed questionable by ENGINEER, core-boring tests shall also be made at CONTRACTOR's expense.
- G. Concrete is acceptable if average strength of 3 cores is at least 85 percent and no single core is less than 75 percent of required minimum allowable 28-day compressive strengths ($f'c$). If core-boring test results fail to meet strength requirements, ENGINEER will have right to require strengthening or replacing those portions of structures which failed to develop specified strength.
- H. Provide additional curing when ordered by ENGINEER because of failure to meet requirements. It shall be done at CONTRACTOR's expense, and no claim for extra compensation for additional curing will be allowed. Additional curing shall extend period of protection. Additional curing is limited to 60 days.
- I. Additional Tests: Testing service shall make additional in-place concrete tests when test results suggest specified concrete strengths and other characteristics have not been attained. Testing service may conduct tests to determine adequacy by cored cylinders complying with ASTM C 42, or by other approved methods. CONTRACTOR shall pay for additional tests when unacceptable concrete is verified.

LIFT STATION TECHNICAL SPECIFICATION

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 08312 - FLOOR, PIT AND SIDEWALK DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Extent, location, and size of each type of floor, pit, and sidewalk door required as indicated on Drawings.
2. Floor, pit, and sidewalk doors shall be of single- or double-cover construction of the size and as shown on Drawings.

B. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1, apply to Work of this Section.

1.02 DESIGN REQUIREMENTS

A. Structural Performance: Provide H-20 reinforcing for 16,000-pound wheel

load. 1.03 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:

1. Drawings for fabrication and installation of all floor, pit, and sidewalk doors and frames, including details of each frame type, elevations of door design types, anchorage, and accessory items.
2. Product Data: Submit manufacturer's technical data and installation instructions for each type of floor, pit, and sidewalk door assembly, including setting drawings, templates, and instructions and directions for installation of anchorage devices.
 - a. Include complete schedule including types, general locations, sizes, floor, pit, and sidewalk construction details, finishes, hardware information, latching or locking provisions, and other data pertinent to installation.
3. Verification: Obtain specific locations and sizes for required floor, pit, and sidewalk doors from trades and manufacturers requiring access to equipment, and indicate on Submittal Schedule.
4. Special Size and Load Floor, Pit, and Sidewalk Doors: Use where required or requested as indicated on Drawing Schedule.
5. Samples: 3 inches by 5 inches minimum size, of each cover face material showing factory finished color, pattern, and texture.

B. Submittals Sequence: Submit Schedule, Product Data, and Shop Drawings at earliest possible date, particularly where acceptance must precede fabrication of other work (e.g., concrete work) which is critical in the Project Construction Schedule. Include the product data, samples, Shop Drawings of other work affected by floor, pit, and sidewalk doors, and other information essential to the coordinated review of same.

1.04 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of equipment, of types and sizes required, and whose products have been in satisfactory use in similar service for not less than 5 years.

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- B. Size Variations: Obtain ENGINEER's acceptance of manufacturer's standard size units which may vary slightly from sizes indicated.
- C. Coordination: Provide inserts and anchoring devices which must be built into other Work for installation of floor, pit, and sidewalk doors. Coordinate delivery with other Work to avoid delay.

1.05 WARRANTIES

- A. Special Warranty: Submit a written warranty, executed by the manufacturer, agreeing to repair or replace components or entire units which fail in materials or workmanship within the specified warranty period. Failures include, but are not necessarily limited to, structural failure including excessive deflection, excessive water leakage, faulty operation of hardware, deterioration of metals, metal finishes and other materials beyond normal weathering.
 - 1. Warranty period for floor, pit, and sidewalk door units shall be 5 years after the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:
 - 1. Floor, Pit, and Sidewalk Doors:
 - a. Babcock-Davis Hatchways, Inc.
 - b. The Bilco Company.
 - c. Dur-Red Products.

2.02 MATERIALS AND FABRICATION

- A. Provide each floor, pit, or sidewalk door assembly manufactured as an integral unit, complete with all parts and ready for installation.
- B. Aluminum Floor, Pit, and Sidewalk Doors and Frames: Fabricate units of continuous welded aluminum construction unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure frames to types of floor or walkway shown on Drawings.
- C. Covers: Covers shall be mill finish aluminum 1/4-inch diamond pattern, reinforced on the underside. Covers shall open to 90 degrees and lock automatically in that position.
- D. Channel Frame: Channel frame shall be 1/4-inch extruded aluminum with bituminous coating applied to the exterior of the frame and with full anchor flange and welded anchors for concrete installation around the perimeter.
- E. For watertightness, furnish frame with formed gutters a minimum of 3-inch wide by 3-inch deep, anchors, and a welded 1-1/2-inch drain coupling located on the right front corner of the channel frame or in another corner if shown on Drawings or specified otherwise. Fully weld gutter frame for absolute weathertightness.

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- F. Hinges, Pins, Bolts, and Nuts: Provide the covers with heavy 12 gauge, No. 316 stainless steel hinges and stainless steel pins. Hinges shall pivot so the cover does not protrude into channel frame. Hinges shall be through-bolted to the cover with stainless steel lock bolts and shall be through-bolted to the frame with stainless steel bolts and lock nuts.
- G. Springs, Tubes, Shoes, Plates, Enclosures, and Operators: Provide the covers with manufacturer's standard springs, tubes and caps, tube or spring enclosures, operators, support plates, and shoes, which shall allow ease of operation through the entire 90-degree arc of opening, and act as a check in retarding downward motion when being closed. Tube and spring enclosures shall prevent accumulation of moisture, grit, and debris inside the tube and spring assembly.
- H. Hold-Open Arms: Provide the covers with hold-open arms with guides which automatically lock the covers in the open position. Vinyl covered release handles shall be provided and conveniently located for closing.
- I. Exterior Lift Handle: Provide the covers with a stainless steel lift handle designed to be flush with walking surface when not in use.
- J. Exterior Locking and Latching Devices: Provide the covers with the following locking or latching device and related hinged lid, flush gasketed removable screw plug, or threaded cover plug as noted:
 - 1. Recessed Hasp: Provide a recessed hinged hasp with staple to receive padlock and covered by a hinged flush lid.
- K. Hardware Finish: Except where noted otherwise, all hardware shall be zinc plated and chromate sealed.
- L. Cover and Frame Finish: Provide mill finish on covers and frame.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Comply with manufacturer's instructions for installation of floor, pit, and sidewalk doors.
- B. Preparatory Work: For normal flush installation, set frames accurately in position, recessed below the finished grade or floor level with cover face panels plumb or level in relationship to adjacent finish surfaces. If unit is watertight type, unit should be set with slight pitch in direction of drain coupling. All four corners of the frame shall be in the same plane; verify that leaves are seated properly on frame all around. Securely attach units to supports.
- C. Coordinate installation with Work of other trades.

3.02 ADJUST AND CLEAN

- A. Adjust hardware and covers after installation for proper operation.
- B. Remove and replace covers or frames which are warped, bowed, or otherwise damaged.

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 11310 - CENTRIFUGAL SEWAGE PUMPS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Labor, materials, and equipment necessary for furnishing the fabrication, production, installation, and erection of the items specified in this Section as shown on Drawings or listed on Schedule.
- B. Products Furnished But Not Installed Under This Section: Anchor bolts shall be installed under Section 03310 in accordance with certified prints furnished by the pump manufacturer.

1.02 REFERENCES

- A. Reference Standards:
 - 1. AISI C1141 Steel
 - 2. ANSI Class 125 Flanged Dimensions
 - 3. ANSI B.11 Bearings
 - 4. ASTM A 48 Cast Iron
 - 5. ASTM A 532 Abrasion-Resistant Cast Irons
 - 6. SAE 1045 Steel
 - 7. SAE 4140 Steel

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements: Except where noted, each pump shall be designed to operate continuously at the intersection of its pump curve and the minimum system curve with available net positive suction head as shown without cavitation and without requiring throttling to prevent cavitation or overloading the motor. Multiple pumps running concurrently shall also satisfy the above condition.
 - 1. Performance curves of variable speed pumps at maximum speed shall intersect the system curves, and pumps shall be designed for operation at that duty point unless otherwise noted on Schedule.
- B. Reverse Rotation: Where noted on Schedule, pumps, motors, shafts, bearings, and all appurtenances furnished under this Section shall be designed to withstand reverse rotation at the full runaway speed of the pumps. The manufacturer shall guarantee that operation at full runaway speed in reverse shall not damage or shorten the useful life of the equipment provided. Static head is as shown on the system head curve for each pump.
- C. Pump/Motor Coupling: Close coupled pumps with the motor fastened directly to the pump casing, without the motor adapter which allows access to the coupling, will not be acceptable unless specifically called for on Schedule.
 - 1. Pumps with common motor and impeller shafts will not be acceptable unless specifically called for on Schedule.
- D. Suction Requirements: Velocities at the pump casing inlet shall not exceed 20 feet per second at the specified duty point. The pump manufacturer shall provide suction reducing elbows if required to

LIFT STATION TECHNICAL SPECIFICATION

provide a reduction of not more than 2 standard pipe diameters per fitting between the suction header and the pump casing inlet.

- E. Characteristic Curves: Constant speed pumps' characteristic curves must have a continuous test rise from duty point to shutoff head. Shutoff head must be a minimum of 10 feet above duty point unless stated otherwise on Schedule.
 - 1. Variable speed pumps' characteristic curves shall have a minimum shutoff head as noted on Schedule.

1.04 SYSTEM RESPONSIBILITY

- A. Pump manufacturer may rely upon information on Pump Schedule pertaining to steady-state operating conditions (flow, TDH, NPSHA, etc.). However, pump manufacturer shall be responsible to review this Specification Section, Section 01600, relevant pipework Drawings, schematics, and electrical and instrumentation Drawings to ensure that equipment offered is suitable for the purposes intended by the Contract Documents. Refer questions and clarifications to ENGINEER.

1.05 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section.
- B. Test and Inspection Report: A written report shall be submitted to ENGINEER documenting testing and/or inspection results. The report shall be prepared as noted under Section 01600.
- C. Operation and Maintenance Manuals: Submit in accordance with requirements of Section 01600, operation and maintenance manuals for items included under this Section.
- D. Equipment Data Sheet: Prior to the taking of Bids for this Contract, as noted on Data Sheet included in this Section, the manufacturer of the equipment furnished under this Section shall furnish ENGINEER the information listed on Equipment Data Sheets. The purpose of the Data Sheets is to furnish OWNER necessary information so that an evaluation of the equipment can be accomplished.
- E. Warranty: Submit in accordance with requirements of Section 01770, warranties covering the items included under this Section.

1.06 WARRANTY

- A. Special Warranty:
 - 1. Submersible Pump Warranty (All Types): The pump manufacturer shall warrant the pumps against defects in workmanship and materials for a period of 5 years under normal use, operation, and service. The pump manufacturer shall also include in the warranty a progressive schedule of cost for a period of 5 years on certain parts that become defective through normal use and wear. These parts shall include, but not be limited to, the mechanical seal, rotor, stator, impeller, pump housing, wear ring, and ball bearings. The warranty shall be in published form and submitted with each pump at the time of shipment. The warranty period shall commence at time of pump start-up.

PART 2 - PRODUCTS

LIFT STATION TECHNICAL SPECIFICATION

2.01 MANUFACTURERS

- A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:
 - 1. Submersible Sewage Pumps:
 - a. [Flygt](#)
 - b. Approved by Engineer.

2.02 EQUIPMENT

- A. Pumps shall be vertical or horizontal in the respective capacities and duty points as listed on Schedule.
- B. The discharge head will consist of the static lift plus the friction head in the suction and discharge piping. Special suction conditions, if required, are as shown on Schedule. Self-priming pumps shall be furnished where called for on Schedule.
- C. The total dynamic head stated on Schedule shall be developed by the pumping units. Any losses incurred between the suction and discharge connections furnished with the pump are not included.
- D. Pumps shall be used to pump sewage and shall be of the nonclog type capable of passing solid spheres up to 3 inches in diameter. The diameter of the impeller furnished shall not be greater than 90 percent of the largest impeller which can be installed in the pump unless specifically approved by ENGINEER.
- E. Abrasive service pumps shall have all parts in contact with the pumped fluid constructed of hardened materials as specified, including impeller, casing, suction, and discharge connections.
- F. Pump speeds shall not exceed the speeds listed on Schedule. The pumps shall be arranged as nearly as the types will permit to those indicated on Drawings with direction of rotation as required by the installation.
- G. Piping and bolts for connecting piping to the pumps shall be provided and installed under Division 15.

2.03 COMPONENTS

- A. Motors: Electric motors shall be of the vertical or horizontal shaft as required. Each motor shall be provided with a suitable thrust bearing which shall carry the load of the rotor together with that of such parts of the shaft as may not be carried by the pump.
 - 1. Pump motor nameplate horsepower shall be sufficient for nonoverloading operation at all points on the performance curve of the impeller selected to meet the duty point including horsepower requirements of the drive. At no point shall the required brake horsepower exceed 85 percent of the motor nameplate horsepower multiplied by the motor service factor.
- B. Anchor Bolts: All anchor bolts shall be stainless steel unless otherwise noted and furnished under this Section.

2.04 SUBMERSIBLE ABRASIVE AND NONABRASIVE SEWAGE PUMPS

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- A. Submersible sewage pumps shall be constructed to be explosion-proof, Class I, Division 1, Group D, construction except when indicated otherwise on Schedule.
- B. Pumps shall be capable of handling raw unscreened sewage. The design shall be such that pumping units shall be automatically connected to the discharge piping when lowered into place on the discharge connection. The pump shall be of a close fit to have minimum leakage at the discharge flange. The pumps shall be easily removable for inspection or service, requiring no bolts, nuts, or other fastenings to be removed for this purpose, and no need for personnel to enter pump well. Each pump shall be fitted with a stainless steel chain of adequate strength and length to permit raising the pump for inspection and removal.
- C. Nonabrasive Service Casings: The stator casing, oil casing and impeller shall be of gray iron construction, with all external parts coming into contact with sewage protected by a coat of corrosion-resistant paint. All external bolts and nuts shall be of stainless steel. A wear ring designed for abrasion resistance shall be installed at the inlet of the pump to provide protection against wear to the impeller. The corrosion-resistant impeller shall be of an enclosed or semi-enclosed, nonclog design, capable of passing 3-inch solids, fibrous material, heavy sludge, and constructed with long throughway with no acute turns. Pump motor shaft shall be of 300 series stainless steel. Speed for the pumps shall not exceed 1,800 rpm.
- D. Abrasive Service Casings: Abrasive service submersible sewage pumps shall either be fitted with replaceable high chrome iron liners in the suction, volute, and discharge areas (Flygt 5500), or the pump casing, suction connection, and impeller shall be wear-resistant white iron with a minimum hardness of Brinell of 850 or Rockwell C of 65 (KSB H-Construction). The pump casing for pumps with liners shall be split along the centerline of the volute for removing the liners. The pump impeller for pumps with liners shall be completely constructed of high chrome iron and replaceable high chrome iron wearing rings shall also be provided. High chrome iron material shall conform to ASTM A 532, Class 3, Type A with 28 percent Cr and a minimum Rockwell C hardness of 60. The stator casing and oil casing for all pumps, and the abrasive impeller for nonabrasive service shall be of gray iron construction, with all external parts coming into contact with sewage protected by a coat of corrosion-resistant paint. All external bolts and nuts shall be of stainless steel. A wear ring designed for abrasion resistance shall be installed at the inlet of the pump to provide protection against wear to the impeller. The impeller shall be of an enclosed or semi-enclosed, nonclog design, capable of passing 3-inch solids, fibrous material and heavy sludge. Pump motor shaft shall be of 300 Series stainless steel material and heavy sludge. Pump motor shaft shall be of 300 Series stainless steel with a 300 Series stainless steel shaft sleeve. Speed for the pumps shall not exceed 1,800 rpm.
- E. Mechanical Seal: Each pump shall be provided with a tandem mechanical seal. The upper running in an oil reservoir consisting of one stationary ceramic, silicon carbide, or tungsten-carbide ring and one rotating carbon ring, and the other consisting of one stationary and one rotating silicon carbide or tungsten-carbide ring, with each pair held in contact by a separate spring so that the outside pressure assists spring compression in preventing the seal faces from opening. The seals shall require neither maintenance nor adjustment and shall be easily replaceable. Conventional double mechanical seals with a single or double spring between the rotating faces that require constant differential pressure to effect sealing and which are subject to opening and penetration by pumping forces, shall not be considered equal to the tandem seal specified. Seal oil chamber shall be fitted with an electrode probe and signal box shall be supplied to indicate contamination in the chamber.
- F. Motor: Pump motor shall be housed in an air or oil filled, watertight casing and shall have resin encapsulated Class F insulated windings. Pump motors shall have cooling characteristics suitable to

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permit continuous operation, in a totally unsubmerged condition. Motor thermal switch and leak detectors shall be provided. Indicators shall be provided on the control panel with operation interlocks for each condition. Cable junction box and motor shall be separated by a stator-lead sealing gland or terminal board which shall isolate motor from any water or solids gaining access through pump top.

1. Pump motor cable shall be suitable for submersible pump application, and this shall be permanently embossed on the cable. The cable shall be continuous with no splices from the junction box to the pump or from the control box to the pump.

2.10 ACCESSORIES

- A. Submersible Sewage Pumps: Submersible sewage pumps shall include discharge base elbow with hydraulically sealed discharge flange, pump mounting stand with bottom rail supports, upper and intermediate rail supports, lifting chain with chain hook and holder, corrosion-resistant nameplate and watertight cable long enough to reach the control panel.
- B. Submersible Pumps (All Types): Provide standard duty aluminum watertight access hatch, complete with stainless steel hinged and hasp-equipped cover, upper guide holder and level sensor and float support bracket as indicated on Schedule. Frame shall be securely anchored in the top slab concrete above the pumps as per the manufacturer's specifications. Each access hatch assembly shall be provided with a positive latch open device and a dependable lock with an inside keyless release.
- C. Variable Speed Drives: Variable speed drives shall be provided when called for on Schedule and shall be of the type specified.
- D. Guide System: A sliding guide bracket shall be an integral part of the pumping unit and the pump casing shall have a machined connecting flange to connect with the cast iron discharge connection, which shall be bolted to the floor of the sump and designed as to receive the pump connecting flange without the need of any bolts or nuts.
 1. Guide rail system shall be designed to be nonsparking through the use of removable bronze or nonmetallic inserts at points of contact.
 2. Sealing of the pumping unit to the discharge connection shall be accomplished by a single linear downward motion of the pump guided to and pressing tightly against the discharge connection. Sealing at the discharge connection by a means to insure a tight connection. Necessary guide bars shall be furnished. Guide bars shall be of stainless steel pipe or an approved stainless steel cable or "T" or "U" bar guide rail system.

2.11 SOURCE QUALITY CONTROL

- A. Shop Tests: Prior to shipment, each pump shall be fully tested on water at the manufacturer's plant. The purpose of the shop tests shall be to demonstrate that the pumps to be provided shall meet the requirements of the Specifications and, if applicable, the Special Warranties included in the Agreement.
 1. Tests shall consist of running the pumps with furnished impeller at their rated capacity, head, and speed, or range of speeds if furnished with variable speed drives, and at such other conditions of head and capacity to properly establish a performance curve or family of curves in the case of variable speed units. Performance data including efficiency and horsepower shall be collected and noted as part of the performance curve.
 2. All pumps shall be tested in accordance with the standards of the Hydraulic Institute. Certified copies of the test results and the performance curves, for each of the pumps to be furnished, shall be submitted to ENGINEER and approved prior to shipment of the pumps to the Project.

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3. Generally, pumps shall be tested as a complete assembly including drive and motor. If the pumps are tested separately from the motors, or variable speed drives and motors, CONTRACTOR shall submit to ENGINEER, certified performance curves of the equipment to be furnished as guaranteed by the manufacturer. These certified curves shall be obtained either from actual tests of the equipment to be furnished or from tests of equipment of the same size and construction. The motor manufacturer's curves shall supply all the necessary information concerning the equipment as indicated for the complete shop tests.
 4. When pumps are tested separately from the variable speed drives, CONTRACTOR shall test one of each size drive complete with the actual motor to be furnished. Each drive and motor shall be tested at the specific speeds, torques, and power requirements for the duty point conditions required for any performance guarantee provisions of the Contract.
- B. Tests: Submersible Pumps (All Types):
1. The pump manufacturer shall perform the following tests on each pump before shipment from the factory:
 - a. Execute a standard commercial motor test.
 - b. Prior to submergence, the pump shall be dry and be checked for correct rotation.
 - c. Pump shall be run for 30 minutes in a submerged condition. The pump shall be tested as a complete assembly including variable frequency drive.
 - d. Pump shall be removed from test tank, meggered immediately for moisture, oil plugs removed for checking lower seal; inspection plug removed for checking of upper seal and possible water intrusion of stator housing. If plugs are not provided, check for intrusion of water using a moisture probe.
 - e. A written certified test report giving the above information shall be supplied with each pump at the time of shipment.
 - f. All ends of pump cables will be fitted with a rubber shrink fit boot to protect cable prior to electrical installation.

PART 3 - EXECUTION

3.01 ERECTION

- A. Equipment provided under this Section shall be fabricated, assembled, erected, and placed in proper operation condition in full conformity with detail drawings, specifications, engineering data, instructions, and recommendations of the equipment manufacturer approved by ENGINEER.

3.02 FIELD QUALITY CONTROL

A. Performance Tests:

1. After the pumping units have been erected, performance tests shall be conducted. The purpose of these performance tests shall be to demonstrate that the units have been properly erected, and that they and their appurtenant equipment will operate satisfactorily and meet the specified conditions and the guarantees of CONTRACTOR.
2. For the purpose of these tests, OWNER will furnish the electricity, lubricating oil, and the water for a test load when these items are available. The measurement of the quantity of water pumped may or may not be included in the performance test.
3. The performance tests shall be conducted under the supervision of ENGINEER with the cooperation of the manufacturer's factory representative.

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4. It is intended that these tests shall be carried out by operating each pumping unit through the range specified for a continuous period of at least 2 hours, or until it is shown to the satisfaction of ENGINEER that all of the equipment is in perfect condition and will meet the requirements specified. Throughout these tests of the pumping equipment, the motors and pumps must run smoothly without vibration or heating, otherwise the test shall be stopped and not again undertaken until the unit shall have been put into condition to comply with the requirements for smoothness of operation.

B. Installation Check: The manufacturer shall provide the services of a factory-trained representative to check the installation of all equipment installed in this Section. The services shall be as noted in Section 01600.

3.03 TESTING AND TRAINING

A. Operator Training: The station manufacturer shall furnish, in addition to the performance tests, operator training for 2 of OWNER's personnel. The training programs shall be conducted at the Site and shall be for a period of approximately 1 day. Training shall include, but not be limited to, operation safety, emergency, maintenance of equipment, and testing procedures.

CENTRIFUGAL SEWAGE PUMP SCHEDULE

No. of Units: 2

Type: Submersible

Location: Wet well

Service: Wastewater

Capacity (gpm): 300

Total Head (feet): 31.4

Motor:

Volt: 480

Phase: 3

Enclosure:

Accessories:

Remarks:

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CENTRIFUGAL SEWAGE PUMPS EQUIPMENT DATA SHEET

The manufacturer of this equipment shall submit to ENGINEER, 72 hours prior to the receipt of Bids, the following specific data on each type of equipment being offered. The purpose of this information is to provide OWNER the information necessary to evaluate the equipment. Failure by a manufacturer to furnish all the information requested may be cause for rejection of the equipment. Any exceptions to these specifications must be noted and included with the information submitted with this form. Exceptions may be cause for rejection of the equipment.

1. Pumps

Type:

Manufacturer: _____

Model Number: _____

Size:

Suction Diameter: _____ inches

Discharge Diameter: _____ inches

Maximum Impeller Diameter _____ inches

Impeller Diameter for specified duty point: _____ inches

Speed: _____ rpm

(Max. speed if pump is furnished with variable speed drive.)

Shutoff Head: _____ feet

Efficiency at Duty: _____ percent

NPSH required at Duty Point: _____ feet

2. Motors

Manufacturer: _____

Horsepower: _____

3. Total weight of pump, motor and base: _____ pounds

4. Variable Speed Drive Manufacturer: _____

(NOTE: Attach performance curves and typical layout dimension drawings along with information on all accessories furnished.)

By: _____

Name of Representative / Company: _____

Phone No.:

Date: _____

END OF SECTION

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SECTION 13410 - BASIC INSTRUMENTATION REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: General administrative and procedural requirements for instrumentation installations. Administrative and procedural requirements are included in this Section to expand on requirements specified in Division 1.

1.02 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Sections 01330, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:
1. Product data for each product specified.
 2. Wiring diagrams, both elementary and schematic, differentiating between manufacturer installed and field-installed wiring.
 3. Digital Systems: Provide the following:
 - a. Digital equipment layouts of input and output racks showing complete module model number and addressing assignment. Layouts of port pin assignment, connection schematic indicating cable types and port addresses.
 4. Software Programs: One fully annotated printed copy of program prior to factory test. In addition, provide required number of copies of latest revisions of program at time of acceptance by OWNER. Submittal of printouts, listings, and screen images shall be supplied on paper (hard copy). With concurrence of OWNER and ENGINEER, machine readable magnetic copies may be supplied in addition to printed copies as a matter of convenience. Format of magnetic media shall be as mutually agreed with OWNER.
 5. Programmable Logic Controllers: Submits lists of input and output assignments, data file structures used, and internal data points. Show points used to communicate with between PLCs and the operator interface and data collection segments. Include complete, fully annotated ladder logic diagrams complete with cross-reference listings.
 6. Operator Interface and Supervisory Control: Submit "screen dump" images of each proposed operator interface screen. Describe color schema, mouse button use, function key controls and communication protocol with PLCs. Provide a flow diagram showing screen navigation. Show sample event and alarm log outputs.
 7. Data Collection: Submit details of data structures, communications protocols, data exchange formats, sampling intervals, and file storage space management. Provide "screen dump" images of historical trending.
 8. Data Management and Reporting: Includes process data management, laboratory management, and reporting. Submit data definitions, customization of base software, data entry screens, menus, and report formats. Describe data entry, collection, and reporting scenarios. Describe data file storage management including backup and archive operations.
- B. Record Drawings: At Project closeout, submit record drawings of installed products, in accordance with requirements of Section 01770.
1. Where Drawings are drafted by computer equipment, CONTRACTOR shall furnish files on a disk. These Drawings shall include changes made by Field Orders, Change Orders, Addenda, and errors discovered during start-up and acceptance.
 2. Drawings shall include terminal numbers at each wiring termination and piping termination. A complete system diagram shall be included.

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- C. Operation and Maintenance Manuals: Submit in accordance with requirements of Section 01600, operation and maintenance manuals for items included under this Section.
1. Instructions shall be short, easy-to-understand directions specifically written for this Project describing various possible methods of operating equipment. Instructions shall include procedures for tests required, adjustments to be made, and safety precautions to be taken with equipment. These documents are to be submitted to ENGINEER's office.
 2. Provide 1 complete set of manufacturer's documentation covering programmable equipment supplied. Include hardware manuals and prints as manufacturer normally ships with programmable equipment.
 - a. Include complete software manuals for operating system, as well as manuals for any other software. Written instructions for the operations and maintenance of software shall be provided. The instructions shall be short, easy-to-understand directions specifically written for this Project describing various possible methods of operating software.
 - b. Include program listings, point/address lists, cross-reference listings, images of screens, data entry forms, and sample reports.
 - c. Manuals shall include instructions for program users and instructions for maintenance programmers.
- D. Warranty: Submit in accordance with requirements of Section 01770, warranties covering the items included under this Section.

1.03 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of equipment, of types and sizes required, and whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Codes and Standards:
1. National Electric Code.
 2. Applicable State and local requirements.
 3. UL listing and labeling shall be adhered to.
- C. Items covered by this Section are designated as undelivered specifically manufactured equipment for which associated progress payments will be made in accordance with this Specification.
- D. Equipment that does not have a UL, FM, CSA, or other listed testing laboratory label shall be furnished with a notarized letter signed by the supplier stating that equipment furnished has been manufactured in accordance with National Electric Code and OSHA requirements.
- E. CONTRACTOR shall provide permits and licenses, observe and abide by applicable laws, regulations, ordinances, and rules of State, territory or political subdivision thereof, wherein the Work is done. CONTRACTOR shall pay fees for permits, inspections, licenses, and certifications when such fees are required.
- F. To ensure timely performance and conformance with Specifications, Project meetings shall be held at OWNER's facility once every 3 months during course of Project. Cost of such meetings shall be included.

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- G. Calibration Equipment and Testing Apparatus: Equipment supplier shall have available test and calibration equipment for factory panel tests, installation, start-up, service contract, and maintenance or troubleshooting purposes.
1. The equipment required for these tests is as follows:
 - a. One - Digital Multimeter with an accuracy of plus or minus 0.1 percent.
 - b. One - Signal calibrator for analog signals.
 - c. One - Programming terminal with software to configure programmable equipment.
- H. Component Requirements: For the purposes of uniformity and conformance to industry standards, signal transmission modes shall be either electronic 4-20 mA DC or pneumatic 3-15 psi only. No other signal characteristics are acceptable, except for remote temperature detector (RTD) and thermocouple (TC) sensing circuits; 4-20 mA DC signals shall be such that devices may be wired in parallel for 1-5 volt DC as required. 1-5 volt DC mode shall be employed only within control panel enclosures.
- I. Responsibility and Coordination: Drawings and Specifications are intended to include details of a complete equipment installation for purposes specified. CONTRACTOR shall be responsible for details which may be necessary to properly install, adjust, and place in operation complete installation. Any error on Drawings or in Specifications which prevents proper operation of supplied system shall be shown correct at time of Shop Drawing submittal for approval or brought to attention of ENGINEER with or prior to submittal.
- J. CONTRACTOR shall be responsible for costs incurred to correct aforementioned errors brought to ENGINEER's attention. CONTRACTOR shall assume full responsibility for additional costs which may result from unauthorized deviations from Specifications.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Manufactured material shall be adequately packed to prevent damage during shipping, handling, storage, and erection. Material shipped to Site shall be packed in a container properly marked for identification. Blocks and padding shall be used to prevent movement.
- B. CONTRACTOR shall inspect the material prior to removing it from carrier. If damage is observed, CONTRACTOR shall immediately notify carrier so that a claim can be made. If no such notice is given, material shall be assumed to be in undamaged condition; any subsequent damage that occurs to the equipment shall be the responsibility of CONTRACTOR. Repair and replacement of damaged parts will be done at no expense to OWNER.
- C. CONTRACTOR shall be responsible for any damage charges resulting from handling of materials.

PART 2 - PRODUCTS

2.01 EQUIPMENT SUPPLIERS

- A. Subject to compliance with specified requirements, equipment suppliers shall be the following (no "or equals"):
1. Commerce Controls
 2. CEC Controls Company
 3. Utilities Instrumentation Service
 4. Perceptive Controls

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- B. References made in these Specifications to specific manufacturer's products are intended to serve as a guide to type, construction, and materials. Listing of a manufacturer does not imply acceptance by ENGINEER of a manufacturer's particular product, product line, or latest product revision if it does not meet Specifications.
- C. Equipment Supplier: Equipment specified under Sections 13413 through 13899 and shown on Drawings shall be designed as a system, fabricated or purchased, shipped to Site, and started up by one of the qualified and approved equipment suppliers listed under this Section. Intent is for unit responsibility.
 - 1. Equipment supplier shall not assign any of its rights or delegate any of its obligations under these Sections without prior written acceptance by ENGINEER.
 - 2. Direct purchase of any items in these Sections by CONTRACTOR is not in compliance with this Specification and will not be permitted.
 - 3. When a Service Contract is included, it shall be performed by factory-trained personnel employed by equipment supplier. Equipment supplier shall assign a qualified Engineer employed by the supplier as Project Engineer/Project Manager.
 - a. Project Engineer/Project Manager's name shall be forwarded to CONTRACTOR and ENGINEER within 30 days after receipt of a purchase order by equipment supplier.
 - b. Project Engineer/Project Manager shall be focal point for design, fabrication, Contract communications, and shall be responsible for start-up and acceptance. Project Engineer/Project Manager shall be at factory test at Site for start-up and at the Site during entire acceptance procedure. Only qualified and approved equipment suppliers shall be accepted as meeting this Specification.

2.02 EQUIPMENT

- A. Transmitted electronic signals to equipment of other vendors and between control panels shall be a separate isolated-floating output for each item of equipment and shall conform to ISA Standard S50.1.
- B. Enclosures shall be NEMA 12, 4, 4X, or 7 as indicated on Drawings. Intrinsically safe systems, as approved by Factory Mutual, shall be furnished when called for.
- C. No external power connections shall be allowed unless specifically called for in Specification. Where an external power source is called for, unit shall accept 120 VAC, plus or minus 10 percent power.
- D. Current-to-current converters shall be used as power boosters to provide sufficient signal power as required. It is equipment supplier's responsibility to determine under what circumstances and locations power boosters are required, provide them, and integrate them into the instrumentation system to make system function properly.
- E. Separate power supplies shall be totally enclosed with solderless terminals for connections. They shall be short circuit current limiting type that will automatically resume regulation after removal of short circuit. They shall operate from 120 volt AC, plus or minus 10 percent power. Regulated voltage shall be fixed. Units with internal trim potentiometers will be accepted.
 - 1. Pneumatic instruments shall have an input and output range of 3-15 psig. Units shall require a 20 psi supply. Provide an air set for each pneumatic unit or for each 20 psi manifold. Bubbler

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- air sets, regulators, valves, etc., must be factory assembled on a subplate as specified and detailed.
2. Instruments shall be panel-mounted or enclosed for wall mounting as shown on Drawings.
- F. Size and style of instruments are defined in Specifications. Pneumatic panel-mounted units shall match in appearance similar electronic components.
- G. Charts and scales are shown on Drawings. Standard scales shall not be accepted without ENGINEER's approval if it differs from those shown. Ratio station scales and other scales shall be graduated such that major graduations fall on whole numbers (i.e., 1, 2, 3, or 5, 10, 15, etc.) and minor graduations fall on 0.1 or 0.2 intervals (i.e., 1.1, 1.2 or 11, 12, etc.). If two scales are called for on ratio stations, each scale shall be indexed to meet Specification. Drawing of each scale for ratio stations shall be submitted with Shop Drawings for approval.
- H. Solid-state output switches, where used, shall be overvoltage transient protected and not be damaged by dI/dT or dv/dt for their design application under this Contract.
- I. Instruments shall be equipped with permanently attached identification tag. Tag shall be included on field- and panel-mounted devices. Tags shall include ENGINEER's tag identification and manufacturer's tag identification if different from ENGINEER's.
1. Tags shall be either stamped metal or laminated phenolic with white letters engraved on a black background. Field-mounted devices shall have tags fastened with screws. Devices mounted in panels will be tagged inside panel on subplates or on device itself where it can be easily read.
- J. Finish on instruments and accessories shall provide protection against corrosion by elements in environment in which they are to be installed. Both the interior and exterior of enclosures shall be finished. Extra paint of each color used on material shall be provided by manufacturer for touch-up purposes.
- K. Provide equipment identification nameplates complying with Section 16075. Nameplates shall contain ENGINEER's item designation and, for indicators and transmitters, design range and units of device shown.

2.03 SOURCE QUALITY CONTROL

- A. Control and monitoring system control panels and computer equipment, if any, shall be tested at the factory and witnessed by ENGINEER prior to shipment to Site. ENGINEER shall be given 4 weeks notice before factory test date. Factory test shall include checking for conformity to Specifications, fabrication, and nomenclature. Control and monitoring system logic and terminals shall be checked line by line and function by function in total for conformity of Drawings.
- B. Conduct preliminary testing prior to factory checkout by executing programs supplied for this Project. Exercise inputs to test logic for correct function and proper response of outputs. Verify correct interface with programs. Verify correct communications.
- C. Factory testing shall be used to validate fieldbus and plant LAN/WAN interconnections. Proper communication between devices and software components shall be demonstrated. Data Collection and Data Management Reporting shall be demonstrated.

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- D. Equipment supplier shall have test equipment available at the factory. A full set of annotated logic programs and wiring diagrams with the latest revisions shall be made available to ENGINEER at factory for checking purposes. Drawings shall include wire numbers and terminal numbers.
- E. Control panels and programmable equipment shall not be shipped to Site until logic conforms to Contract requirements, physical changes required by testing are made, and tags conform to factory test corrections. Equipment delivered to Site without factory test or corrections will be returned to factory at CONTRACTOR's expense.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Equipment provided under this Section shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with detail drawings, specifications, engineering data, instructions, and recommendations of equipment manufacturer as approved by ENGINEER.
- B. Install equipment as indicated, in accordance with manufacturer's written instruction, and in compliance with recognized industry practices to ensure that products fulfill requirements.
- C. Elements that are supported by plumbing or piping, or that have only plumbing or piping connections shall be installed under those Sections.
- D. Plumbing, piping, or pneumatic signal connections to elements requiring such connections shall be made under those Sections. Control panels shall be installed in accordance with Division 16 Sections, with piping connections to control panels installed under Division 15 Sections.
- E. Drawings are not intended to show every detail of construction or location of piping, ductwork, or equipment. Where proper operation or construction makes it necessary or advisable to change location of piping, instrumentation equipment, air ducts, or other equipment, CONTRACTOR shall so inform ENGINEER for his approval and permission.

3.02 FIELD QUALITY CONTROL

- A. Calibrate equipment in accordance with manufacturer's instructions to ranges or set points indicated on Drawings.
- B. Installation and Start-up: Equipment supplier shall have an established service facility from which qualified technical service personnel and parts may be dispatched upon call. Such a service facility shall be no more than 6 hours travel time from Site.
 - 1. Equipment supplier shall provide an experienced, factory-trained, competent, and authorized service representative for a minimum of 3 times at Site, including once during installation and start-up and once during acceptance to inspect, check, and calibrate any part of system. Supplier's service representative shall revisit Site for 8 hours per day as often as necessary after installation until trouble is corrected and equipment has passed acceptance test and is operating satisfactorily to ENGINEER.
 - 2. Third trip is after equipment has been accepted and shall be used to instruct OWNER's personnel in aspects of operation and maintenance, such as fuse locations, use of controls, instruction manuals, etc. Third trip shall be for duration of two, 8-hour days at OWNER's facility.

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- C. Equipment supplier shall provide one, 4-hour day of training for OWNER's personnel in aspects of operation and maintenance such as use of controls, fuse locations, instruction manuals, etc.
 - 1. Training and instructions at the plant shall be given by the Project Engineer assigned to the Project by the equipment supplier or other personnel as approved by ENGINEER.

3.03 DEMONSTRATION

- A. Upon completion of installation and calibration, demonstrate functioning of equipment in accordance with requirements. Where possible, correct malfunctioning units at Site, then retest to demonstrate compliance; otherwise, remove and replace with new or repaired units, and retest to demonstrate compliance.

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 13423 - LEVEL MEASUREMENT

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes the following:
 - 1. Cord type float switch.
 - 2. Submersible level sensor.

1.02 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Sections 01330 and 13410, Shop Drawings covering the items included under this Section.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:
 - 1. Cord Type Float Switch:
 - a. Anchor Scientific, Inc.
 - b. Consolidated Electric Co.
 - c. Pulsar, Inc.
 - 2. Submersible Level Sensor:
 - a. Keller America.
 - b. Measurement Specialties; KPSI.
 - c. Siemens
 - d. Endress Hauser
 - e. Blue Ribbon

2.02 FLOAT SWITCH (CORD TYPE)

- A. Direct acting float switch shall be furnished to automatically detect liquid level change. Liquid rise of 1 inch from rest position shall operate float switch and reset will occur when liquid level drops 1 inch. Mounting shall be to a 1-inch vertical pipe for multiple float applications or to a flange for a single float application as shown. Free cable hanging floats with weights shall not be acceptable.
- B. Float switch shall consist of 316 type stainless steel housing, mounting clamp for 1-inch-diameter pipe, flexible 3-conductor cable with a synthetic rubber jacket, and mercury switch. Inside float housing will be a (normally open/closed) mercury switch potted in epoxy. Electrical load for switch contacts shall be rated 115 volt AC at 0.5 horsepower inductive load.
- C. Three-conductor cable shall be 14 AWG with 105 strands per conductor made for heavy flexing service and underwater use. A green grounding wire shall connect internally to float housing.

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2.10 SUBMERSIBLE LEVEL SENSOR

- A. Submersible level sensor shall measure liquid depths using a fully submerged differential pressure transducer suspended in measured medium by electrical cable. Transducer shall be supplied with cable required to reach control unit from sensor location.
- B. Transducer shall be loop powered. Output from transducer shall be 4-20 mA DC into 500 ohms.

PART 3 - EXECUTION

3.01 GENERAL

- A. Examination, Installation, Field Quality Control, Demonstration: In accordance with Section 13410.

END OF SECTION

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SECTION 13430 - CONTROL PANELS AND CONSOLES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Control panels and consoles.
2. Switches, push-buttons, lights.
3. Relays.
4. Intrinsically safe isolator relays.
5. Timing devices.
6. Terminal blocks.
7. Control power transformers.

1.02 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Sections 01330 and 13410, Shop Drawings covering the items included under this Section.

1.03 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Codes, Ordinances, and Industrial Standards: Design, testing, assembly, and methods of installation for materials, electrical equipment, and accessories proposed under this Section shall conform to National Electric Code and to applicable State and local requirements.
2. UL listing and labeling of custom-built panels (UL 508) shall be adhered to under this Contract.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:

1. Switches, Push-Buttons, Lights:
 - a. Allen-Bradley (Type 800MR).
 - b. American Solenoid Company.
 - c. Arrow Hart (Type OB).
 - d. Electroswitch.
 - e. Microswitch (Series PW).
2. Relays:
 - a. Potter-Brumfield (Type KUP).
 - b. Schrack North America, Inc. (Type CAD).
 - c. Square D Co. (Type KU).
 - d. Struthers-Dunn (Type A283).
3. Intrinsically Safe Isolator Relay:
 - a. B/W Controls, Inc.
 - b. MTL, Inc.
 - c. R. Stahl, Inc.

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- d. Symcom, Inc.
- e. Warrick Controls.
- 4. Synchronous Timers:
 - a. ATC (Series 305D or 355).
 - b. Eagle Signal (Type HP5 or BR4).
- 5. Solid-State Timers:
 - a. ATC (Series 306D).
 - b. Eagle Signal (Type DG100).
- 6. Terminal Blocks:
 - a. Allen-Bradley (Type 1492F1 or Type 1492CA1).
 - b. Altech (Type CTS4U-N).
 - c. Square D Co. (Class 9080, Type KCA-1).
 - d. Thomas & Betts (100 series or 200 series).
 - e. Weidmueller (SAKD2.5N or SAK2.5).
- 7. Fusible Terminal Blocks:
 - a. Allen-Bradley (Type 1492-CE6).
 - b. Altech (Type CAFL4U).
 - c. Square D Co. (Class 9080, Type KH-1).
 - d. Thomas & Betts (Series 300 or 0300).
 - e. Weidmueller (SAKS1 or ASK1).
- 8. Control Power Transformers:
 - a. Acme.
 - b. Sola.
- 9. Textured Polyurethane Enamel:
 - a. Sherwin-Williams, Polane T and/or Polane HST.
- 10. Wire Markers:
 - a. Brady.
 - b. T&B.
 - c. Westline.

2.02 CONTROL PANELS AND CONSOLES

A. Sheet Metal Construction:

- 1. Panels and consoles shall be fabricated from sheet steel welded and bolted into a rigid self-supporting structure a maximum of 90 inches high and a minimum of 20 inches deep. Overall length shall be coordinated with space requirements as indicated by Drawings. Changes in length from that shown on Drawings must be brought to attention of ENGINEER within 90 days of Contract Award. Cost to modify floor plan or wall opening shall be at CONTRACTOR's expense after this 90-day period. Panel face layouts shown on Drawings are intended to indicate relative position of all components. Supplier shall fix exact locations and overall dimensions to meet requirements of its equipment.
- 2. Panel and console bodies shall be 12 gauge minimum steel for panels up to 42 inches in width, and 10 gauge minimum steel for panels exceeding 42 inches in width. Panel subplates shall be same gauge as enclosure. Stiffening members shall be provided for strength and stiffness as required.
- 3. A minimum of 3 inches shall be provided between edge of panel subplate and outside walls of panel body to ensure adequate wire-way space for external wires entering panel. Panel subplate shall be mounted on collar studs for easy removal. Print pockets shall be provided on each panel. Brackets welded to inside of panel, complete with lights, shall be provided on panels where indicated by Drawings.

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3. Identification plates shall be laminated phenolic with black letters engraved on a white background and mounted with screws or double-back adhesive foam tape.
4. All components inside panel shall have identification plates. This includes instruments, relays, switches, circuit boards in plug-in racks, etc. Identification plates shall include engineering symbols (FBQ-1, SW-3, FIC-4, CR-1, etc.). Switches and circuit breakers inside panel shall have names (Horn, Audio Tone, Panel Power, etc.) on identification plates as well as engineering symbol.
5. Identification plates shall be located on or adjacent to device they are identifying and shall be readable without looking around, under, or on top of device to find identification plate.

B. Access:

1. Wall- and/or floor-mounted control panels shall have continuous piano-hinged doors for ease of access. Door openings shall expose a minimum of 80 percent of panel interior. Door openings shall be sealed with a 0.125-inch thick minimum cellular neoprene gasket cemented with oil-resistant adhesive and held in place with a retaining strip. Print pockets shall be provided on each door. Two door enclosures shall have a removable center post. Panel doors less than 40 inches high shall be equipped with a 2-point latching mechanism. Panel doors 40 inches high or more shall be equipped with a 3-point latching mechanism.
2. Components and terminals shall be accessible without removing another component except covers. Swing out sections shall be used if mounting space is required that is not normally accessible.
3. Panels shall have open bottoms except where structural members are required.

C. Finish:

1. Panel face openings for mounting equipment shall be smoothly finished cut with counterboring and trim strips provided as required to give a neat finished appearance. Bezels shall be used on all front panel-mounted devices to cover panel cutouts. A chrome-plated or stainless steel bezel shall be used at parting line of panels that have shipping splits or at parting line of panels placed end to end.
2. After fabrication, panel surfaces shall be given a phosphatizing treatment inside and out, and then finished with 2 coats of textured polyurethane enamel. Panel interior shall be painted white, ANSI No. 51. Exterior color will be selected by ENGINEER.
3. Panels shall have identical exterior finishes as selected by ENGINEER. Panel finishes on matching colored panels shall be identical. It is supplier's responsibility to achieve this result, especially for panels fabricated in different shops.

D. Electrical:

1. Internal panel wiring shall be 19 strand No. 16 AWG, 90oC MTW, Class C stranded, or THHN/THWN approved as 90oC MTW. All panel wiring not run in wire ducts shall be bundled and tied. Each wire shall be identified at both ends with same exclusive number. Number shall be same number shown on control schematic. Number shall not be used again for any other purpose. Wires marked differently on each end will not be accepted. Wire markers shall be provided on end of each wire at termination point.
2. Control wiring associated with control circuits de-energized when main disconnect is opened shall be color-coded red. Control wiring associated with control circuits which remains "hot" when main disconnect is opened shall be color-coded yellow. DC control wiring shall be color-coded blue. Ground wires shall be color-coded green. Terminal blocks shall be numbered in numerical order. Yellow wiring leaving panel shall be brought to an isolated set of terminal blocks.
3. Provide an instrument common bus 0.1 by 0.5 by 6-inch minimum in enclosure and isolated from enclosure. A separate instrument common wire shall be run from each common terminal

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- on an instrument to instrument common bus. Instrument common wires looped from one terminal to another and then to instrument common bus will not be accepted.
4. Instrument common bus shall be connected to power supply common with a wire or wire braid strap as short as practical and of sufficient capacity to prevent troublesome voltage drop. Common terminals and common bus for instrument common shall be tagged "Instrument Common." Instrument signal wires of 4-20 mA or 1-5V shall be shielded wire. Telephone wires and telemetry equipment interconnection wires shall be shielded wires.
 5. Provide a copper ground bus 0.1 by 0.5 by 6-inch minimum in enclosure to which all instrument grounds and panel enclosure are tied. Separate ground wire shall be run from instrument enclosure ground terminal directly to ground bus. Instrument ground wires looped from one instrument to another will not be accepted. Under no circumstances shall neutral side of power source or any other terminals used for grounding power circuits be used as an instrument common.
 6. Wires to internal components shall be connected to inside of terminal strip. Wires to external components shall be connected to outside of terminal strip. No more than 2 wires shall be connected to one terminal point.
 7. Panel wire duct shall be provided between each row of components and adjacent to each terminal strip. Wire ducts shall be a minimum of 1-inch wide and 3 inches deep with removable snap-on covers and perforated walls for easy wire entrance. Wire ducts shall be constructed of nonmetallic materials with a voltage insulation in excess of maximum voltage carried therein.
 8. Floor-standing panels and consoles shall be equipped with a flange mounted 600V rated main non-automatic trip circuit breaker or disconnect switch. Single phase, 60 hertz power at voltage shown on Drawings shall be supplied to main disconnect. Panel fabricator shall provide any additional voltages and power requirements at control panel to meet requirements of equipment contained therein.
 9. Disconnect and transformer shall have enclosed protected terminations to prevent accidental shock.
 10. Relays, timers, etc., installed on panel subplate shall be provided with a minimum spacing between component and wire duct of 1.5 inches above and 1 inch below. Minimum spacing between adjacent components shall be 0.25 inch. Relays, timers, etc., shown in schematics are intended to show function. Additional relays may be required in conjunction with items shown to provide total number of contacts required. Where limit, pressure, float switches, etc., are used and more than SPDT contacts are indicated by schematics, provide additional contacts required by using auxiliary relays. However, if a DPDT switch is called for, using a SPDT with a relay will not be accepted. All control and pilot devices such as relays, timers, etc., shall be 120V, 3 amp rated except where noted with coil voltage as required. One N.O. spare contact shall be provided on each relay.
- E. Panel/Subplate Layout:
1. Panel face-mounted equipment shall consist of pilot lights, push-buttons, selector switches, meters, indicating timer, etc. Spacing between horizontal rows of components shall be 1.5 inches minimum; spacing between vertical columns of components shall be 1.875 inches minimum. Components shall be grouped and/or located as indicated on Drawings. Distance from bottom row of components to floor shall be not less than 36 inches. Top row of recording and indicating instruments shall be centered approximately 60 inches above floor. Maximum height for annunciator windows shall be 85 inches above floor. In general, indicating lights, push-buttons, etc., shall be mounted in accordance with sequence of operation from left to right and top to bottom.
 2. A minimum of 2 inches shall be provided between terminal strips and wire ducts or terminal strips and terminal strips. In general, terminal strips shall be mounted on vertical edges of

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subplate. Where terminal strips are mounted side-by-side, terminals shall be elevated 1.5 inches above subplate to allow wires to pass underneath.

3. Subplates shall have a minimum of 15 percent spare mounting space, and terminal strips shall have a minimum of 20 percent spare terminal blocks.

2.03 SWITCH, PUSH BUTTONS, LIGHTS

- A. Selector switches shall be 120 VAC rated, oil-tight construction with standard operator knob.
- B. Start push buttons shall be 120 VAC rated, oil-tight construction with extended guard and black color insert.
- C. Stop push-buttons shall have a half-guard with red color insert. Contacts shall be rated NEMA B-150 and P-150.
- D. Pilot lights shall be push-to-test oil-tight construction with cap colors and voltages as required. Nameplates for each switch and light shall conform to manufacturer's series and type with engraving as called for on Drawings.

2.04 RELAYS

- A. Control Relays: Switching and output relays shall be plug-in type with contacts rated 120 VAC, 3 amp with 120 VAC or 24 VDC coil, indicating light, manual operator, and plastic transparent cover. Relays shall have a retainer mechanism to prevent loosening from vibration. Relays shall not be used for switching 1-5 VDC or 4-20 mA signals associated with instruments.
- B. Intrinsically Safe Isolator Relay:
 1. Intrinsically safe relay shall be provided between raw sewage floats and control circuits or where shown on Drawings.
 2. Relay shall operate at 120 VAC plus 10 percent with a switch rating of 1 amp rms and maximum holding current of 20 milliamp for solid-state devices. Relay shall be rated for ambient temperatures of 32 degrees F to 120 degrees F.
 3. Output shall be N.O. or N.C. Equipment supplier is responsible for choosing proper output for float specified and circuits specified. If float and circuit are not defined, intrinsically safe relay shall be of such a polarity as to fail in a safe condition for function being performed.
 4. When intrinsically safe relay is required in panels exposed to outdoor temperatures, relays shall be rated for ambient temperatures of -40 to 120 degrees F, or thermostatically controlled heaters must be added to panel to maintain an ambient in panel of 32 to 120 degrees F.

2.05 TIMING DEVICES

- A. Synchronous and solid-state timers shall be plug-in type.
- B. Synchronous timers with ON or OFF delay cycles shall operate at 120 VAC, 60 hertz. Time interval shall be as shown on Drawings or as required.
- C. Solid-state timers with ON or OFF delay cycles shall operate at 120 VAC, 60 hertz. Solid-state device may be analog or digital in operation. Time interval shall be as shown on Drawings or as required.

2.06 TERMINAL BLOCKS

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- A. Terminal blocks shall be 300 or 600 volt rated, channel-mounted box lug with pressure plate type or binding head screw type with pressure plate, and shall have a white marking strip. Terminal blocks shall be color-coded according to the following coloring scheme:
- | | |
|--------|--|
| Black | 120V power circuits de-energized when main disconnect is opened. |
| White | 120V neutral conductors. |
| Red | 120V control circuits de-energized when main disconnect is opened. |
| Yellow | 120V control circuits which remain hot when main disconnect is opened. |
| Blue | Terminal blocks for DC wiring. |
| Gray | Terminal blocks for shields in DC wiring. |
| Green | Ground terminal blocks. |
- B. For terminals associated with 120V nonisolated input cards, individually fused terminal blocks shall be used for 120V power to field devices.
- C. Provide a minimum of 20 percent spare terminals for each type and color of terminal used. All terminals of a given color shall be grouped with other terminals of the same color.

2.07 CONTROL POWER TRANSFORMERS

- A. Control power transformers shall be sized to handle in-rush currents and to accommodate continuous load of circuits plus 25 percent future load with 5 percent or less voltage drop. Transformer primary voltage shall be as indicated on Drawings.

PART 3 - EXECUTION

3.01 GENERAL

- A. Examination, Installation, Field Quality Control, Demonstration: In accordance with Section 13410.

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 15050 - BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: General administrative and procedural requirements for mechanical installations. The following administrative and procedural requirements are included in this Section to expand the requirements specified in Division 1:
1. Submittals.
 2. Record documents.
 3. Maintenance manuals.
 4. Quality assurance.
 5. Delivery storage and handling.
 6. Guarantee.
 7. Rough-ins.
 8. Mechanical installations.
 9. Cutting and patching.
- B. The Drawings are schematic and are not intended to show every detail of construction.
1. In general, piping/ductwork transitions and offsets shown on Drawings indicate approximate locations in plan and elevation where the systems are intended to be run.
 2. CONTRACTOR shall fully coordinate mechanical work with other trades to avoid interferences.
 3. In the event of interferences, CONTRACTOR shall request clarification from ENGINEER in writing.

1.02 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:
1. A schedule indicating the system, line size, line material, joints, fittings, valves, insulation thickness, hanger type and spacing, test pressure and shop finish for each system shown on the Drawings and/or specified herein.
 2. Complete layout drawings of all pipe sleeves, ductwork, etc., showing all sizes and controlling elevations. These drawings shall be reproducible and submitted on tracing, mylar or sepia paper.
 3. No work shall be undertaken until such drawings, specifications and schedules have been approved by ENGINEER. Approval of this data by ENGINEER shall not relieve CONTRACTOR of responsibility for the completeness, coordination, and dependable operation of the system as installed.
- B. Product Data: Submit in accordance with requirements of Section 01330, product data covering the items included under this Division of the Work.
- C. Record Drawings: At Project closeout, submit record drawings of installed products, in accordance with requirements of Section 01770.
- D. Operation and Maintenance Manuals: Submit in accordance with requirements of Section 01600, operation and maintenance manuals for items included under this Section.

LIFT STATION TECHNICAL SPECIFICATION

1.03 QUALITY ASSURANCE

- A. Permits, Inspections and Licenses: CONTRACTOR shall procure all necessary permits and licenses, observe and abide by all applicable laws, codes, regulations, ordinances, and rules of the State, territory or political subdivision thereof, wherein the Work is done, or any other duly constituted public authority.
 - 1. Upon completion of the Work, CONTRACTOR shall secure certificates of inspection from the inspector having jurisdiction and shall submit three copies of the certificates to OWNER. CONTRACTOR shall pay the fees for the permits, inspections, licenses and certifications when such fees are required.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.

1.05 PROJECT CONDITIONS

- A. Explosion-proof Requirements: All work and equipment located in areas designated "Explosion-proof" shall conform to all requirements of Article 500 of the National Electric Code for Class 1, Division 1, Group. D installations, except when otherwise noted. All mechanical equipment located in these areas shall be built from nonsparking material per AMCA Std. 401-66 Type B.
- B. Corrosive Area Requirements: All heating, ventilating and air conditioning equipment, controls, ductwork, piping, supports and hangers shall be made of materials resistant to the chemicals or gases to which they are exposed, or be coated with the appropriate resistant coatings.
 - 1. The following is a partial list of areas which require equipment, piping, ductwork, supports, anchors etc. to be corrosion treated:
 - a. grit and screen rooms,
 - b. enclosed primary sanitary treatment structures,
 - c. chemical storage and handling areas,
 - d. filter areas,
 - e. high-humidity areas,
 - f. wet wells, and
 - g. other areas as indicated on Drawings.
 - 2. Acceptable Manufacturers: Products shall meet the requirements of this Section and be the product of:
 - a. Liberty Plastics.
 - b. Plasite (Wisconsin Protective Coating Corp.).
 - 3. Hanger, supports, anchors in corrosive areas shall be 316 stainless steel or FRP unless otherwise noted on the drawings or herein.
- C. Painting and Identification: Painting of piping and drainage lines installed as a part of this Work will be done under Section 09900, Painting.
 - 1. CONTRACTOR under this Section shall identify and label lines clearly so painting contractor can apply correct color(s) to each pipe.
 - 2. CONTRACTOR under this Section shall apply pipe labels to the pipe after painting has been completed. The piping labels shall include the pipe material and flow direction.

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- D. Motors: Motors shall comply with the specifications as set forth in Section 16220. Submit motor manufacturer's name with Shop Drawings for approval.
 - 1. All motors in Division 15 shall be TEFC Premium Efficiency unless noted otherwise in the specific Division 15 Sections or on mechanical drawing Schedules.
- E. Stainless Steel: All stainless steel referenced in the specifications is 316 Stainless Steel unless otherwise noted herein or on the drawings.

PART 2 – PRODUCTS

2.01 PIPE LABELS

- A. Provide Vinyl pipe label that attach to the pipe with tie-wraps or formed label that snaps on the pipe. Labels shall be rated for indoor and outdoor use.
 - 1. Label ManufacturesL Seton Name Plate Corporation, W.H. Brady, James H. Matthews, or approved equal.
- B. Labels that use adhesive shall not be used.
- C. Where product labels are not available for the media in the pipe, the contractor may paint the background the stencil the pipe product and flow arrow on the pipe.

PART 3 - EXECUTION

3.01 ROUGH-IN

- A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.
- B. Refer to equipment specifications in Divisions 2 through 16 for rough-in

requirements. 3.02 MECHANICAL INSTALLATIONS

- A. General: Sequence, coordinate, and integrate the various elements of mechanical systems, materials, and equipment. Comply with the following requirements.
 - 1. Coordinate mechanical systems, equipment, and materials installation with other building components.
 - 2. Verify all dimensions by field measurements.
 - 3. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for mechanical installations.
 - 4. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed. Furnish, set, and grout or secure in place all required sleeves.
 - 5. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
- B. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.

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1. Unless noted otherwise on Drawings, mount unit heaters 8'-0" above finished floor.
- C. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
- D. Install systems, materials, and equipment to conform with approved submittal data. Conform to arrangements indicated by the Contract Documents, recognizing that portions of Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to ENGINEER.
- E. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
- F. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.
- G. Install access panel or doors where units are concealed behind finished surfaces. Access panels and doors are specified in Section 08310.
- H. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.

3.03 PIPE AND EQUIPMENT IDENTIFICATION:

- A. Label all piping showing contents and direction of flow.
- B. Place label adjacent to each valve and branch takeoff, at each side of a wall or partition through which pipe passes; and at 20 feet 0 inch spacing on straight runs.
- C. Label Manufacturers: Seton Name Plate Corporation, W.H. Brady, Topflight Tape Company, James H. Matthews, or approved equal.
- D. Paint or stencil 1-1/2 inch high black enamel block type letters or numerals on all equipment items

3.04 VALVE IDENTIFICATION:

- A. Brass Tags: 1-inch diameter, secured to each valve with brass S-hook and stamped with system designation and assigned number.
- B. Obtain existing valve schedule from Owner and review existing valve naming sequence. Submit proposed schedule showing proposed continuation of sequence to Architect / Engineer for approval. Provide a printed schedule, in duplicate, describing each valve by number, giving location and service for which used.

3.05 CUTTING AND PATCHING

- A. General: Perform cutting and patching in accordance with the following requirements:
 1. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.

LIFT STATION TECHNICAL SPECIFICATION

- B. Perform cutting, fitting, and patching of mechanical equipment and materials required to:
 - 1. Uncover Work to provide for installation of ill-timed Work.
 - 2. Remove and replace defective Work.
 - 3. Remove and replace Work not conforming to requirements of the Contract Documents.
 - 4. Remove samples of installed Work as specified for testing.
 - 5. Install equipment and materials in existing structures.
- C. Upon written instructions from ENGINEER, uncover and restore Work to provide for ENGINEER observation of concealed Work.
- D. Cut, remove and legally dispose of selected mechanical equipment, components, and materials as indicated, including but not limited to removal of mechanical piping, heating units, plumbing fixtures and trim, and other mechanical items made obsolete by the new Work.
- E. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.
- F. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.
- G. Patch existing finished surfaces and building components using new materials matching existing materials and experienced Installers.
- H. Patch finished surfaces and building components using new materials specified for the original installation and experienced Installers.

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 15100 - PRESSURE PROCESS PIPING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes the following:
1. Provide all labor, materials, and equipment necessary for fabrication and production of the items specified in this Section and as shown on Drawings or listed on Schedule.
 2. Unless otherwise noted on Drawings, or in this Section, pressure process piping 4 inches in diameter and larger shall be part of this Work.
 3. Dismantling of existing piping and supports, where required or shown or noted on Drawings; piping connections to existing piping, structures, valves, gates, measuring devices, pumps and other equipment, including equipment erected under other Contracts, are included in Work of this Section. Piping shall contain necessary unions or companion flanges to allow ease of equipment removal.
 4. Complete all the demolition work and repair thereof to existing walls and slabs as required for the installation of this Work including grouting of all sleeves and castings. Provide all necessary joint and coupling materials, including bolts, nuts and gaskets, wall castings or sleeves, and standard or special fittings. Furnish hangers, supports, anchors, blocking, harnesses, and other necessary closure pipe sections and special fittings. Provide and secure in proper alignment, all sleeve and casting openings in existing walls and slabs, including repair thereof.
 5. Provide all shop-applied interior and exterior pipe linings and coatings. Provide plugs in open ends of pipe, temporary bulkheads, protection of surface and subsurface improvements, cleaning, painting, testing, and disinfection, as required to accomplish Work as specified and shown on Drawings.
- B. Products Installed But Not Furnished Under This Section: Install process valves, hydraulic gates, flow meters, and other appurtenances which are furnished under other Sections and incorporated in the piping systems as shown on Drawings and specified in this Section.
- C. Products Supplied But Not Installed Under This Section:
1. All piping, fittings, appurtenances, and shop-applied coatings shall be supplied as specified under this Section.
 2. The installation and testing of Pumping Mains shall be performed as specified in this Section.

1.02 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:
1. Shop Drawings shall be fully dimensioned Drawings showing the piping in full detail with exact locations, dimensions, and schedules of all pipe, fittings, hangers, supports, and appurtenances. They shall be made in accordance with the general information shown on Drawing and special information furnished by the several manufacturers of equipment. Where special fittings are required, they shall be shown in large detail with all necessary dimensions.
 2. Each pipe section, special fitting, casting, sleeve, and appurtenance shall be identified on Drawings by its respective erection mark.
 3. Design details of joints and joint restraint shall be submitted to ENGINEER for ENGINEER's consideration and approval before ordering any pipe.
 4. Product Data: Submit product data covering the items included under this Section.

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- B. Record Drawings: At Project closeout, submit record Drawings of installed products, in accordance with requirements of Section 01770.

1.03 QUALITY ASSURANCE

- A. All Work under this Section shall be done in accordance with standard practices as recommended by manufacturer and AWWA.
- B. Codes, Ordinances, and Standards: Manufacture, storage, and erection of equipment under this Contract shall be in accordance with current ASA (ANSI), AWWA, and ASTM Standards. Standards and Specifications referenced herein shall be the current published edition. The manufacturer of the pipe and fittings shall furnish ENGINEER a certified statement that all pipe and fittings furnished by manufacturer meet the material requirements and have been inspected and tested in accordance with the applicable Specification and Standard.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Storage:

1. All pipe and related items installed under this Section shall be stored as recommended by manufacturer.
2. CONTRACTOR shall take all actions necessary to protect all items installed under this Contract including furnishing all special storage areas required by equipment manufacturers.
3. Pipe shall be stored on suitable timber skids free from contact with the ground. Gaskets shall be stored in as cool, clean, and shaded a place as practical.

B. Handling:

1. All items installed under this Contract shall at all times be handled as recommended by manufacturer and in such a manner as to avoid any damage.
2. All special handling equipment and temporary supports shall be provided by CONTRACTOR.
3. Items will be subject to inspection and approval upon delivery to the Site and after storage. No cracked, broken, or damaged pipe shall be used.
4. In the event coatings are damaged, the damaged area shall be recoated with an approved coating similar to that specified for that item.
5. Steel pipe shall be handled by means of rubber or fabric slings. No hooks shall be permitted to come in contact with joint rings or be inserted in the ends of the pipe and fittings for any reason.
6. During handling, hauling, and storage of pipe, each piece shall be kept from contact with adjacent pieces by means of wooden blocks or timbers.

1.05 PROJECT CONDITIONS

- A. Existing Conditions: The Drawings are not intended to show every detail of construction or location of piping or equipment. Where existing conditions make it necessary or advisable to change location of piping or equipment, CONTRACTOR shall so inform ENGINEER for ENGINEER's approval.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

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- A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:
1. Adapter Flange Coupling (AFC):
 - a. EBAA Iron Sales, Inc. (Series 2100 Megaflange).
 - b. Smith-Blair, Inc.
 - c. Uni-Flange Corp.
 - d. Victaulic Co.
 2. Bolted Flexible Coupling (BFC):
 - a. Dresser Industries, Inc.
 - b. Smith-Blair, Inc.
 3. Equipment Connections:
 - a. Garlock.
 - b. Metra Flex.
 - c. Mercer Rubber Co.
 - d. Redflex.
 - e. Atlantic Metal Hose Co. (Vibra-flexor).
 - f. Allied Metal Hose Company.
 - g. Universal Oil Products Flexonics Division.
 4. Hangers and Supports:
 - a. Grinnell.
 - b. Elcen.

2.02 PIPE JOINTS

- A. All joint material and lubricants shall be furnished with the pipe, including all joint material required for connection to equipment furnished under other Sections. All joint materials shall be assembled in accordance with standard practice and manufacturer's recommendations. All equipment connections shall be flanged, union, or grooved coupling so that equipment can be removed without disassembly of the connecting piping.
- B. Bolted Flexible Couplings (BFC): Bolted flexible couplings shall consist of a steel sleeve, with centering bead removed, rubber gaskets, follower rings, and a full complement of nuts and bolts. Couplings shall allow a deflection of approximately 4 degrees per joint.
1. Couplings shall have a minimum middle ring thickness and minimum length as follows:

<u>Pipe Size (inches)</u>	<u>Middle Ring Thickness</u>	<u>Middle Ring Length</u>
4	0.203-inch	5-inch
6 to 12	1/4-inch	5-inch
14 to 20	5/16-inch	7-inch
24	3/8-inch	7-inch
30 to 48	3/8-inch	10-inch
54 to 72	1/2-inch	10-inch

2. Couplings shall have a maximum gap between pipe ends as follows:

<u>Sleeve Length</u>	<u>Max. Gap Allowed</u>
5-inch	1-inch
7-inch	2-inch
10-inch	3-inch

LIFT STATION TECHNICAL SPECIFICATION

3. Couplings and accessories shall be galvanized and shall be shop coated with a sealer suitable for subsequent field painting or coating. Bolts and nuts shall be 304 stainless steel.
 4. Restraint rods shall be installed across the coupling and anchors with welds bracket of a manufacturer supplied bolted bracket.
- C. Flanged Joints (FJ): Pipe flanges shall conform to American Standards: dimensions, ANSI B16.1 and threads, ANSI B2.1. Flange faces except stainless steel shall be coated with a rust inhibitor immediately after drilling.
1. Flanges for cast or ductile iron pipe and fittings shall be ductile iron and meet the requirements of AWWA C115 (ANSI 21.15).
 2. Flanges for steel plate pipe and fittings shall meet the requirements of AWWA C207 Standard Steel Ring Flanges, Class B, except high service discharge piping as noted on Drawings or on Schedule, shall be Class D.
 3. Flanged joints shall be made up with full-face 1/8-inch rubber gaskets. Gaskets for gas lines shall be neoprene and asbestos.
 4. Flanges shall be firmly bolted with machine, stud or tap bolts of the proper size and number meeting the requirements of ASTM A 307, Grade B. Joints made with bolts or bolt studs shall have a nut on each side. Bolt projection through nuts shall be equal, and where studs are used, bolt projection on each side of the flange shall be equal.
 5. All nuts and bolts shall be 304 stainless steel except on stainless steel flanges shall be 316L stainless steel.
 6. Flange connections to all flexible connectors and expansion joints shall have a lock washer under all nut and bolt heads, 2 control rods across each joint and steel retainer rings at each flange. All steel materials shall be galvanized.
 7. Flange joints shall not be used on ground-buried pipe.
- D. Adapter Flange Coupling (AFC): Adapter flange couplings for steel or ductile iron pipe shall be provided where shown on Drawings.
1. The coupling shall be designed to meet the test requirements of ANSI B16.1, 125-pound flanges.
 2. The coupling shall be designed to handle a 525 psi hydrostatic test and 175 psi working pressure at temperatures of -20 to 150 degrees Fahrenheit without leaking or requiring additional restraint.
 3. The coupling shall consist of a standard flange drilling (ANSI B16.1); a standard mechanical joint material (ANSI A21.11 or AWWA C111); and standard retainer gland construction (AISI 4140 steel setscrews, galvanized with ductile iron body ASTM A 536).

2.03 PIPING

- A. Ductile Iron Pipe (DIP): Buried ductile iron pipe shall be either the Pressure Class indicated on Bid Form or on Schedule. If no classification is indicated, pipe shall be the highest Standard Pressure Class available. Ductile iron pipe shall be manufactured in accordance with AWWA C151 (ANSI A21.51). Pipe placed in buildings to be joined by flanges or grooved couplings for the pipe size shown shall have a minimum thickness of Special Thickness Class 53. Each pipe run shall be of the same class. Pipe sizes indicated are inside diameter (I.D.).
1. Fittings for ductile iron pipe shall be ductile iron or cast iron and shall meet the requirements of AWWA C110 (ANSI A21.10) or AWWA C153 (ANSI A21.53). All radii on the fitting shall meet the requirements of AWWA C110 (ANSI A21.1). Ductile iron fittings shall be rated for 350 psi, pipe sizes 24-inch diameter and less and 250 psi for pipe sizes over 24-inch diameter, except that ductile iron flanged fittings shall be rated for 250 psi for all pipe diameters.

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2. Cast iron fittings shall be rated for 250 psi, pipe sizes 12-inch diameter and less and 150 psi for pipe sizes over 12-inch diameter.
3. Ductile iron joints shall be mechanical, bolted flexible coupling, and push-on, as specified under Pipe Joints, as shown or noted on Drawings, listed on Schedule, and approved by ENGINEER. Joints shall meet the requirements of AWWA C111 (ANSI A21.11). All joint materials shall be furnished with the pipe.
4. Coatings and Linings: Ductile iron pipe and fittings to be ground buried shall be coated by manufacturer on the outside with an asphaltic coating 1 mil thick, in accordance with AWWA C151 and C110 (ANSI A21.51) and cement lined, standard thickness, in accordance with AWWA C104/ANSI 21.4. The pipe shall be supplied with and wrapped in polyethylene encasement in accordance with AWWA C105 (ANSI 21.5) and shall be installed following Method "A."
5. Exposed pipe and fittings shall be coated by manufacturer on the outside with a universal rust-inhibitive primer 2 mils minimum dry thickness, and cement lined, standard thickness, in accordance with AWWA C104/ANSI 21.4.

2.04 EQUIPMENT CONNECTIONS

- A. The connecting piping to pumps and other equipment shall be supported independently of the pump or equipment so as to avoid any strain on the pump or equipment.
- B. All equipment connections shall be flanged or have unions to facilitate removal of the equipment.
- C. Piping to vibrating equipment shall contain control-rodged, retainer ringed flanges, flexible spool-type expansion joint of duct and chlorobutyl or Buna-N material as shown or noted on Drawings.
- D. All carbon steel shall be galvanized.

2.05 HANGERS AND SUPPORTS

- A. Hangers and supports shall include all hanging and supporting devices of metallic construction shown, specified, or required for piping, apparatus, and equipment installed under this Section. All supports and parts shall conform to the latest requirements of ANSI B31.1, except as supplemented or modified by the requirements of this Specification or as detailed on Drawings. Materials shall be stainless steel.
- B. Hangers and supports shall be adequate to maintain the pipelines, apparatus, and equipment in proper position and alignment under all operating conditions with due allowance for expansion and contraction, and shall have springs where necessary. Hangers and supports shall be of standard design where possible and be best suited for the service required, as approved by ENGINEER. Supporting devices shall be designed in accordance with the best practice and shall not be unnecessarily heavy. Sufficient hangers and supports shall be installed to provide a working safety factor of not less than 5 for each hanger. Hangers shall have a minimum spacing in accordance with ANSI B31.1. Point loading hangers are not acceptable. Hangers shall be sling or saddle type.
- C. Wherever possible, pipe attachments for horizontal piping shall be pipe clamp, and structural attachments shall be beam clamps. All rigid hangers shall provide a means of vertical adjustment after erection. Generally, hangers shall be sized for supporting the pipe, excluding insulation. Proper pipe protection saddles shall be installed on pipes that are covered with insulation where hangers and supports are outside the insulation. Overhead hangers shall be supported by threaded rods properly fastened in place by suitable screws, clamps, inserts or bolts, or by welding. Saddle stands shall be of

LIFT STATION TECHNICAL SPECIFICATION

the adjustable type. Each stand shall consist of a length of steel pipe fitted at the base with a standard threaded flange and at the top with an adjustable saddle or roll. The base flange shall be bolted to the floor, foundation, or concrete base.

- D. Anchors shall be furnished and installed where specified, shown, or required for holding the pipelines and equipment in position or alignment. Anchors shall be designed for rigid fastening to the structures, either directly or through brackets. The design of all anchors shall be subject to approval by ENGINEER. Materials shall be galvanized or stainless steel. Inserts for concrete shall be stainless steel and shall be installed in the concrete structures where required for fastening supporting devices. They shall be designed to permit the rods to be adjusted horizontally in one place and to lock the rod nut or head automatically. Inserts shall be recessed near the upper flange to receive reinforcing rods. Inserts shall be so designed that they may be held in position during concrete pouring operations. Inserts shall be designed to carry safely the maximum load that can be imposed by the rod that they engage.
- E. Concrete supports shall be placed wherever shown or required under Division 3. Equipment shall be supported in accordance with manufacturer's recommendations.

2.06 TAPS AND PLUGS

- A. Where indicated or required, pipe or fittings shall be tapped to receive small or special fittings under this or other headings of the Work. Required taps shall be provided as part of this Work.
- B. All taps shall be temporarily plugged at point of fabrication.

2.07 SOURCE QUALITY CONTROL

- A. Tests, Inspections:
 - 1. All pipe and fittings delivered to the Project shall be accompanied by certification papers showing that the pipe and fittings have been tested in accordance with the applicable Specifications and that pipe and fittings meet the Specifications for this Project. All pipe and fittings will be inspected upon delivery to the Site by ENGINEER or OWNER's Representative. No cracked, broken, or damaged pipe or fittings will be allowed in this Work.
 - 2. Ductile Iron Pipe:
 - a. Each pipe shall be hydrostatically tested to 500 psi at the point of manufacture.
 - b. The class of nominal thickness, net weight without lining, and casting period shall be clearly marked on each length of pipe. Additionally, the manufacturer's mark, county where cast, year in which the pipe was produced, and the letters "DI" or "ductile" shall be cast or stamped on the pipe.
 - c. Where required, other designation marks shall be painted on the pipe or fittings to indicate correct location in the pipeline in conformity to a detailed layout plan.

PART 3 - EXECUTION

3.01 ERECTION

- A. Equipment provided under this Section shall be fabricated, assembled, erected, and placed in proper operation condition in full conformity with detail Drawings, specifications, engineering data, instructions, and recommendations of equipment manufacturer approved by ENGINEER.

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3.02 INSTALLATION

- A. Laying and Erecting Pipe: Pipe shall be installed as recommended by manufacturers or by the applicable AWWA installation manual or specification.
1. Pipe shall be carefully laid to line and grade as shown on Drawings. Care shall be taken to keep the interior of the pipe clean and free from dirt and other foreign materials.
 2. Bulkheads or other means shall be used at the open ends of the pipe for this purpose. At the end of each day's work, ground-buried pipe shall have its working end bulkheaded.
 3. Ground-buried ductile iron pipe shall be wrapped with polyethylene encasement in accordance with AWWA C105 (ANSI 21.5) following Method "A."
- B. Field Cutting Piping: The spigot ends of all pipe lengths, which have been cut in the field, shall be ground to a smooth surface and painted with 2 coats of asphaltum metal protective paint.
- C. Bolted Flexible Couplings (BFC): All bolted flexible couplings shall be harnessed with tie bolts or studs across the joint, design based on test pressures.
1. On cast iron or ductile iron pipe, tie bolts shall be installed between flanges across the coupling unless otherwise noted on Drawings or approved by ENGINEER.
 2. Piping of other materials shall be furnished with lugs. The number and size of the bolts and studs and other details of the harnessed joint shall be submitted to ENGINEER for review.
 3. Tie bolts or studs shall be galvanized.
- D. Joints: All joints shall be assembled in accordance with that described in the "Pipe Joints" Article.
- E. Connections to Existing Facilities:
1. CONTRACTOR shall furnish all labor and materials required for the connection of piping under this Contract to existing structures as called for on Drawings.
 2. Where breaking holes for connections to existing structures, care shall be taken to prevent debris from entering.
 3. After installation of the pipe, the structure shall be pointed up around the pipe, both on the inside and outside so that it is restored to a watertight condition.

3.03 REPAIR

- A. Repair of all damaged interior pipe coatings, ground-buried exterior pipe coatings and galvanized coatings shall be under this Section.
- B. For field-welded joints, both inside and outside, coatings shall be left off for a distance of 6 inches from each end. These areas shall be shop primed. After completing the welded joint and under this Section, the interior of all joints and exterior of ground-buried pipe shall be thoroughly cleaned, primed, and given field coating of the same material as specified for the pipe. Coating shall meet the requirements of AWWA C203 or AWWA C210, as approved by ENGINEER. Exposed field-welded joints shall be cleaned under this Section to remove slag and scale, and then shall be finish cleaned, primed and painted.
- C. Damaged linings, coatings, and wrapping shall be repaired under this Section and, if possible, before pipe is laid.
1. Surfaces shall be thoroughly cleaned, dried, and free of old materials.
 2. They shall then be given a field coating of the same material as specified for the pipe.
 3. Coating shall meet the requirements of AWWA C203, AWWA C210, or AWWA C602 as approved by ENGINEER.

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4. All other pipe coatings and linings shall be as stated in "Piping"

Article. 3.04 FIELD QUALITY CONTROL

- A. Defective Pipe: No pipe or special casting known to be defective shall be laid in Work.
 1. Any piece found to be defective after it has been laid shall be removed by CONTRACTOR and replaced by a sound and perfect piece.
 2. If the major part of a defective pipe is sound, the good end may be cut off and used.
 3. The cutting of pipes for this and any other purpose shall be done by skilled workers, and in such manner as will not injure the pipe. Every such cut shall be square and smooth. Cut surfaces shall be recoated as specified for the pipe.
- B. Tests:
 1. After completion, each run of pipe shall be tested by CONTRACTOR in the presence of ENGINEER. All appurtenances such as service connections, corporation stops, and curb stops shall be tested with the run of pipe.
 - a. Any leaks shall be made tight.
 - b. Under this Work, CONTRACTOR shall furnish all water or air, piping, bulkheads, pumps or compressors, gauge, and other equipment required for the test.
 - c. The section of pipe to be tested shall be cleaned and isolated by valves or plugs, and shall not exceed 2,000 feet for any individual test. Such valves or plugs shall be designed to hold against the test pressure. Sections of pipe shall have an opening through which air or water can be introduced. The supply line shall be fitted with suitable control valves and a pressure gauge for continually measuring the pressure. The pressure gauge shall have a minimum diameter of 3-1/2 inches and a range compatible with the test pressure. Pipelines that cannot be closed for a direct pressure test shall be tested by filling the tanks to which they are connected to the highest operating level or installing temporary test bulkheads. After completion of tests, all pipes shall be drained. Buried pipelines shall be pressure tested with all pipe joints exposed for visual inspection unless otherwise directed by ENGINEER.
 - d. If requested by ENGINEER, CONTRACTOR shall furnish proposed test procedures for approval including pipe identification, test pressure and a description of the method of testing.
 - e. In the event that the leakage exceeds the specified amount, the joints in the line shall be carefully inspected for leaks and repaired where necessary. Any pipes or special castings found to be cracked shall be removed and replaced with new pieces by CONTRACTOR. After this Work has been done, the test shall be repeated. Final acceptance of the lines will not be made until satisfactory tests have been passed.
 2. Test Pressures: In general, pipelines shall be tested at 1-1/2 times their working pressure or at the test pressure indicated on Piping Schedule. Adjustments for hydrotest water temperature and water column elevation differences at point of test must be made.
 3. Hydrostatic Testing (except HDPE): The section of pipe to be tested shall be filled with water, the entrained air within the line shall be removed, and water shall be pressurized up to test pressure at the pipe low point within 5 to 10 minutes.
 - a. The test period shall start immediately after initial pressurization. The line shall be maintained under the test pressure for a continuous 2-hour period.

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- b. The section of pipe to be tested shall hold the test pressure with no more than a 5 percent loss in pressure over the test period or the leakage per hour under the conditions of test shall not exceed values determined by the following equation:

$$L = \frac{SD\sqrt{P}}{148,000}$$

where L = allowable leakage per hour (gallons)

S = length of pipe in test (feet)

D = nominal diameter of pipe (inches)

P = average test pressure (psi, gauge)

- c. Piping with flanged, grooved coupling, screwed, socket type, and welded joints shall be completely tight at the designated test pressure.
- d. The test pressure shall not vary by more than 5 psi throughout the entire test period.
4. Pneumatic Testing: The section of pipe to be tested shall be filled with air and pumped up to test pressure.
- a. Sufficient time shall be allowed for the air pressures to stabilize at the test pressure. After the stabilization period, the air control valve shall be closed and the test period started. The section of pipe shall be maintained under the test pressure for a continuous 4-hour period with no more than a 10 percent loss in pressure over the entire test period.
5. Each valve assembly shall be tested by CONTRACTOR; the test shall consist of opening and closing the valve.

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 15110 - PROCESS VALVES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Labor, materials, and equipment necessary for fabrication, production, installation, and erection of the items specified in this Section and as shown on Drawings or on Valve Schedule on Drawings.
- B. Items furnished under this Section shall be erected under Division 15. Hanger rods, inserts and supports, flange bolts, and gaskets for valves shall be furnished and installed under Section 15100.

1.02 REFERENCES

- A. ANSI:
 - 1. B16.1 Cast Iron Pipe Flanges and Flanged Fittings, Classes 25, 125, 250, and 800.
 - 2. B16.3, B2.1 Threaded Valve Joint Standards.
 - 3. B16-104 Reinforced Teflon Steel Standard.
- B. ANSI/AWWA:
 - 1. C110/A21.10 Ductile Iron and Gray Iron Fittings, 3-inch through 48-inch for Water and Other Liquids.
 - 2. C508 Swing-Check Valves for Waterworks Service, 2-Inch Through 24-Inch
 - 3. C517 Resilient-Seated Cast-Iron Eccentric Plug Valves
- C. ASTM:
 - 1. A 48 Specification for Gray Iron Castings.
 - 2. A 126 Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
 - 3. A 536 Specification for Ductile Iron Castings.

1.03 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:
 - 1. Each valve, including accessories, shall be identified on Shop Drawings by its respective mark as noted on Valve Schedule.
- B. Operation and Maintenance Manuals: Submit in accordance with requirements of Section 01600, operation and maintenance manuals for items included under this Section.
- C. Warranty: Submit in accordance with requirements of Section 01770, warranties covering the items included under this Section.

1.04 QUALITY ASSURANCE

- A. All Work under this Section shall be performed in accordance with standard practices as recommended by manufacturer and AWWA.

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PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:

1. Standard Swing Check Valves (C):
 - a. Clow Valve Co.
 - b. G.A. Valves (Golden Anderson).
 - c. Kennedy Valve.
 - d. M&H Valve Co.
 - e. Rensselaer Valve Mfg. Co.
2. Plug Valves (P):
 - a. Clow Valve Co.
 - b. DeZurik.
 - c. Homestead Valve (Div. of Olson Technologies, Inc.).
 - d. Milliken Valve Co.
 - e. Henry Pratt Co.
 - f. Val-Matic Valve and Manufacturing Co.
 - g. Victaulic Co.

2.02 VALVE AND GATE IDENTIFICATION

A. Each valve and gate shall be tagged with its distinguishing mark letter and number. Mark letter and number will be as listed on Valve Schedule. Identification tag shall be 1-1/2-inch in diameter, 18-gauge polished brass or aluminum with 1/2-inch-high, embossed, black-filled mark letter and number placed thereon. Tags shall be securely fastened to the valve or gate operator with No. 16 brass jack chain or plastic seals.

2.03 COMPONENTS

A. Standard Swing Check Valves (C):

1. Standard swing check valves shall meet the requirements of ANSI/AWWA C508.. Check valves shall be cast or ductile iron body with end flanges conforming to ASME B16.1 Class 125. Resilient to metal type seat shall be provided with stainless steel seating surface mechanically attached to machined body area with the buna-N seat material integral with or mechanically attached to the disc. Check valves shall be of the balanced single disc type with the disc hinged at the top, with outside lever and adjustable weight or spring. A clear waterway opening equal to the full area of the connecting pipe shall be provided when the valve is open.
2. Disc shall be cast or ductile iron.. Hinge pins shall be one piece stainless steel and protrude through both sides of the body. Bronze or stainless steel bushings with adjustable packing or O-ring seal shall be provided where pins pass through the valve body.
3. Valves shall be interior coated with epoxy meeting requirements NSF/ANSI 61 approved epoxy in accordance with AWWA C550 and, as minimum, be painted with primer on the exterior.

B. Plug Valves (P):

1. Plug valves shall meet the requirements of AWWA C517, be nonlubricated, eccentric type with nitrile butadiene (hycar) or Buna-N resilient faced plugs. End connections shall generally be flanged or grooved for inside valves and mechanical joint for exterior ground-buried valves. Port areas shall be equal to at least 80 percent of the nominal size pipe area. Valve shall be suitably marked to indicate whether it is open or closed.

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2. The seating surface of the valve body shall be welded in stainless steel or nickel. Bearings at the top and bottom supporting the rotating element shall be self-lubricating, corrosion-resistant type, suitable for sewage plant service. The valve shall be of the bolted bonnet design. Packing shall be visible for inspection without dismantling valve or removing operator. The packing shall be adjustable and replaceable without disassembling of the valve and actuator. The valve body shall be cast or ductile iron marked to show seat side of valve.
3. Plug valves shall be of adequate design to operate with a pressure of 50 psi on both sides or on either side of the valve without leakage.

2.04 VALVE JOINTS

- A. Flange Joint: Flanges shall meet the requirements of ANSI-B16.1 Standard Class 125, except that bolt holes at shaft hubs may be drilled and tapped on the flanges. Flange faces shall be coated with a rust inhibitor immediately after drilling.
- B. Grooved Coupling: Grooved coupling joints shall be the rigid type and shall have housing fabricated in 2 or more parts of malleable iron in accordance with ASTM Specification A 47, Grade C32510. Ends shall be factory grooved in accordance with the coupling manufacturer's standard groove dimension. Bolts shall be oval neck track head type with hexagonal heavy nuts, per ASTM A 183 and A 194/A 194M. Gasket material shall be Grade H, E chlorinated butyl, or E.P.D.M. for water service and Grade T Buna-N for sewage.
- C. Mechanical joints shall conform to ANSI/AWWA C110/A 21.10 and ANSI/AWWA C111/A 21.11.
- D. Push-on joints shall conform to ANSI A21.11 and AWWA C111.

2.05 ACCESSORIES

- A. Manual Operators: Operators shall be designed with a safety factor of 5 for torsional and shear stresses. The operating mechanism shall be so located and so designed that parts subject to the maintenance shall be easily accessible.
 1. Manual operators shall be so sized that a maximum of 80 pounds of rim force/pull is required for operation.
 2. Positions of operators shall be approved by ENGINEER.
 3. Valve shall be made to open when turned to the left or counterclockwise.
 4. The direction of the operator to open position shall be indicated on the operator.
 5. Bevel gear activators shall provide vertical mounting of the handwheel. Handwheels shall be included.
 6. Crank/Handle: Cranks shall be cast iron with a rotating brass grip. They shall be a maximum of 15 inches in length and keyed to the operator nut.
 7. Chainwheels shall be cast iron and furnished complete with chain and guides. Chain shall be galvanized and shall be looped to extend to within 4 feet of the floor below the valve.
 8. Handwheels shall be fabricated steel. They shall be a maximum of 30 inches in diameter and keyed to the operating nut.
 9. Lever shall be fabricated steel, shall include a setscrew and be grease lubricated.
 10. Position lever shall be of extra heavy steel with a multiple position throttling plate.
 11. Wrench heads shall be cast iron with setscrew. They shall be furnished for wrench nuts except where extension stems or T-handle wrenches are required.
 12. Wrench nuts shall be provided with a 2-inch operating nut when a T-handle wrench or extension stem is required. Other wrench nuts shall be furnished with a wrench head.

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PART 3 - EXECUTION

3.01 ERECTION

- A. Equipment provided under this Section shall be fabricated, assembled, erected, and placed in proper operation condition in full conformity with detail drawings, specifications, engineering data, instructions, and recommendations of the equipment manufacturer approved by ENGINEER.
- B. Equipment furnished under this Section shall be installed under Section 15100.

3.02 FIELD QUALITY CONTROL

- A. Installation: Special attention shall be given by CONTRACTOR to ensure that items furnished under this Section are installed in accordance with manufacturer's recommendations.

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 16050 - BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: General administrative, procedural requirements, and installation methods for electrical installations specified in Division 16.
- B. The Drawings are schematic and are not intended to show every detail of construction.
 - 1. In general, conduits/raceways, transitions and offsets shown on Drawings indicate approximate locations in plan and elevation where the systems are intended to be run.
 - 2. CONTRACTOR shall fully coordinate electrical Work with other trades to avoid interferences.
 - 3. In the event of interferences, CONTRACTOR shall request clarification from ENGINEER in writing.
- B. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Sections, apply to Work of this Section.

1.02 SUBMITTALS

- A. Shop Drawings: Submit in accordance with requirements of Section 01330, Shop Drawings covering the items included under this Section of Work. Shop Drawing submittals shall include:
 - 1. Submit product data covering the items included under this Section of Work.
- B. Conforming to Construction Drawings: Submit a complete set of Drawings showing the locations of the piping, ductwork, etc., as actually installed. Such Drawings shall be submitted to ENGINEER in electronic format (PDF), one full size print, and one 11x17 print.
- C. Operation and Maintenance Manuals: Submit in accordance with requirements of Section 01600, operation and maintenance manuals for items included under this Section. Include following information for equipment items:
 - 1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
 - 2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
 - 3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
 - 4. Servicing instructions and lubrication charts and schedules.

1.03 RECORD DOCUMENTS

- A. Prepare Record Documents in accordance with requirements in Section 01770. In addition, CONTRACTOR shall submit, prior to final payment, Drawings conforming to construction records of systems it has installed. Vendor drawings shall be sized as manufacturers' standard.
- B. Provide typewritten data sheets on motor control circuits with following information on each branch feeder: Load name, horsepower or KVA (transformer), fuse size, starter size, service factor of motor,

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motor nameplate currents, power factor correction capacitor size (if used), and thermal overload part number.

1.04 QUALITY ASSURANCE

- A. National Electrical Code: Comply with NFPA 70, National Electrical Code.
- B. UL Compliance and Labeling: Use products and components labeled by

UL. 1.05 PERMITS, INSPECTIONS, AND LICENSES

- A. CONTRACTOR shall procure all necessary permits and licenses, observe and abide by all applicable laws, codes, regulations, ordinances, and rules of the State, territory, or political subdivision thereof, wherein Work is done, or any other duly constituted public authority, and further agrees to hold OWNER harmless from liability or penalty which might be imposed by reason of an asserted violation of such laws, codes, regulations, ordinances, or other rules.
 - 1. Upon completion of Work, CONTRACTOR shall secure certificates of inspection from the inspector having jurisdiction and shall submit 3 copies of the certificates to OWNER. CONTRACTOR shall pay the fees for the permits, inspections, licenses, and certifications when such fees are required.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification. Equipment shall be packaged to prevent damage during shipment, storage, and handling. Do not install damaged units; replace, and remove damaged units from Site.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 GENERAL ELECTRICAL INSTALLATION

- A. Provide electrical materials and equipment enclosures appropriate for areas in which they are installed. Each area will be designated on Drawings with a type of construction such as NEMA 4, 4X, 7 or 9 if it is other than NEMA 12. An area designated by a name and elevation includes space bounded by floor, ceiling, and enclosing walls.
 - 1. Exception: Provide manufacturer's standard construction for indoor or outdoor application where equipment is not manufactured to NEMA specifications (e.g., switchgear, transformers, high voltage capacitors, bus duct, and light fixtures; materials and equipment used in finished areas such as offices, laboratories, etc.).
- B. Provide nonmetallic electrical materials and equipment enclosures in NEMA 4X areas; watertight NEMA 4 and equipment enclosures for outdoor applications and indoor applications below grade; explosion-proof NEC Class I, Division 1, Group D equipment for NEMA 7 areas; explosion-proof NEC Class II, Division 2, Group F equipment for NEMA 9 areas.

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- C. Coordinate with power company high voltage and/or low voltage metering requirements. Furnish, install, and connect metering equipment not furnished, installed or connected by power company.
- D. Provide chases, slots, and openings in other building components during progress of construction, to allow for electrical installations.
- E. Supporting devices and sleeves shall be set in poured-in-place concrete and other structural components as they are constructed.
- F. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide maximum headroom possible. Locate light fixtures at approximately 8 feet above floor and where fixtures may be readily serviced.
- G. Coordinate connection of electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
- H. Install systems, materials, and equipment to conform with approved submittal data, including coordination Drawings, to greatest extent possible. Conform to arrangements indicated by Drawings recognizing that portions of Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to ENGINEER.
- I. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components where installed exposed in finished spaces.
- J. As much as practical, connect equipment for ease of disconnecting with minimum of interference with other installations.
- K. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.

3.02 RACEWAY INSTALLATION

- A. Outdoors, use the following materials:
 - 1. Exposed Conduit: PVC externally coated rigid metal conduit and fittings.
 - 2. Underground Direct Buried Conduit: PVC externally coated rigid metal conduit.
 - 3. Underground Concrete Encased Conduit: Rigid nonmetallic conduit.
 - 4. Conduit Used to Connect to Vibrating Equipment including transformers and hydraulic, pneumatic or electric solenoid or motor-driven equipment: Liquidtight flexible metal conduit.
- B. Indoors, use the following wiring materials:
 - 1. Connection to Vibrating Equipment, including transformers and hydraulic, pneumatic or electric solenoid or motor-operated equipment: Liquidtight flexible metal conduit.
 - a. Exception: NEMA 7 or 9 areas require explosion-proof flexible conduit.
 - 2. Exposed Conduit: Rigid metal conduit or intermediate metal conduit.
 - a. Exceptions:
 - 1) Areas indicated as NEMA 4X, use rigid Schedule 40 PVC conduit.
 - 2) Areas indicated as NEMA 7 or NEMA 9 (such as grit and raw sewage rooms), use PVC externally coated rigid steel conduit.

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3. Concealed Conduit: Rigid metal conduit or intermediate metal conduit unless indicated otherwise.
- C. Minimum size conduit shall be 3/4 inch unless shown otherwise.
 - D. Instrument Signal Conduit Requirements: Shielded signal wires for 4-20 mA type instruments or thermocouple wires assigned to the same control panel may be run in the same conduit. Shielded instrument signal wires, thermocouple wires, and shielded 2-wire intercom wires may be run in the same conduit. No other wires will be permitted in an instrument signal/2-wire intercom conduit. Conduit shall be RMC or PVC-coated RMC.
 - E. Conduit Thread Paint: Make threaded conduit joints watertight by coating threaded portions with a spray-on or brush-on zinc-bearing paint. Provide paint containing 90 percent minimum by weight of metallic zinc powder in the dried film. Clean field-cut threads of oil using the recommended solvent prior to coating threads.
 - F. Install expansion fittings in all exposed rigid nonmetallic conduit runs of 20 feet or more.
 - G. Install expansion/deflection fittings where conduit passes a building expansion joint or where conduits are attached to two structures joined by a concrete expansion joint.
 - H. Exposed or Concealed Construction: Install conduit exposed inside buildings except for areas with finished walls (e.g., offices, laboratories, lavatories, locker rooms, etc.) unless otherwise indicated.
 - I. Concealed Raceways: Raceways embedded in slabs shall be installed in the middle third of the slab thickness where practical and leave at least 1-inch concrete cover. Tie raceways to reinforcing rods or otherwise secure them to prevent sagging or shifting during concrete placement. Space raceways laterally to prevent voids in the concrete. Run 1-inch and smaller raceways with a minimum of bends in the shortest practical distance. Run larger conduit parallel with or at right angles to the main reinforcement; where at right angles to the reinforcement, the conduit shall be close to one of the supports of the slab. Where nonmetallic conduit or fiberglass-reinforced conduit is used, raceways must be converted to PVC externally coated rigid metal conduit before rising above floor.
 - J. Exposed Raceways: Install parallel and perpendicular to nearby surfaces or structural members and follow the surface contours as much as practical. Make bends and offsets so the inside diameter is not effectively reduced. Keep the legs of a bend in the same plane and the straight legs of offsets parallel. Conduits shall slope away from loads to keep moisture from entering the load. Run parallel or banked raceways together. Make bends in parallel or banked runs from the same centerline so that the bends are parallel. Factory elbows may be used in banked runs only where they can be installed parallel. This requires that there be a change in the plane of the run, such as from wall to ceiling and that the raceways be of the same size. In other cases, provide field bends for parallel raceways. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot water pipes. Install horizontal raceway runs above water and steam piping.
 - K. Space raceways, fittings, and boxes 0.25 inch from mounting surface in NEMA 4 and NEMA 7 areas. Spacers shall be one-piece construction of stainless steel, galvanized steel, PVC, ABS, or other noncorrosive material.
 - L. Sleeves: Install in concrete floor slabs except where conduit passes through a housekeeping pad. Install in exterior walls below grade.

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- M. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment with an adjustable top or coupling threaded inside for plugs and set flush with the finished floor. Extend conductors to equipment with rigid metal conduit; flexible metal conduit may be used 6 inches above the floor. Where equipment connections are not made under this Contract, install screwdriver-operated threaded flush plugs with floor.
- N. Flexible Connections: Use short length (maximum 6 feet for lighting fixtures; maximum 3 feet for all other equipment) of flexible conduit for recessed and semi-recessed lighting fixtures, equipment subject to vibration, noise transmission, or movement, and all motors. Use liquidtight flexible conduit in wet locations and rated flexible connections for hazardous locations. Install separate ground conductor across flexible connections.
- O. Join raceways with fittings designed and approved for the purpose and make joints tight. Where joints cannot be made tight, use bonding jumpers to provide electrical continuity of the raceway system. Where terminations are subject to vibration, use bonding bushings or wedges to assure electrical continuity. Where subject to vibration or dampness, use insulating bushings to protect conductors.
- P. Use raceway fittings that are of types compatible with the associated raceway and suitable for the use and location. For intermediate metal conduit, use threaded rigid metal conduit fittings. For PVC externally coated rigid metal conduit, use only factory-coated fittings approved for use with that material. Patch all nicks and scrapes in PVC coating after installing conduit.
- Q. Install raceway sealing fittings in accordance with the manufacturer's written instructions. Locate fittings at suitable, approved, accessible locations and fill them with UL listed sealing compound. For concealed raceways, install each fitting in a flush metal box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points and elsewhere as indicated:
1. Where conduits enter or leave hazardous locations.
 2. Where required by the NEC.
- R. Install electrical boxes in those locations which ensure ready accessibility to enclosed electrical wiring. Provide knockout closures to cap unused knockout holes where blanks have been removed.
- S. Avoid installing boxes back-to-back in walls. Provide not less than 6-inch (150 mm) separation.
- T. Position recessed outlet boxes accurately to allow for surface finish thickness.
- U. Fasten electrical boxes firmly and rigidly to substrates or structural surfaces to which attached, or solidly embed electrical boxes in concrete masonry.
- V. Provide fire-retardant barriers in all pull and junction boxes containing circuits that are otherwise continuously separated in conduit. Securely fasten these barriers within box. Size barriers so that space between barrier and box wall does not exceed 0.125 inch anywhere around the perimeter of barrier.
- W. Support exposed raceway within 1 foot of an unsupported box and access fittings. In horizontal runs, support at box and access fittings may be omitted where box or access fittings are independently supported and raceway terminals are not made with chase nipples or threadless box connectors.

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- X. In open overhead spaces, cast boxes threaded to raceways need not be supported separately except where used for fixture support; support sheet metal boxes directly from building structure.
- Y. Terminations: Where raceways are terminated with locknuts and bushings, align the raceway to enter squarely and install the locknuts with dished part against the box. Where terminating in threaded hubs, screw the raceway or fitting tight into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align the raceway so the coupling is square to the box and tighten the chase nipples so no threads are exposed.
- Z. Complete installation of electrical raceways before starting installation of conductors within raceways and prevent foreign matter from entering raceways by using temporary closure protection. Cap spare conduit. Protect stub-ups from damage where conduits rise from floor slabs. Arrange so curved portion of bends is not visible above the finished slab.
- AA. Install pull wires in empty raceways: Use No. 14 AWG zinc-coated steel or monofilament plastic line having not less than 200-pound tensile strength. Leave not less than 12 inches of slack at each end of the pull wire.

3.03 WIRE AND CABLE INSTALLATION

- A. Use pulling means including fish tape, cable, rope, and basket weave wire/cable grips which will not damage cables or raceways. Pull conductors simultaneously where more than one is being installed in same raceway. Use UL listed pulling compound or lubricant where necessary.
- B. Keep branch circuit conductor splices to minimum. Splice feeders only where indicated. Use a standard kit. No splices are allowed for instrument and telephone cables except at indicated splice points.
- C. Install splice and tap connectors which possess equivalent or better mechanical strength and insulation rating than conductors being spliced. Use splice and tap connectors which are compatible with conductor material and are UL listed as pressure type connectors.
- D. Provide adequate length of conductors within electrical enclosures and train conductors to terminal points with no excess. Bundle multiple conductors, with conductors larger than No. 10 AWG cabled in individual circuits. Make terminations so there is no bare conductor at terminal.
- E. Terminate power conductors at equipment using pressure-type terminals specifically designed for type of terminations to be made. Terminate no more than 2 conductors No. 8 AWG and smaller within the same pressure-type terminal. These 2 conductors shall be no more than 4 wire gauge sizes apart. Terminate no more than 1 conductor larger than No. 8 AWG within any pressure-type terminal.
 - 1. Exception: Power factor correction capacitor conductors may be terminated at the motor disconnect switch load terminals.
- F. Seal wire and cable ends until ready to splice or terminate.

3.04 EQUIPMENT CHECKOUT AND TESTING

- A. In addition to testing recommended by equipment or material supplier and called for in equipment or material specification, perform the following.

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- B. Check-out Procedures. In general, check-out procedures (as listed below) which are applicable for a particular item of equipment shall be performed:
1. Vacuum interior of cubicles and remove foreign material.
 2. Wipe clean with a lint-free cloth insulators, bushings, bus supports, etc.
 3. Check and adjust time delay, under-voltage devices, phase relay, over-current relays, etc., as required by coordination study or ENGINEER.
 4. Fill motor bearings requiring oil.
 5. Check and change, as required, thermal overload heater elements to correspond with motor full-load current and service factors of installed motor.
 6. Check direction of rotation of motors and reverse connections if necessary. Check rotation with motor mechanically uncoupled where reverse rotation could damage equipment.
 7. Equipment with two or more sources of power connected by tie breakers, transfer switches, or generator receptacles shall be checked for rotation from each possible combination of power sources. Power sources must have the same phase sequence for each source throughout entire facility.
 8. Check exposed bolted power connections for tightness.
 9. Check operation of breakers, contactors, etc., and control and safety interlocks.
 10. Check tightness of bolted structural connections.
 11. Check leveling and alignment of enclosures.
 12. Check operating parts and linkages for lubrication, freedom from binding, vibration, etc.
 13. Check tightness and correctness of control connections at terminal blocks, relays, meters, switches, etc.
 14. Clean auxiliary contacts and exposed relay contacts after vacuuming.

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 16060 - GROUNDING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Electrical grounding and bonding Work as follows:
 - 1. Solidly grounded.

- B. Applications of electrical grounding and bonding Work in this Section:
 - 1. Underground metal piping.
 - 2. Underground metal structures.
 - 3. Electrical power systems.
 - 4. Grounding electrodes.
 - 5. Separately derived systems.
 - 6. Raceways.
 - 7. Service equipment.
 - 8. Enclosures.
 - 9. Equipment.

1.02 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:
 - 1. Product Data: Submit manufacturer's data on grounding and bonding products and associated accessories.

1.03 QUALITY ASSURANCE

- A. Codes and Standards:
 - 1. UL Compliance: Comply with applicable requirements of UL Standards No. 467, "Electrical Grounding and Bonding Equipment," and No. 869, "Electrical Service Equipment," pertaining to grounding and bonding of systems, circuits, and equipment. In addition, comply with UL Standard 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors." Provide grounding and bonding products which are UL listed and labeled for their intended usage.
 - 2. IEEE Compliance: Comply with applicable requirements and recommended installation practices of IEEE Standards 80, 81, 141, and 142 pertaining to grounding and bonding of systems, circuits, and equipment.

PART 2 - PRODUCTS

2.01 GROUNDING AND BONDING

- A. Materials and Components:
 - 1. Except as otherwise indicated, provide electrical grounding and bonding systems indicated; with assembly of materials including, but not limited to, cables/wires, connectors, solderless lug terminals, grounding electrodes and plate electrodes, bonding jumper braid, surge arresters, and additional accessories needed for complete installation. Where more than one type component

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product meets indicated requirements, selection is Installer's option. Where materials or components are not indicated, provide products which comply with NEC, UL, and IEEE requirements and with established industry standards for those applications indicated.

2. Conductors: Electrical copper grounding conductors for grounding system connections that match power supply wiring materials and are sized according to NEC.
3. Service Arrester: Electrical service arrester, 480 volts, 3-phase, 4-wire, for exterior mounting.
4. Grounding Electrodes: Steel with copper welded exterior, 3/4-inch diameter by 10 feet.
5. Electrical Grounding Connection Accessories: Provide electrical insulating tape, heat-shrinkable insulating tubing, welding materials, bonding straps, as recommended by accessories manufacturers for type services indicated.

PART 3 - EXECUTION

3.01 INSTALLATION OF ELECTRICAL GROUNDING AND BONDING SYSTEMS

- A. Connect grounding conductors to underground grounding electrodes using exothermic weld process or mechanical compression type connectors.
- B. Ground electrical service system neutral at service entrance equipment to grounding electrodes.
- C. Ground each separately derived system neutral to effectively grounded metallic water pipe, effectively grounded structural steel member, and separate grounding electrode.
- D. Connect together system neutral, service equipment enclosures, exposed noncurrent carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, receptacle ground connectors, and plumbing systems.
- E. Terminate feeder and branch circuit insulated equipment grounding conductors with grounding lug, bus, or bushing.
- F. Connect grounding electrode conductors to 1-inch diameter or greater, metallic cold water pipe using a suitably sized ground clamp. Provide connections to flanged piping at street side of flange.
- G. Connect building reinforcing steel, building steel beam, building steel roof and walls and duct bank and vault reinforcing steel to ground mat using No. 4/0 AWG bare copper grounding cable.
- H. Bond bare No. 4/0 AWG grounding cable in duct banks to grounding cable in vaults and to power equipment ground bus at ends of each duct bank.
- I. Bond strut and other metal inside of electrical manholes and vaults to bare No. 4/0 AWG grounding cable carried in duct bank.
- J. Bond grounding cables to both ends of metal conduit or sleeves through which such cables pass.
- K. Tighten grounding and bonding connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque-tightening values for connectors and bolts. Where manufacturer's torquing requirements are not indicated, tighten connections to comply with tightening torque values specified in UL 486A to assure permanent and effective grounding.

LIFT STATION TECHNICAL SPECIFICATION

- L. Install braided type bonding jumpers with code-sized ground clamps on water meter piping to electrically bypass water meters.
- M. Route grounding connections and conductors to ground and protective devices in shortest and straightest paths as possible while following building lines to minimize transient voltage rises. Protect exposed cables and straps where subject to mechanical damage.
- N. Apply corrosion-resistant finish to field connections, buried metallic grounding and bonding products, and places where factory applied protective coatings have been destroyed and are subjected to corrosive action.

3.02 FIELD QUALITY CONTROL

- A. Upon completion of installation of electrical grounding and bonding systems, test ground resistance with ground resistance tester using the 3-point fall of potential method. Testing shall be performed during normal dry weather conditions with at least 5 non-rain days elapsing prior to test. Where tests show resistance-to-ground is over 5 ohms, take appropriate action to reduce resistance to 5 ohms or less by driving additional ground rods; then retest to demonstrate compliance.

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 16070 - SUPPORTING DEVICES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Secure support from the building structure for electrical items by means of hangers, supports, anchors, sleeves, inserts, seals, and associated fastenings.

1.02 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:
1. Product data for each type of product specified.

1.03 QUALITY ASSURANCE

- A. Electrical components shall be listed and labeled by UL, ETL, CSA, or other approved, nationally recognized testing and listing agency that provides third-party certification follow-up services.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:
1. Slotted Metal Angle and U-Channel Systems:
 - a. Allied Tube & Conduit.
 - b. American Electric.
 - c. B-Line Systems, Inc.
 - d. Cinch Clamp Co., Inc.
 - e. GS Metals Corp.
 - f. Haydon Corp.
 - g. Kin-Line, Inc.
 - h. Unistrut Diversified Products.
 2. Conduit Sealing Bushings:
 - a. Bridgeport Fittings, Inc.
 - b. Cooper Industries, Inc.
 - c. Elliott Electric Mfg. Corp.
 - d. GS Metals Corp.
 - e. Killark Electric Mfg. Co.
 - f. Madison Equipment Co.
 - g. L.E. Mason Co.
 - h. O-Z/Gedney.
 - i. Producto Electric Corp.
 - j. Raco, Inc.
 - k. Red Seal Electric Corp.
 - l. Spring City Electrical Mfg. Co.
 - m. Thomas & Betts Corp.

LIFT STATION TECHNICAL SPECIFICATION

2.02 COATINGS

- A. Coating: Supports, support hardware, and fasteners shall be protected with zinc coating or with treatment of equivalent corrosion resistance using approved alternative treatment, finish, or inherent material characteristic. Products for use outdoors, in NEMA 4 areas, or embedded in concrete shall be hot-dip galvanized.

2.03 MANUFACTURED SUPPORTING DEVICES

- A. Raceway Supports: Clevis hangers, riser clamps, conduit straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring steel clamps.
- B. Fasteners. Types, materials, and construction features as follows:
 - 1. Expansion Anchors: Carbon steel wedge or sleeve type.
 - 2. Toggle Bolts: Steel springhead type.
 - 3. Hanger Rods: 0.375-inch diameter minimum, steel.
- C. Conduit Sealing Bushings: Factory fabricated, watertight conduit sealing bushing assemblies suitable for sealing around conduit or tubing passing through concrete floors and walls. Construct seals with steel sleeve, malleable iron body, neoprene sealing grommets or rings, metal pressure rings, pressure clamps, and cap screws.
- D. Cable Supports for Vertical Conduit: Factory fabricated assembly consisting of threaded body and insulating wedging plug for nonarmored electrical cables in riser conduits. Provide plugs with number and size of conductor gripping holes as required to suit individual risers. Construct body of malleable iron casting with hot-dip galvanized finish.
- E. U-Channel Systems: 12 gauge or 0.105-inch-thick steel channels, with 9/16-inch-diameter holes, at a minimum of 8 inches on center in top surface. Provide fittings and accessories that mate and match with U-channel and are of same manufacturer.

2.04 FABRICATED SUPPORTING DEVICES

- A. Shop- or field-fabricated supports or manufactured supports assembled from U-channel components.
- B. Steel Brackets: Fabricated of angles, channels, and other standard structural shapes. Connect with welds and machine bolts to form rigid supports.
- C. Pipe Sleeves: Provide a waterstop on pipe sleeves. Provide pipe sleeves of 2 standard sizes larger than conduit/pipe passing through it and of one of the following:
 - 1. Sheet Metal: Fabricate from galvanized sheet metal; round tube closed with snaplock joint, welded spiral seams, or welded longitudinal joint. Fabricate sleeves from the following gauge metal for sleeve diameter noted:
 - a. 3-inch and smaller: 20-gauge.
 - b. 4-inch to 6-inch: 16-gauge.
 - c. Over 6-inch: 14-gauge.
 - 2. Steel Pipe: Fabricate from Schedule 40 galvanized steel pipe.
 - 3. Plastic Pipe: Fabricate from Schedule 80 PVC plastic pipe

LIFT STATION TECHNICAL SPECIFICATION

PART 3 - EXECUTION

NOT USED

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 16075 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Identification of electrical materials, equipment, and installations. It includes requirements for electrical identification components including, but not limited to, the following:
1. Buried electrical line warnings.
 2. Identification labeling for cables and conductors.
 3. Operational instruction signs.
 4. Warning and caution signs.
 5. Equipment labels and signs.

1.02 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:
1. Product Data for each type of product specified.

PART 2 - PRODUCTS

2.01 ELECTRICAL IDENTIFICATION PRODUCTS

- A. Colored Adhesive Marking Tape for Wires and Cables: Self-adhesive, vinyl tape not less than 3 mils thick by 1 inch to 2 inches in width.
- B. Pre-tensioned Flexible Wraparound Colored Plastic Sleeves for Cable Identification: Flexible acrylic bands sized to suit raceway diameter and arranged to stay in place by pre-tensioned gripping action when coiled around the cable.
- C. Underground Line Marking Tape: Permanent, bright colored, continuous printed, plastic tape compounded for direct-burial service not less than 6 inches wide by 4 mils thick. Printed legend indicative of general type of underground line below.
- D. Wire/Cable Designation Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound, cable/conductor markers with pre-printed numbers and letter.
- E. Aluminum, Wraparound Cable Marker Bands: Bands cut from 0.014-inch-thick aluminum sheet, fitted with slots or ears for securing permanently around wire or cable jacket or around groups of conductors. Provide for legend application with stamped letters or numbers.
- F. Engraved, Plastic Laminated Labels, Signs, and Instruction Plates: Engraving stock melamine plastic laminate, 1/16 inch minimum thick for signs up to 20 square inches or 8 inches in length; 1/8-inch thick for larger sizes. Engraved legend in white letters on black face and punched for mechanical fasteners.

LIFT STATION TECHNICAL SPECIFICATION

- G. Baked Enamel Warning and Caution Signs for Interior Use: Pre-printed aluminum signs, punched for fasteners, with colors, legend, and size appropriate to the location.
- H. Exterior Metal-Backed Butyrate Warning and Caution Signs: Weather-resistant, nonfading, preprinted cellulose acetate butyrate signs with 20-gauge galvanized steel backing, with colors, legend, and size appropriate to location. Provide 1/4-inch grommets in corners for mounting.
- I. Fasteners for Plastic Laminated and Metal Signs: Self-tapping stainless steel screws or Number 10/32 stainless steel machine screws with nuts and flat and lock washers.
- J. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking nylon cable ties, 0.18 inch minimum width, 50-pound minimum tensile strength, and suitable for a temperature range from minus 50 to 350 degrees F. Provide ties in specified colors when used for color coding.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Lettering and Graphics: Coordinate names, abbreviations, colors, and other designations used in electrical identification Work with corresponding designations specified or indicated. Install numbers, lettering, and colors as approved in submittals and as required by Code.
- B. Underground Electrical Line Identification: During trench backfilling for exterior nonconcrete encased underground power, signal, and communications lines, install continuous underground plastic line marker located directly above line at 6 to 8 inches below finished grade. Where multiple lines installed in a common trench, do not exceed an overall width of 16 inches; install a single line marker.
- C. Install line marker for underground wiring, both direct buried and in raceway.
- D. Conductor Color Coding: Provide color coding for secondary service, feeder, and branch circuit conductors throughout the Project secondary electrical system following OWNER's method of phase identification or as follows:
 - 1. 480/277 Volt, 3-Phase Power:
 - a. Brown.
 - b. Orange.
 - c. Yellow.
 - d. Grey Neutral.
 - 2. 208 Volt, 3-Phase Power:
 - a. Black.
 - b. Red.
 - c. Blue.
 - 3. 240/120 Volt, 1-Phase Power:
 - a. Black.
 - b. Red.
 - c. White Neutral.
 - 4. Motor Leads, Control Cabinet/MCC:
 - a. Black, numbered L1-T1, etc.
 - 5. Control Wiring:

LIFT STATION TECHNICAL SPECIFICATION

- a. Red Control circuit wiring that is de-energized when the main disconnect is opened.
 - b. Yellow Control circuit wiring that remains energized when the main disconnect is opened.
 - c. Blue DC.
 - d. Green Ground.
- E. Use conductors with color factory applied entire length of conductors except as follows:
- 1. The following field applied color coding methods may be used in lieu of factory-coded wire for sizes larger than No. 10 AWG.
 - a. Apply colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last 2 laps of tape with no tension to prevent possible unwinding. Use 1-inch-wide tape in colors as specified. Do not obliterate cable identification markings by taping. Tape locations may be adjusted slightly to prevent such obliteration.
 - b. In lieu of pressure-sensitive tape, colored cable ties may be used for color identification. Apply 3 ties of specified color to each wire at each terminal or splice point starting 3 inches from the terminal spaced 3 inches apart. Apply with a special tool or pliers, tighten for snug fit, and cut off excess length.
- F. Power Circuit Identification: Securely fasten identifying metal tags of aluminum wraparound marker bands to cables, feeders, and power circuits in vaults, pull boxes, junction boxes, manholes, and switchboard rooms with 1/4-inch steel letter and number stamps with legend to correspond with designations on Drawings. If metal tags are provided, attach them with approximately 55-pound test monofilament line or one-piece self-locking nylon cable ties.
- G. Install wire/cable designation tape markers at termination points, splices, or junctions in each circuit. Circuit designations shall be as indicated on Drawings.

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 16120 - WIRES AND CABLES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes the following:
 - 1. Low-Voltage Wire and Cable.
 - 2. Instrument Cable.
 - 3. Local Area Network Wiring (LAN).

1.02 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section. Include Shop Drawings of wires, cables, connectors, splice kits, and termination assemblies.
- B. Reports of field tests prepared as noted in Section 01600.

1.03 QUALITY ASSURANCE

- A. UL Compliance: Provide components which are listed and labeled by UL. For cables intended for use in air handling space comply with applicable requirements of UL Standard 710, "Test Method for Fire and Smoke characteristics of cables used in Air Handling Spaces."
- B. NEMA/ICEA Compliance: Provide components which comply with following standards:
 - 1. NEMA WC 70-1999/ICEA S-95-658-1999, Nonshielded Power Cables Rated 2,000 Volts or Less for the Distribution of Electrical Energy.
- C. IEEE Compliance: Provide components which comply with the following standard.
 - 1. Standard 82, Test procedures for Impulse Voltage Tests on Insulated Conductors.
- D. Network Wiring Experience: CONTRACTOR must be able to prove to the satisfaction of OWNER that it has significant experience in the installation of Local Area Network cable systems. Installation must include installation of Network cable, cable termination, knowledge of interconnect equipment, and a thorough knowledge of testing procedures.
- E. Labeling: Handwritten labels are not acceptable. All labels shall be machine printed on clear or opaque tape, stenciled onto adhesive labels, or typewritten onto adhesive labels. The font shall be at least 1/8 inch in height, block characters, and legible. The text shall be of a color contrasting with the label such that it may be easily read. If labeling tape is utilized, the font color shall contrast with the background. Patch panels shall exhibit workstation numbers or some type of location identifier, in sequential order, for all workstations or devices attached. Each Network cable segment shall be labeled at each end with its respective identifier.
- F. Network Wiring Interconnect Equipment (Patch Panels): Interconnect equipment shall be used in all Local Area Network cable installations. Patch panels shall be mounted in the equipment racks or panel mounted. Interconnect equipment mounted in racks shall be affixed to the rack by at least 4 screws. All interconnect devices shall be assembled and installed in accordance with the manufacturer's instructions and recommendations.

LIFT STATION TECHNICAL SPECIFICATION

G. Patch Cords: Patch cords shall be provided for each Local Area Network port on the patch panel. Patch cords shall meet or exceed technical specifications of all installed Local Area Network cable. Patch cord connectors shall be matched with patch panel connector type and network module connector type as required.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:
1. Low-Voltage Wire and Cable:
 - a. American Insulated Wire Corp.
 - b. General Cable.
 - c. The Okonite Co.
 - d. Southwire Co.
 2. Connectors for Low-Voltage Wires and Cable Conductors:
 - a. AMP.
 - b. O-Z/Gedney Co.
 - c. Square D Company.
 - d. 3M Company.
 3. Instrument Cable:
 - a. Belden (Trade Nos. 1120A and 1118A).
 4. Local Area Network Cable:
 - a. Belden 7882A/7883A, or equal.

2.02 LOW-VOLTAGE WIRES AND CABLES

- A. Conductors: Provide stranded conductors conforming to ASTM Standards for concentric stranding, Class B. Construction of wire and cable shall be single conductor (1/c) unless multiconductor cable is shown by notation in form (x/c) where x indicates the number of separate insulated conductors per cable.
- B. Conductor Material: Copper. Minimum size power wire shall be No. 12 AWG.
- C. Insulation: Provide XHHW insulation for power
1. Provide XHHW insulation for grounding conductors installed in raceways.
 2. Provide THHN/THWN insulation for control conductors.

2.03 CONNECTORS FOR LOW-VOLTAGE WIRES AND CABLES

- A. Provide UL listed factory fabricated, solderless metal connectors of sizes, ampacity ratings, materials, types, and classes for applications and services indicated. Use connectors with temperature ratings equal to or greater than those of the wires upon which used.

2.04 INSTRUMENT CABLE

LIFT STATION TECHNICAL SPECIFICATION

- A. Instrument Cable: 600 volt minimum insulated shielded cable with two or more twisted No. 16 or No. 18AWG stranded copper conductors; PVC, nylon, or polyethylene outer jacket; and 100 percent foil shielding.

2.05 LOCAL AREA NETWORK CABLE

- A. Category 6 (Ethernet) Data and Patch Cable:
1. Paired, 4-pair, 24 AWG, solid bare copper conductors with polyethylene insulation, overall aluminum foil-polyester tape shield with 24 AWG stranded tinned copper drain wire, 100 percent shield coverage, PVC jacket.
 2. UL verified to Category 6.
 3. Provide plenum rated cable where installed exposed.

PART 3 - EXECUTION

3.01 FIELD QUALITY CONTROL

- A. Local Area Network (LAN) Cable Tests: Testing of all cable segments shall be completed in compliance with EIA/TIA-568-B.1 Standards. Testing shall be done by CONTRACTOR with at least 5 years of experience in testing Network cabling systems.
1. TESTING: CONTRACTOR shall test each network cable segment. **OWNER reserves the right to have representation present during all or a portion of the testing process. CONTRACTOR must notify OWNER 5 days prior to commencement of testing.** If OWNER elects to be present during testing, test results will only be acceptable when conducted in the presence of OWNER.
 2. DOCUMENTATION (Network Cable): CONTRACTOR shall provide documentation to include test results and as-built Drawings. Network Cable Results: Handwritten results are acceptable provided the test is neat and legible. Copies of test results are not acceptable. Only original signed copies will be acceptable.
 - a. Each cable installed shall undergo complete testing in accordance with TIA/EIA-568-B.1 to guarantee performance to this Standard.
 - b. All required documentation shall be submitted within 30 days at conclusion of the project to OWNER.
 - c. Test Criteria: Pass rate to conform to latest TIA/EIA-568-B.1 Standards that incorporate link performance testing through entire path, including cable, couplers, and jumpers.
 3. ACCEPTANCE: Acceptance of the Data Communications System, by OWNER, shall be based on the results of testing, functionality, and receipt of documentation.
- B. Reports (non-LAN cable): Testing organization shall maintain a written record of observations and tests, report defective materials and workmanship, and retest corrected defective items. Testing organization shall submit written reports to ENGINEER.

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 16130 - RACEWAYS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Raceways for electrical wiring. Types of raceways in this Section include the following:
1. Intermediate metal conduit.
 2. Liquidtight flexible conduit.
 3. Rigid metal conduit.
 4. Rigid nonmetallic conduit.
 5. PVC externally coated rigid metal conduit.
 6. Conduit bodies.

1.02 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:
1. Product data for the following products:
 - a. Conduit.
 - b. Conduit bodies.

1.03 QUALITY ASSURANCE

- A. Codes and Standards:
1. NEMA Compliance: Comply with applicable requirements of NEMA standards pertaining to raceways.
 2. UL Compliance and Labeling: Comply with applicable requirements of UL standards pertaining to electrical raceway systems. Provide raceway products and components listed and labeled by UL, ETL, or CSA.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in Work include:
1. Conduit:
 - a. Allied Tube.
 - b. Carlon.
 - c. General Electric Co.
 - d. Johns Manville.
 - e. Occidental Coatings.
 - f. Orangeburg.
 - g. Perma-Cote Industries.
 - h. Republic Steel.
 - i. Robroy Industries.

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- j. Steelduct Co.
- k. Triangle Conduit.
- l. Wheatland Tube.
- m. Youngstown Sheet and Tube.
- 2. Liquidtight Conduit:
 - a. Anamet, Inc.
 - b. Carlon.
 - c. Electric-Flex.
 - d. Thomas and Betts.
- 3. Conduit Bodies:
 - a. Adalet-PLM.
 - b. American Electric.
 - c. Appleton Electric Co.
 - d. Carlon.
 - e. Crouse-Hinds Division, Cooper Industries, Inc.
 - f. Delta Industrial Products.
 - g. Killark Electric Mfg. Co.
 - h. Kraloy Products Co.
 - i. O-Z/Gedney Co.
 - j. Perma-Cote Industries.
 - k. Robroy Industries.
 - l. Spring City Electrical Mfg. Co.
- 4. Conduit Thread Paint:
 - a. CRC Chemicals, USA.
 - b. Sherwin Williams.
 - c. ZRC Chemical Products Co.

2.02 METAL CONDUIT AND TUBING

- A. Rigid Metal Conduit: ANSI C 80.1, hot-dip galvanized.
- B. Intermediate Metal Conduit: UL 1242, hot-dip galvanized.
- C. PVC Externally Coated Rigid Metal Conduit and Fittings: ANSI C 80.1 and NEMA RN 1., Type 40, 40 mil nominal coating and thickness. The bond of the PVC to the substrate shall be stronger than the tensile strength of the PVC.
- D. Liquidtight Flexible Metal Conduit and Fittings: UL 360. Fittings shall be specifically approved for use with this raceway.

2.03 NONMETALLIC CONDUIT AND DUCTS

- A. Rigid Nonmetallic Conduit (RNC): NEMA TC 2 and UL 651, Schedule 40 or 80 PVC.
- B. PVC Conduit and Tubing Fittings: NEMA TC 3; match to conduit or conduit/tubing type and material.

2.04 CONDUIT BODIES

LIFT STATION TECHNICAL SPECIFICATION

- A. Provide matching gasketed covers secured with corrosion-resistant screws. Use cast covers in NEMA 4 areas and stamped steel covers in NEMA 1 and 12 areas. Use nonmetallic covers in NEMA 4X areas and threaded, ground joint covers in NEMA 7 and NEMA 9 areas.

- B. Metallic Conduit and Tubing: Use metallic conduit bodies as follows:
 - 1. Rigid Metal Conduit: Use cast or malleable iron conduit bodies with zinc electroplating, aluminum enamel or lacquer finish, and threaded hubs.
 - 2. Intermediate Metal Conduit: Use cast or malleable iron conduit bodies with zinc electroplating, aluminum enamel or lacquer finish, and threaded hubs.
 - 3. PVC Externally Coated Rigid Metal Conduit: Use hot-dipped galvanized or cadmium-plated cast or malleable iron conduit bodies with threaded hubs factory PVC-coated. Field application of PVC coating to conduit bodies is not acceptable. Secure covers using PVC encapsulated or stainless steel screws.
 - 4. Nonmetallic Conduit and Tubing: Use nonmetallic conduit bodies conforming to UL 514 B.
 - 5. NEMA 7 and NEMA 9 Areas: Use materials conforming to UL standards for the area.

PART 3 - EXECUTION

NOT USED

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 16135 - CABINETS, BOXES, AND FITTINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Cabinets, boxes, and fittings for electrical installations and certain types of electrical fittings not covered in other Sections. Types of products specified in this Section include:

1. Pull and junction boxes.
2. Terminal boxes.
3. Bushings.
4. Locknuts.
5. Conduit hubs.

1.02 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:

1. Shop Drawings for floor boxes and boxes, enclosures, and cabinets that are to be shop-fabricated, (nonstock items). For shop-fabricated junction and pull boxes, show accurately scaled views and spatial relationships to adjacent equipment. Show box types, dimensions, and finishes.
2. Product data for boxes, fittings, cabinets, and enclosures.

1.03 QUALITY ASSURANCE

A. Codes and Standards:

1. UL Listing and Labeling: Items provided under this section shall be listed and labeled by UL.
2. NEMA Compliance: Comply with NEMA Standard 250, "Enclosures for Electrical Equipment (1,000 Volts Maximum)."

LIFT STATION TECHNICAL SPECIFICATION

SECTION 16151 - VARIABLE FREQUENCY DRIVE UNIT

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Provide complete simplex type variable frequency drive (VFD) units and appurtenances including drive reactors, DC chokes, harmonic filters, enclosures, and certain auxiliary items, as indicated and as specified, to provide a complete operating system.
- B. Variable frequency drive unit shall be furnished, installed and electrically connected by the electrical subcontractor.
- C. VFD units shall be manufacturer's standard technology and in production for a minimum of 2 years.
- D. Provide control system operation, input and control signals, status signals and devices in accordance with Division 13.
- E. Provide Underwriter's Laboratories listed drive components where applicable.
- F. Provide VFD output filter or reactor, when cable length between VFD and motor is greater than 20 feet, to insure motor terminals do not experience overvoltage condition as defined by NEMA Standard MG-1, section 30.02.2.9.
- G. Each VFD unit to be provided is to exhibit less than 5% voltage total harmonic distortion and less than 3% voltage distortion on each harmonic at their immediate upstream distribution bus as verified by calculation and testing. Harmonic current distortion to be in accordance with Table 2.02A. This bus to be referred to as the point of common coupling (PCC).

1.02 RELATED WORK:

- A. Division 1: General Requirements

1.03 REFERENCES:

- A. Underwriter's Laboratories Inc. (U.L.):
 - 1. UL-508 Electrical Industrial Control Equipment.
- B. National Electrical Manufacturers Association (NEMA): MG 1.
- C. National Fire Protection Association (NFPA):
 - 1. NFPA-70 National Electric Code.

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1.04 SUBMITTALS:

- A. Shop Drawings: Submit the following in accordance with Section 01340 – Shop Drawings and Submittals:
1. Shop Drawings: Provide a complete list of equipment components, and materials, including manufacturer's descriptive and technical literature, and catalog cuts. Provide complete wiring, system interconnection and schematic diagrams for the equipment and controls furnished including external interlocked and controlled components, equipment layout, time versus current curves for protective devices and any other details required to demonstrate that the system and the required external controls has been coordinated and will properly function as designed.
 - a. Provide data to verify that drives can be used for motor lead lengths up to 100 feet without output filters. Include information from the VFD manufacturer or output filter or reactor manufacturer (if required) stating that the motor terminal voltage limitations as defined by NEMA Standard MG-1, section 31.40.4.2, are met. For VFD's located more than a cable length of 100 feet from the motor load provide output filter or reactor at VFD.
 - b. Provide enclosure drawings and details showing all dimensions and construction details.
 2. Submit information relative to location and expertise of local service office and personnel.
 3. For informational purposes only, provide installation and anchoring details to meet earthquake requirements as specified and indicated on structural drawings.
 4. For informational purposes only, submit manufacturer's printed installation instructions.
 5. Spare Parts Data: Submit a list of spare parts for the equipment specified.
 6. Operating and Maintenance Instruction Manuals:
 - a. Furnish:
 - (1) Operating instruction manuals outlining step-by-step procedures required for system startup and operation.
 - (2) Manufacturer's name, model number, service manual parts list.
 - (3) Brief description of equipment and basic operating features.
 - (4) Maintenance instruction manuals outlining maintenance procedures.
 - (5) Troubleshooting guide listing possible breakdown and repairs.
 - (6) Point-to-point connection wiring diagram for the system.
 - (7) Performance Test Reports: Upon completion of installed system, submit in booklet form all shop and field tests performed to prove compliance with specified performance criteria.

1.05 QUALITY ASSURANCE:

- A. Ensure that conduit size and wire quantity, size, and type are suitable for the equipment supplied. Coordinate all design information with the Electrical Contractor. Review the proper installation of each type of VFD unit with the equipment supplier prior to installation.

LIFT STATION TECHNICAL SPECIFICATION

1. Services of Service Engineer, specifically trained on type of equipment specified. Man-day requirements listed exclusive of travel time.
 - a. Assist in location of devices, methods of mounting, field erection, etc.
1 man-day.
 - b. Start-up and testing.
3 man-day.
 - c. At the end of start-up service provide for a maximum of six members of the owners staff at the facility site to receive training from the startup/testing service Engineer.
1 man-day.
 - d. Service-inspections during first year of operation, for use at Owner's request, and exclusive of repair, malfunction or other trouble-shooting service calls:
2 man-day.
 - e. Man-day is defined as one 8-hour day, excluding travel time.

1.06 DELIVERY, STORAGE AND HANDLING:

A. Shipping:

1. Ship equipment and materials, except where partial disassembly is required by transportation regulations or for protection, complete with identification and quantity of items.
2. Pack spare parts in containers bearing labels clearly designating contents and pieces of equipment for which intended.
3. Deliver spare parts after installation but as specified before start-up of drives. Deliver to Owner after completion of work.

B. Storage:

1. Inspect and inventory items upon delivery to site.
2. Store and safeguard equipment, material and spare parts.

1.07 WARRANTY AND SERVICE:

- A. Provide in accordance with Section 01740 and as specified.
- B. Guarantee components, parts, and assemblies supplied by manufacturer against defects in materials and workmanship for a period of 24 months after turning the equipment over to the Owner, and in this time period include onsite, parts and labor warranty. All labor to be performed by local factory trained service engineers.
- C. Ensure that equipment manufacturer has local branch office staff with trained, full-time employees who are capable of performing testing, inspecting, repair, and maintenance services.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

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- A. Manufacturer shall have at least five years commercial experience in the manufacture, operation and servicing of equipment of type, size, quality, performance, and reliability equal to that specified.

- B. Variable Frequency Drive Units:
 - 1. Allen Bradley.
 - 2. Square D Company.
 - 3. ABB
 - 4. Danfoss
 - 5. Siemens
 - 6. Or acceptable equivalent product.

- C. VFD Input Filters and Output Filters/Reactors:
 - 1. Trans-Coil, Inc.
 - 2. MTE Corporation.
 - 3. Power Quality International.
 - 4. Or acceptable equivalent product.

2.02 PROVISIONS:

- A. Service Conditions:
 - 1. Ambient Temperature Range: 0 deg. C to 40 deg. C.
 - 2. Operational Humidity: Up to 90 percent non-condensing.
 - 3. Environment: Enclosure NEMA 12.
 - 4. Altitude: Below 3,300 ft. above sea level.
 - 5. Input Power:
 - a. Nominal voltage - 460 volts (plus 10 percent or minus 10 percent), 3-phase, 3 wire
 - b. Nominal Frequency - 60 Hertz (plus or minus 2 Hz.)
 - c. Service provided from feeder breaker on distribution bus.

- B. Drive System: 0-500 HP Units
 - 1. General:
 - a. Furnish solid state variable frequency, microprocessor type with Pulse Width Modulated (PWM) output wave form converter. The VFD shall employ a full wave rectifier to prevent input line notching, a DC bus choke, DC bus capacitors and Insulated Gate Bipolar Transistors (IGBT) as the output switching device to convert nominal 480 volts, 3 phase, 60 Hertz, 3 wire input power into adjustable-frequency 3 wire system at 0 to 480 volts, 3 phase, 0 to 60 Hertz output power. Provide output speed control of required motor under variable torque load or constant torque as required by the driven equipment.
 - b. Motor control circuits shall be wired in accordance with the requirements specified herein or indicated on the Drawings. Where not indicated, the control circuits shall be standard two-wire "start-stop" and the Contractor shall furnish wiring accordingly.

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- c. Variable frequency drive manufacturer shall be responsible for the successful application and operation of the entire drive and control system serving the motor and driven equipment. This includes the responsibility for obtaining loads, torque, speed and performance requirements from the respective sources and integrating these into a variable frequency drive system that fulfills the requirements of this Specification.
- d. The Contractor and variable frequency drive system manufacturer are cautioned regarding the review and compliance with the total Contract Documents. Typical examples are circuit breakers, motor circuit protectors, magnetic starters, relays, timers, control and instrumentation products, pilot devices including pushbuttons, selector switches and pilot lights, enclosures, conduit, disconnect switches, terminal boxes, and other equipment.
- e. Provide flux vector control type drives, also known as field-oriented control, with hard-wired motor speed feedback encoder or tachometer, for full torque at zero speed capability.
- e. Provide VFD control which ensures accurate zero to full load torque control at low frequencies, including zero speed, with torque repeatability accuracy of 2% or better and torque response time less than 20 ms.
- f. Provide on drive, a disconnecting device and fixed diode input rectifier (for a constant power factor).
- g. Provide 6 pulse drives with 3% impedance input line reactor.
- h. All components of the drive shall be designed and sized for the abnormal condition of continuous operation of the driven equipment specified herein at loads up to 15% above rated full load.
- i. RMS harmonic output of the drive not to provide more than 5 percent increase in motor heating over similar operation of the motor with zero harmonics in the current.
- j. The unit shall withstand drive output terminal line-to-line and line-to-ground short circuits without component failure during start-up and during operation. Drive to safely shutdown until short is cleared.
- k. NEMA type cabinet for each drive unit, as indicated on drawings and enclosure schedule. NEMA 4 and NEMA 4X enclosures to be provided with stainless steel hand operated quick disconnect devices. Provide hinged acrylic door with gasketing on front of door for each access to keypad controls.
- l. For inverter rated squirrel cage motors, per NEMA Standard MG-1, part 31.40.4.2, the following limit values at the motor terminals are to be observed:
 - (1) For motors with base rating voltage less than or equal to 600 volts, the peak instantaneous voltage must be limited to 1600 volts or less, with a voltage rise time greater than or equal to 0.1 micro-seconds.
- m. The VFD manufacturer shall provide a drive output dV/dT, appropriately rated, located within the VFD enclosure and near the VFD output terminals, which shall ensure that the limitations listed above are maintained. A device located at the motor terminals is not acceptable.
- n. The drive unit shall be of modular design to provide for ease and speed of maintenance.
- o. Drive electronics to be conformal coated.

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- p. Control circuits shall be isolated from power circuits. Unit to accept a 4-20 mA DC speed control signal from an isolated, ungrounded transmitter with unit in remote mode and from local door-mounted manual speed potentiometer or micro-processor type keypad with unit in local mode. The input 4-20 mA signal to be optically isolated from the drive run control circuit. Manual speed potentiometer or keypad controls to have adjustable minimum speed setting of 10 to 80% of full speed and maximum speed setting of 50 to 100% of full speed. The total speed setting to follow a linear time ramp, adjustable from 1-300 seconds for acceleration and deceleration control.
 - q. Provide trap filters for the drive unit to meet the requirements of the harmonic study under paragraph 2.02. Filters shall be provided with contractors and controlled by the VFD to remove them from the line when the drive is not operating. Contractors shall be provided with spare contacts for remote alarm and to energize status lamp at VFD enclosure.
 - r. VFD shall be capable of full rated output when powered by incoming voltage with Total Harmonic Distortion (THD) in excess of 10%.
 - s. Furnish series choke and capacitors on dc bus to reduce ripple in rectifier output and to reduce harmonic distortion reflected into incoming power feeders.
 - t. Properly size enclosure to dissipate heat generated by VFD within limits of specified service conditions. Provide NEMA enclosure type as specified on drawings. Provide integral fans or cooling systems as required by the application. NEMA 4 and 4X type enclosures to use hand-operated locking devices for door closing hardware. Circuit breaker interlocks to be able to be bypassed via lever on front door surface. NEMA 1 type enclosures to have keypad controls located on exterior of enclosure. Provide visual alarm indicator on cabinet door.
2. Performance characteristics:
- a. Output amps: 110 percent of rated, continuous.
 - b. Current limit: Range 0 to 130% for constant torque applications, 0 to 110% for variable torque applications, for 1 minute minimum.
 - c. Acceleration time to top speed, 1-300 seconds, minimum, adjustable.
 - d. Deceleration time from top speed, 1-300 seconds, minimum, adjustable.
 - e. Frequency stability: +/- 0.5% (at 25 degrees C, +/-10 degrees C) after reaching operating temperature.
 - f. Output voltage: Proportional to frequency with low speed boost.
 - g. Combined drive/and filtering efficiency, defined as motor shaft KW divided by VFD input KW, shall meet the following minimum requirements at the specified operating points:
 - (1) 97 percent at 60 Hz VFD output and 100 percent load.
 - (2) 92 percent at 50 Hz VFD output and 60 percent load.
 - h. VFD fundamental power factor shall be 0.98 or higher at all speeds and loads.
 - i. The VFD shall be capable of sustaining continued operation with a 30% dip in nominal line voltage. Output speed may decline only if current limit rating of the VFD is exceeded.

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- j. Losses to be utilized in drive system efficiency calculation shall include the input isolation transformer, harmonic filter and power factor correction if applicable. Auxiliary controls such as internal VFD control boards and cooling fans shall be included in all loss calculations.

3. Drive Protection:

a. General :

- (1) Fault detection and trip circuits shall protect VFD and connected motor against line voltage transients, single-phase, power line overvoltage and undervoltage, output overvoltage and overcurrent, and VFD overtemperature. The VFD shall employ three (3) current limit circuits to provide trip free operation. The slow current regulation limit circuit shall be adjustable to a minimum 125% of the VFD's variable torque current rating. The rapid current regulation limit shall be adjustable to a minimum 170% of the VFD's variable torque current rating. The current switch off limit shall be fixed at a minimum 225% of the VFD's variable torque current rating.

b. Internal Protection: Minimum circuitry as follows:

- (1) Current limiting, fast acting, semiconductor input fuses for protection of internal power semiconductors.
- (2) Instantaneous output overcurrent trip max. - 200 percent.
- (3) DC bus and control circuit transformer fusing.
- (4) Grounded control chassis.
- (5) Under and over voltage trip, 3 phases.
- (6) Motor overload protection, with solid state relays.
- (7) Fault reset push button.
- (8) Line to ground faults.
- (9) Input metal oxide varistor and input line reactor for transient protection.
- (10) VFD overtemperature.

c. Troubleshooting: Diagnostic aids to indicate cause of fault; used to assist in troubleshooting circuit problems. Isolated Form C contacts for remote indication of alarms to include the following:

- (1) Over/under voltage indication.
- (2) Overcurrent trip indication.
- (3) DC bus charged indication.
- (4) Fault detection indication.
- (5) Recycle start indication (to indicate that the unit tried to pick up load for three previous tries and failed).

d. Provide power loss ride through capability which will allow the logic to maintain control due to load inertia without faulting.

e. Provide a programmable automatic restart function which will provide a minimum with time delays between restarts of 3 restarts following a fault condition other than a ground fault, short circuit, internal fault, or user programmable fault condition. Restart type to be programmable for time delay or coasting motor restart.

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- f. For drives units rated 200 hp or more, provide uninterruptable power supply (UPS) to power control circuits and prevent inadvertent trip due to voltage sag conditions. The UPS shall be installed within the drive enclosure. The battery backup time of the UPS shall be a minimum of 5 minutes or as recommended by the VFD manufacturer.

C. Minimum Control Features:

1. LOCAL-REMOTE selection of Start/Stop control.
2. LOCAL/REMOTE selection of Speed Control.
3. Accept a grounded, isolated, 4-20 mA input remote speed control signal from an external device.
4. Provide a 4-20 mA output signal proportion to VFD output frequency for remote speed indication.
5. Provide Ethernet TCP/IP communication module

D. Devices:

1. Provide operating, monitoring or alarm indicating devices, on keypad, with minimum as follows:
 - a. System control selector switch (RUN/OFF/REMOTE) (When in RUN position drive will run).
 - b. System speed control selector switch (LOCAL/REMOTE) (When in LOCAL position, speed controlled by manual speed potentiometer).
 - c. Keypad controls to set speed in manual mode.
 - d. Speed indicating meter in percent speed to indicate speed of the converter powered motor.
 - e. Run time meter.
 - f. Alarm and status lights.

2.01 SPARE PARTS:

- A. Provide in accordance with Section 01730 and as specified.
- B. Provide one spare board or card, three diodes, for each horsepower size drive. Spares will be color-coded or otherwise keyed to their original counterpart such that improper installation of spare cards is impossible. In addition to the cards, the manufacturer shall provide three spares for all expendable items such as pilot lamps, power fuses, and control fuses. Provide one keypad for every three VFD of the same model.

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PART 3 – EXECUTION

3.01 INSPECTION:

- A. Examine VFD location for satisfactory preparation. Check conduits and raceway location for connection to units.
- B. Visually inspect delivered unit(s) and accessories for conformance with specification and drawings.
- C. Verify availability of appropriate pacing signal.
- D. Maintain variable frequency drive in upright position at all times.
- E. Protect variable frequency drive against damage. Store drive in clean, dry environment with temperature and humidity within range as specified by drive manufacturer. Energize space heaters during storage as recommended by manufacturer.

3.02 INSTALLATION:

- A. Erect, install, and start-up equipment.
- B. The VFD's shall be installed as shown on the Drawings and in accordance with the manufacturer's installation instructions.
- C. Install VFD's to allow complete door swing required for component removal. This is specifically required where a VFD is set in the corner of a room.
- D. Factory-trained service personnel, other than sales representatives, shall supervise field installation, inspect, make final adjustments and operational checks, make functional checks of spare parts, and prepare a final report for record purposes. Adjust control and instrument equipment until this equipment has been field tested.

3.03 FIELD TESTING:

- A. Provide in accordance with Section 01650.
- B. Perform testing checkout, and start-up for variable frequency drive equipment under technical direction of manufacturer's service engineer. Under no circumstances energize any portion of the drive system without authorization from manufacturer's technical representative.
- C. Field Tests:
 - 1. Test each drive over the total speed range that it will be required to operate through for the load being driven for a minimum of two hours. Determine for each drive,

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motor, and load combination the following at minimum speed, maximum speed, and at 1/3 and 2/3 points between the minimum and maximum speeds:

- a. Input power (kW), voltage, current and RMS power factor on the line side of the drive isolation device.
 - b. Output to the driven load in kilowatts.
 - c. For each drive, measure the harmonic voltage distortion and harmonic current distortion for each harmonic at the main distribution bus for maximum and minimum load conditions.
 - d. Measure the total harmonic voltage distortion and total harmonic current distortion at each PCC for maximum and minimum load conditions.
2. Test each drive by using the actual control signal for remote and local operation.
 3. Test each driver's alarm functions.
 4. Perform all tests in the presence of the Owner's representative.
 5. Perform the above test in addition to the manufacturer's normal field tests.
 6. Submit final test report with summary comparing field test data with harmonic analysis design calculated values for each drive.

3.04 CONTRACT CLOSEOUT:

- A. Provide in accordance with Section 01700.

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 16231 - STANDBY NATURAL GAS GENERATOR SETS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Extent of natural gas generator set Work as indicated by Drawings and Schedules, and is hereby defined to include, but not by way of limitation:
 - 1. Natural gas engine.
 - 2. Electrical generator.
 - 3. Engine starting system, including batteries, instrument control panel, protective housing, annunciator panel, exhaust silencer, wall thimble, and accessories.

- B. Types of generator sets required for the Project include:
 - 1. Permanent natural gas engine-driven generator.

1.02 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:
 - 1. Product Data: Submit manufacturer's data on natural gas engine-driven generator sets and components.
 - a. Generator dimensions.
 - b. Generator weight.
 - c. Generator rating.
 - d. Alternator rating.
 - e. Generator starting system data:
 - 1) Battery size and ratings.
 - 2) Charging system capacity.
 - 3) Battery heater data.
 - 4) Battery warranty.
 - f. Generator control panel data:
 - 1) Layout.
 - 2) Wiring diagrams.
 - 3) Control interconnection.
 - 4) Instrumentation.
 - g. Exhaust system data:
 - 1) Muffler size.
 - 2) Decibel reduction curve.
 - 3) Fuel system data.
 - h. Cooling system data:
 - 1) Radiator capacity.
 - 2) Cooling reduction capacity.
 - i. Enclosure data:
 - 1) Materials.
 - 2) Size.
 - 3) Assembly/disassembly instructions.
 - 4) Door locations.
 - 5) Noise reduction.
 - j. Warranty data.

LIFT STATION TECHNICAL SPECIFICATION

- k. Accessory and miscellaneous equipment.
2. Wiring Diagrams: Submit wiring diagrams for natural gas engine-driven generator units showing connections to electrical power panels, feeders, and ancillary equipment. Differentiate between portions of wiring that are manufacturer installed and portions that are field installed.
3. Agreement to Maintain: Prior to time of final acceptance, Installer shall submit 4 copies of an agreement for continued service and maintenance of natural gas engine-driven generator sets for OWNER's possible acceptance. Offer terms and conditions for furnishing parts and providing continued testing and servicing, including replacement of materials and equipment, for 1-year period with option for renewal of Agreement by OWNER.
4. Certifications: Provide natural gas engine-driven generator sets certified test record of the following final production testing:
 - a. Single-step load pickup.
 - b. Transient and steady state governing.
 - c. Safety shutdown device testing.
 - d. Voltage regulation.
 - e. Rated power.
 - f. Maximum power.
 - g. Provide certified test record prior to engine-driven generator set being shipped from factory to Project location.

1.03 QUALITY ASSURANCE

- A. Codes and Standards:
 1. NFPA Compliance: Comply with applicable requirements of NFPA 37, "Installation and Use of Stationary Combustion Engines and Gas Turbines," NFPA 99, "Standard for Health Care Facilities," and NFPA 101, "Code for Safety to Life from Fire in Buildings and Structures."
 2. UL Compliance: UL 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors;" UL 2200, "Standard for Safety for Stationary Engine Generator Assemblies," rated 600 volts or less.
 3. ANSI/NEMA Compliance: Comply with applicable requirements of ANSI/NEMA MG1, "Motors and Generators," and MG2, "Safety and Use of Electric Motors and Generators."
 4. IEEE Compliance: Comply with applicable portions of IEEE Standard 446, "IEEE Recommended Practice for Emergency and Standby Power Systems for Industrial and Commercial Applications."
- B. Warranty: Submit in accordance with requirements of Section 01770, warranties covering the items included under this Section. Unit shall be provided with a full factory warranty of 2 years from date of ENGINEER's acceptance.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:
 1. Standby Natural Gas Generator Sets:
 - a. Caterpillar.
 - b. Cummins.
 - c. Detroit Diesel.
 - d. Generac.

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- e. Kohler Co.
- f. Peninsular Diesel, Inc.

2.02 GENERATOR SETS

- A. Except as otherwise indicated, provide manufacturer's standard natural gas engine-driven generator set and auxiliary equipment as indicated by published product information and as required for a complete installation. Generator set shall be rated to continuously power the total accumulated load and starting load shown on Schedule at 100 degrees F ambient temperature and at altitude where installed.
- B. Natural Gas Engine: Provide a 4-cycle, spark ignition type engine for operation on a commercial grade of natural gas such as that furnished by Consumers Energy Co. or MichCon Gas Co. Engine operating speed shall not exceed 1,800 rpm and shall be controlled by a governor to maintain alternator frequency within plus or minus 3 hertz of 60 hertz from no load to full load. Frequency shall recover to steady-state tolerance within 5 seconds after application of 90 percent rated load.
- C. Starting System: Provide engine-generator unit with 12 or 24 volt negative ground starting system, including positive engagement solenoid shift-starting motor, batteries, and 35 ampere or greater automatic battery charging alternator with solid-state voltage regulator. Mount batteries in a plastic-or epoxy-coated metal platform near the starter but not on the generator, and coat battery terminals with an anti-oxidant. Generator sets rated 150 kW or less shall have a battery rated 650 amperes cold cranking at 0 degree F and 170 minutes reserve capacity by SAE Standard J-537. Larger generators shall have a battery rated either 220 ampere-hours or 900 amperes cold cranking and 430 minutes reserve capacity. Batteries shall have a 12-month full warranty and 60-month prorated warranty.
- D. Battery Charger: Provide a solid-state current limiting, float-type battery charger with 5 ampere minimum capacity. Charger shall operate from 120 volt AC single phase, 60 hertz power and shall automatically keep batteries at full charge. Equip charger with ammeter and voltmeter.
- E. Alternator: Provide a single bearing, brushless, self-excited alternator with inherently regulated rotating rectifier exciter system or a revolving field design with a temperature compensated solid-state voltage regulator. Connect the alternator housing directly to the engine flywheel housing. Couple the alternator rotor directly to engine flywheel with a semi-flexible steel disk coupling.
 - 1. Provide windings with Class F insulation with epoxy impregnation and fungus-resistant coating. Temperature rise shall be as defined in NEMA Standard MG1-22.40.
 - 2. The alternator shall be capable of starting load given on Schedule with 35 percent maximum instantaneous voltage dip. Recovery to stable equation within plus or minus 5 percent of rated voltage shall occur within 3 seconds.
- F. Engine Cooling Radiator: Provide a complete engine cooling system equipped with a radiator and blower type fan sized to maintain safe operation, 190 degrees F engine outlet water temperature at 100 degrees F maximum ambient temperature. The engine cooling system shall be filled with a solution of 50 percent ethylene glycol. On indoor mounted units, radiator shall be equipped with a duct adapter flange. An air duct with flexible connecting sections shall be provided between radiator duct flange and exhaust damper.
- G. Instrument Control Panel: Provide engine-generator unit with engine oil pressure and water temperature indicators, reset circuit breaker, static voltage regulator, voltage-adjusting rheostat, voltmeter, ammeter with phase selector switch with OFF position, and running time indicator and frequency meters. Select circuitry of plug-in design, capable of quick replacement and accepting a

LIFT STATION TECHNICAL SPECIFICATION

plug-in device which allows maintenance to test control panel performance without operating the engine.

1. Provide a cranking limiter to open starting circuit in 45 to 90 seconds if engine has not started within that time, or after a series of 3 or more cranking intervals separated by 2 or more rest periods.
2. Provide engine safety devices to shut unit down on high engine temperature, low oil pressure, overspeed, and overcrank. Provide for each of these conditions, an alarm light and unpowered, normally open contact for remote use. Provide an audible alarm with silence switch which is activated by any alarm condition.
3. Provide a relay with 2 normally open and 2 normally closed contacts rated 5A at 120 volts AC and which is energized when unit is running. Wire these contacts to terminal strips for remote use.
4. Provide a RUN-OFF-AUTO switch. In AUTO position, unit shall start when a remote contact closes and stop when contact opens. In RUN position, unit shall start and run until OFF position is selected.
5. Mount instrument control panel on unit such that it is isolated from generator set vibration.

2.03 PERMANENT ENGINE-GENERATOR SET ACCESSORIES

- A. Enclosure: Engine-generator set shall be enclosed in a heavy gauge reinforced sheet steel, weather-protective housing, which allows ample air flow around unit for proper operation. Housing shall be factory attached to generator set mounting base and radiator cowling. Provide removable panels on each side complete with lockable doors. A hinged and lockable door shall be provided over instrument panel.
 1. When this enclosure is specified for an outdoor permanent or a portable unit, the temperature specifications for unit shall be -20 to 120 degrees F with ambient air at radiator intake being 100 degrees F maximum.
- B. Sound Attenuation: Enclosure shall be insulated to attenuate sound and include sound attenuating features that direct radiant cooling air in a route to minimize ambient noise when generator is running. Enclosure shall reduce noise by 8 dBA minimum.
- C. Fuel System: Provide unit with all necessary fuel supply lines. Fuel lines shall be furnished pre-assembled to unit. Fuel shut-off valve shall be closed when the engine is not running. Provide flexible connections at engine for all gas lines. Interconnecting lines from gas line to engine will be provided by others.
- D. Coolant Heater: Provide an engine coolant heater of voltage indicated on Schedule, with thermostatic controls to maintain engine coolant at proper temperature to fulfill start-up requirements of NFPA 99.
- E. Inlet and Exhaust Systems: Silencers and exhaust ducting to silencers shall be self-supporting when assembled. Provide all necessary supporting members for ductwork between silencer and outlet. Provide all required cutting as shown on Drawings and noted herein. The unit shall be complete with raincap. All exhaust ducts shall be Schedule 10 steel pipe minimum. Inlet silencer and filter to be self-supporting. Provide necessary supports for all intake ductwork. All intake ducts shall be Schedule 10 steel pipe minimum.
 1. Provide bellows sections, insulated wall thimbles, and inlet and outlet flexible section as shown on Drawings. Design of exhaust silencer and stack including all ducting shown shall have a pressure drop not exceeding 5 inches of water.

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2. Provide a silencer which meets sound standards of a critical area. Silencer shall provide attenuation (input to output) of 25 dB or greater at frequencies of 125 hertz to 8 kilohertz. A curve shall be submitted with Shop Drawings showing attenuation (input to output) in dB versus frequency. Curve shall be on manufacturer's standard data sheet or from an independent test lab. A spiral or bellows-type flexible section of pipe shall be installed in the exhaust line between the muffler and engine manifold connection. An insulated thimble section shall be provided where exhaust line passes through roof or wall. Exhaust lines shall be pitched and a condensation trap provided at nondraining low points in line.
- F. Circuit Breaker: A generator power circuit breaker shall be installed as a manual load circuit interrupter and an automatic overload and short circuit protection device.
1. The circuit breaker shall be a solid-state trip type for all sizes rated 300 amp continuous and larger. Solid-state trip shall include Long-time, Short time, and Instantaneous. Ground fault trip required on breakers 1,000 amps and above.
 2. Trip settings for all breakers shall be selected for the rating of the generator power circuit as indicated on Drawings or on Schedule.

PART 3 - EXECUTION

3.01 INSTALLATION OF NATURAL GAS ENGINE-DRIVEN GENERATOR SETS

- A. Install natural gas engine-driven generator units as indicated, in accordance with equipment manufacturer's written instructions and recognized industry practices to ensure that engine-generator units fulfill requirements. Comply with NFPA and NEMA standards pertaining to installation of engine-generator sets and accessories.
- B. Coordinate with other work, including raceways, electrical boxes and fittings, fuel tanks, piping, and accessories, as necessary to interface installation of engine-generator equipment work with other work.
- C. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque-tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Standards 486A and B and the National Electrical Code.
- D. Install units on steel spring type vibration isolators fastened to an inertia base in accordance with manufacturer's instructions.
- E. Connect fuel piping to generator equipment as indicated, and comply with manufacturer's installation instructions.

3.02 GROUNDING

- A. Provide equipment grounding connections for natural gas engine-driven generator units as indicated. Tighten connections to comply with tightening torques specified in UL Standard 486A to ensure permanent and effective grounding.

3.03 FIELD QUALITY CONTROL

- A. Start-up Testing:

City of Hillsdale
Marion Ellen Pump Station
200-12761-23002

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1. Engage local equipment manufacturer's representative to perform start-up and building load tests upon completion of installation, with ENGINEER in attendance; provide certified test record. Tests are to include the following:
 - a. Check gas pressure, gas supply volume, lubricating oil, and antifreeze in liquid-cooled models for conformity to manufacturer's recommendations under environmental conditions present.
 - b. Test prior to cranking engine for proper operation, accessories that normally function while the set is in a standby mode. Accessories include: engine heaters, battery charger, generator strip heater, remote annunciator.
 - c. Check, during start-up test mode, for exhaust leaks, path of exhaust gases outside the building, cooling air flow, movement during starting and stopping, vibration during running, normal and emergency line-to-line voltage and phase rotation.
 - d. Test, by means of simulated power outage, automatic start-up by remote-automatic starting, transfer of load, and automatic shutdown. Prior to this test, adjust for proper system coordination, transfer switch timers. Monitor throughout the test, engine temperature, oil pressure, battery charge level, generator voltage, amperes, and frequency.
 - e. Upon completion of installation, demonstrate capability and compliance of system with requirements. Where possible, correct malfunctioning units at Site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting. Initial testing and retesting to be at no cost to OWNER.

3.04 PERSONNEL TRAINING

- A. Building Operating Personnel Training: Train OWNER's building personnel in procedures for starting-up, testing, and operating natural gas engine-driven generator sets. In addition, train OWNER's personnel in periodic maintenance of batteries.

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PERMANENT ENGINE-GENERATOR SCHEDULE

Load at starting: 5 HP VFD, 3 kVA load

Load applied after the above
starting load is running: 5 HP VFD

Voltage Starting Type: 480 volt, 3 phase

<u>Accessories</u>	<u>Required</u>	<u>Remarks</u>
Engine Cooling Radiator	x	
Coolant Heater	x	120 volts
Enclosure	x	
Sound Attenuation	x	
Fuel System		NG

Minimum Generator Size: 20 kW*

*Stated minimum does not release CONTRACTOR from successfully completing the load test.

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 16238 - TRANSFER SWITCHES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Types of transfer switches required for the Project and include the following:
1. Automatic transfer.

1.02 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:
1. Product Data: Submit manufacturer's data and installation instructions for electrical power transfer switches.
 2. Wiring Diagrams: Submit wiring diagrams for electrical transfer switches, and associated control diagrams showing connections to prime and alternate power sources, electrical load, and equipment components. Differentiate between portions of wiring that are manufacturer installed and portions that are field installed.

1.03 QUALITY ASSURANCE

- A. Codes and Standards:
1. UL Compliance: Comply with applicable requirements of UL 1008, "Automatic Transfer Switches," and UL 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors." Provide transfer switches and components which are UL listed and labeled.
 2. NEMA Compliance: Comply with applicable requirements of NEMA Standards Pub/Nos. ICS 2, "Industrial Control Devices, Controllers and Assemblies," ICS 6 and 250, pertaining to transfer switches.
 3. NFPA Compliance: Comply with applicable requirements of NFPA 99, "Standard for Health Care Facilities," and NFPA 101, "Code for Safety to Life from Fire in Buildings and Structures," pertaining to transfer switches.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:
1. Automatic Transfer Switches:
 - a. Automatic Switch Co. (ASCO).
 - b. Caterpillar, Inc.
 - c. Cummins.
 - d. Russelectric, Inc.
 - e. Zenith Controls, Inc.

LIFT STATION TECHNICAL SPECIFICATION

2.02 AUTOMATIC TRANSFER SWITCHES

- A. Automatic Transfer Switch: UL listed and 600 volt-rated with amperage rating shown on Drawings and shall be the mechanically held, electrically operated type rated for continuous duty in an unventilated sheet metal enclosure.
- B. Switch shall be double throw, with an off position, having electrical operated normal-emergency positions inherently interlocked mechanically, and with main contacts mechanically attached to a common shaft. Main contacts shall be silver alloy wiping-action type. They shall be protected by arcing contacts.
- C. Switch and Relay Contacts, Coils, Springs, and Control Elements: Removable from front of transfer switch without removal of the switch panels from enclosure and without disconnection of drive linkages or power conductors. Sensing and control relays shall be continuous duty industrial control type with 600 volt, 10 amp rated contacts.
- D. Upon drop in normal voltage of 83-85 percent of rated voltage, and after an override delay of 3 seconds nominal, switch shall start generator and transfer the load to emergency source, provided emergency source voltage and frequency are 90 percent of rated or higher.
- E. Upon rise in normal voltage of 110 - 115 percent of rated voltage, and after an override delay of 3 seconds nominal, switch shall start generator and transfer the load to emergency source, provided emergency source voltage and frequency are 90 percent of rated or higher.
- F. Upon return of normal source voltage for 5 seconds nominal, to 92-95 or 101-105 percent of rated, switch shall retransfer load to normal source after a minimum transfer time or if emergency source fails. Provide a 5- to 60-second adjustable time delay to maintain transfer switch in the "Off" position during transfer to either source.
- G. Sensing relays shall operate without contact chatter or false response when voltage is slowly varied to dropout and pickup levels.
- H. Four auxiliary contacts shall be provided: Two for transfer switch position indicating use, and two auxiliary contacts, one N.O. and one N.C. to operate after completion of the 3-second override delay for starting generator. All auxiliary contacts shall be 600 volt, 10 amp continuous rating.
- I. Accessory devices shall be provided as follows:
 1. Time delay to override harmless power dips and outages. (Inverse time characteristic with voltage.)
 2. Test switch.
 3. Auxiliary contacts (as specified herein).
 4. Selector relay (as specified herein).
 5. Lockout relay (sensitive to voltage and frequency).
 6. Full phase protection with nominal 75-80 percent dropout and 92-95 percent pickup on phase relay.
 7. Adjustable time delay on retransfer to normal source. Minimum retransfer of 2 minutes and maximum of 25 minutes. Built-in circuitry to nullify the retransfer time delay if the emergency source fails and the normal source is available.
 8. Adjustable (10-20 minutes) time delay for running generator unloaded after transfer for cool down.

LIFT STATION TECHNICAL SPECIFICATION

9. Adjustable time delay or delays (5 to 60 seconds) for holding transfer switch in the "Off" position when switching from standby source to normal and normal source to standby.
10. Engine starting contact.
11. Exerciser to exercise generator for 15 minutes every 168 hours. A selector switch shall permit generator to be exercised with or without load.

PART 3 - EXECUTION

NOT USED

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 16270 - TRANSFORMERS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Types of transformers specified, and include the following:
1. Dry-type transformers (lighting transformers).

1.02 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:
1. Product Data: Submit manufacturer's technical product data, including rated kVA, frequency, primary and secondary voltages, percent taps, polarity, impedance and average temperature rise above 40 degrees C ambient temperature, sound level in decibels, and standard published data.
 2. Submit manufacturer's Drawings indicating dimensions and weight loadings for transformer installations.
 3. Wiring Diagrams: Submit wiring diagrams for power distribution transformers.

1.03 QUALITY ASSURANCE

- A. Codes and Standards:
1. NEMA Compliance: Comply with NEMA Standard Pub/Nos. ST 20, "Dry-Type Transformers for General Applications," TR 1, and TR 27.
 2. UL Compliance: Comply with applicable portions of ANSI/UL 506, "Safety Standard for Specialty Transformers. Provide power/distribution transformers and components which are UL listed and labeled.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:
1. Acme Electric Corporation.
 2. Cutler-Hammer.
 3. General Electric Company.
 4. Hevi-Duty Electric Div., General Signal Corp.
 5. Square D Company.

2.02 POWER/DISTRIBUTION TRANSFORMERS

- A. Except as otherwise indicated, provide manufacturer's standard materials and components as indicated by published product information, designed and constructed as recommended by manufacturer, and as required for complete installation.
- B. Dry-Type Distribution Transformers (45 kVA or less): Provide factory assembled, general purpose, air cooled, dry-type distribution transformers where shown; of sizes, characteristics, and rated

LIFT STATION TECHNICAL SPECIFICATION

capacities indicated, single phase, 60 hertz, 10 kV BIL, 4.0 percent impedance, with 480 volts primary and 240/120 volts secondary; or K-rated 13 three-phase, 60 hertz, 10 kV BIL, 4.0 percent impedance with 480-volts delta connection primary and 208/120 volts secondary wye connected. Provide primary winding with 4 taps; 2 to 2-1/2 percent increments above and below full-rated voltage for de-energized tap-changing operation. Insulate with Class 150 or 220 degree C insulation and rate for continuous operation at kVA, and limit transformer temperature rise to maximum of 115 or 150 degrees C, respectively. Provide terminal enclosure, with cover, to accommodate primary and secondary coil wiring connections and electrical supply raceway terminal connector. Equip terminal leads with connectors installed. Limit terminal compartment temperature to 75 degrees C when transformer is operating continuously at rated load with ambient temperature of 40 degrees C. Provide wiring connectors suitable for copper or aluminum wiring. Cushion-mount transformers with external vibration isolation supports; sound-level ratings not to exceed 45 db as determined in accordance with ANSI/NEMA standards. Electrically ground core and coils to transformer enclosure by means of flexible metal grounding strap. Provide transformers with fully enclosed sheet steel enclosures. Apply manufacturer's standard light gray indoor enamel over cleaned and phosphatized steel enclosure. Provide transformers suitable for wall mounting.

- C. Finishes: Coat interior and exterior surfaces of transformer, including bolted joints, with manufacturer's standard color baked-on enamel.

PART 3 - EXECUTION

NOT USED

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 16420 - MOTOR CONTROLLERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Types of motor controllers, including:

1. Fractional HP manual controllers.

1.02 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:

1. Shop Drawings: Submit Shop Drawings of motor controllers showing dimensions and sizes.
2. Product Data: Submit manufacturer's data and installation instructions on motor controllers.
3. Wiring Diagrams: Submit power and control wiring diagrams for motor controllers

1.03 QUALITY ASSURANCE

A. Codes and Standards:

1. UL Compliance: Comply with applicable requirements of UL 486A and B, and UL 508, pertaining to installation of motor controllers. Provide controllers and components which are UL listed and labeled.
2. NEMA Compliance: Comply with applicable requirements of NEMA Standards ICS 2, "Industrial Control Devices, Controllers and Assemblies," and Pub No. 250, "Enclosures for Electrical Equipment (1,000 Volts Maximum)," pertaining to motor controllers and enclosures.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:

1. Allen-Bradley Co.
2. Crouse-Hinds Co.
3. Cutler-Hammer Products/Eaton Corp.
4. Emotron.
5. Furnas Electric Co.
6. General Electric Co.
7. Siemens, Inc.
8. Square D Company.

2.02 MOTOR CONTROLLERS

A. Except as otherwise indicated, provide motor controllers and ancillary components which comply with manufacturer's standard materials, design, and construction in accordance with published product information and as required for a complete installation.

LIFT STATION TECHNICAL SPECIFICATION

- B. Fractional HP Manual Controllers: Provide 3-phase and single-phase fractional horsepower manual motor controllers, of sizes and ratings indicated. Equip with manually operated quick-make, quick-break toggle mechanisms, and with one-piece melting alloy type thermal units. Controller shall become inoperative when thermal unit is removed. Provide controllers with double-break silver alloy contacts, visible from both sides of controller, and switch capable of being padlocked-OFF. Enclose controller unit in NEMA-type enclosure suitable for the location in which it is installed; coat with manufacturer's standard color finish.

PART 3 - EXECUTION

NOT USED

END OF SECTION

LIFT STATION TECHNICAL SPECIFICATION

SECTION 16440 - PANELBOARDS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes the following:
1. Lighting panelboards.

1.02 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01330, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:
1. Manufacturer's product data on panelboards and enclosures.

1.03 QUALITY ASSURANCE

- A. Codes and Standards:
1. UL Compliance: Comply with applicable requirements of UL 67, "Electric Panelboards," and UL's 50, 869, 486A, 486B, and 1053 pertaining to panelboards, accessories, and enclosures. Provide panelboard units which are UL listed and labeled.
 2. NEMA Compliance: Comply with NEMA Standards Pub/No. 250, "Enclosures for Electrical Equipment (1,000 Volts Maximum)," Pub/No. PB 1, "Panelboards," and Pub/No. PB 1.1, "Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less."
 3. Federal Specification Compliance: Comply with FS W-P-115, "Power Distribution Panel," pertaining to panelboards and accessories.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:
1. Cutler-Hammer Products.
 2. General Electric Company.
 3. Siemens, Inc.
 4. Square D Company.

2.02 PANELBOARDS

- A. Except as otherwise indicated, provide panelboards, enclosures, and ancillary components, of types, sizes, and ratings indicated, which comply with manufacturer's standard materials; with design and construction in accordance with published product information. Equip with proper number of unit panelboard devices as required for complete installation. Where types, sizes, or ratings are not indicated, comply with NEC, UL, and established industry standards for those applications indicated.

LIFT STATION TECHNICAL SPECIFICATION

- B. Lighting Panelboards: Provide dead-front safety type lighting and appliance panelboards as indicated, with switching and protective devices in quantities, ratings, and types shown; with anti-turn solderless pressure type lug connectors approved for use with copper conductors. Construct unit for connecting feeders at top of panel; equip with copper bus bars, full-sized neutral bar with bolt-in type heavy-duty, quick-make quick-break, single pole circuit breakers, and toggle handles that indicate when tripped. Provide suitable lugs on neutral bus for each outgoing feeder required and provide bare uninsulated grounding bars suitable for bolting to enclosures. Select enclosures fabricated by same manufacturer as panelboards, which mate and match properly with panelboards. Panelboards and circuit breakers shall be braced for 10,000 rms symmetrical amperes fault current unless otherwise indicated.
- C. Molded-Case Circuit Breakers: Provide factory assembled, molded-case circuit breakers of frame sizes, characteristics, and ratings, including rms symmetrical interrupting ratings indicated. Select breakers with permanent thermal and instantaneous magnetic trip, and with fault-current limiting protection, ampere ratings as indicated. Construct with overcenter, trip-free, toggle type operating mechanisms with quick-make quick-break action and positive handle trip indication. Construct breakers for mounting and operating in any physical position, and operating in an ambient temperature of 40 degrees C. Provide breakers with mechanical screw type removable connector lugs, AL/CU rated.
- D. Ground Fault Protected Breakers: Provide UL Class A protected GFI breakers with 6 mA for personnel protection, and for general-purpose receptacles. For breakers dedicated to equipment (sump pumps, heat trace, etc.), provide breaker with 30 mA equipment protection.

PART 3 - EXECUTION

3.01 INSTALLATION OF PANELBOARDS

- A. Type out panelboard's circuit directory card upon completion of installation Work.

END OF SECTION



CDBG SPECIFIC DOCUMENTS

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The above information is provided for reference as this is a Federally Funded grant project through the Michigan Economic Development Corporation (MEDC).

**MEDC
GRANTS ADMINISTRATION
COMMUNITY DEVELOPMENT BLOCK GRANT
PROGRAM**

CONTRACT SPECIAL PROVISIONS

The following CDBG Contract Special Provisions should be used with all construction contracts, and professional service contracts, where CDBG funds are being used in whole or in part.

CONTRACT SPECIAL PROVISIONS

1. **Definitions:** For purposes of this Contract, the following terms shall have the meanings set forth below:
 - (a) “Assistance” means the CDBG grant funds provided, or to be provided, to the Grantee by the State, pursuant to the Grant Award Agreement.
 - (b) “CDBG” means Community Development Block Grant.
 - (c) “Contract” means the contractual agreement between the Owner and the Contractor to which these Contract Special Provisions have been incorporated and made a part thereof.
 - (d) “Contractor” means the contractor whose services are retained pursuant to the Contract.
 - (e) “Grantee” means the unit of local government designated as the recipient of the Assistance in the Grant Award and signing the acceptance provision of the Grant Award.
 - (f) “HUD” means U.S. Department of Housing and Urban Development, which is the federal agency that awards and has authority over CDBG funding to the State.
 - (g) “Owner” means the Grantee or Subrecipient, as applicable.
 - (h) “Project” means the project for which the services of the Contractor have been retained pursuant to the Contract which are funded, in whole or in part, with CDBG funds.
 - (i) “State” means the State of Michigan, or that agency, agency division, or Office of State government which has been delegated the responsibility for administering the CDBG program for the State of Michigan, as appropriate.
 - (k) “Labor Surplus Area” means a civil jurisdiction that has an unemployment rate at least 20% above the average unemployment rate for all states, the District of Columbia, and Puerto Rico during the previous two calendar years. The Department of Labor issues the labor surplus area list on a fiscal year basis.
2. **Prime Contractor Responsibilities:** The Contractor is required to assume sole responsibility for the complete effort and enforcement of laws and regulations under this Contract. The Owner will consider the Contractor to be the sole point of contact with regard to contractual matters. All contractors, including subcontractors must be registered in SAM and eligible to receive federal contracts.
3. **Federal and State Laws:** The Contractor agrees to comply with all CDBG requirements as well as other federal and state laws, regulations, or Executive Orders. The State reserves the right to add or delete terms and conditions of this Contract as may be required by revisions and additions or changes in the requirements, regulations, and laws governing the CDBG Program.

4. **Procurement and Contracting:** In accordance with 2 CFR Part 200, the cost plus a percentage of cost and percentage of construction cost methods of contracting shall not be used. This provision shall supersede any conflicting provision in an executed contract document or agreement funded in whole or in part with CDBG funds.
5. **Ownership:** Ownership of all real or personal property, acquired in whole or in part with CDBG funds for use on this Project, shall be vested in the Grantee, unless otherwise authorized by the State. When the Grantee determines that the property is no longer required for the purposes of this Project, the Grantee must notify the State and obtain approval for disposition of the property in accordance with applicable guidelines.
6. **Copyright:** Except as otherwise provided in the terms and conditions of this Contract, the Contractor paid through this Contract is free to copyright any books, publications or other copyrightable materials developed in the course of the Project and under this Contract. However, HUD and the State reserve a royalty-free, non-exclusive and irrevocable license to reproduce, publish or otherwise use and to authorize others to use, for Federal government and State purposes:
 - (a) the copyright in any work developed under this Contract; and
 - (b) any rights of copyright to which a subcontractor purchases ownership with grant support.

The Federal government's rights and the State's rights identified above must be conveyed to the publisher and the language of the publisher's release form must insure the preservation of these rights.

7. **Reporting Requirements:** The Contractor agrees to complete and submit all reports, in such form and according to such schedule, as may be required by the State or HUD. Further, the Contractor agrees to require any subcontractors to submit reports that may be required and to incorporate such language in its agreements. Failure to meet deadlines with the required information could result in sanctions.
8. **Access to Records:** All records with respect to all matters covered by this Contract shall be made available at any time for audit and inspection by HUD, the State or the Grantee or their representatives upon their request.
9. **Maintenance of Records:** Records for non-expendable property purchased totally or partially with Federal funds must be retained for five years after final close-out of the grant. All other pertinent contract records including financial records, supporting documents and statistical records shall be retained for a minimum of five years after the final close-out report. However, if any litigation, claim, or audit is started before the expiration of the five-year period, then records must be retained for five years after the litigation, claim or audit is resolved.
10. **Confidential Information:** Any reports, information, data, etc., given to, prepared by, or assembled by the Contractor under this Contract, which the Grantee or the State requests to be kept confidential, shall not be made available to any individual or organization by the Contractor without prior written approval of the Grantee or the State, as applicable.

11. **Reporting of Fraudulent Activity:** If at any time during the term of this Contract anyone has reason to believe by whatever means that, under this or any other program administered by the State, a recipient of funds has improperly or fraudulently applied for or received benefits, monies or services pursuant to this Contract or any other contract, such information shall be reported immediately to the appropriate authorities.
12. **Political Activity:** None of the funds, materials, property or services provided directly or indirectly under this Contract shall be used for any partisan political activity, or to further the election or defeat of any candidate for public office or otherwise.
13. **Conflicts of Interest and Ethical Standards:** The following provisions regarding “conflicts of interest” apply to the use and expenditure of CDBG funds by the Grantee and its subrecipients, including the Contractor.

In the procurement of supplies, equipment, construction and services, the more restrictive conflict of interest provisions of the State of Michigan Ethics laws, or of the Contractor shall apply.

In cases not governed by the above, such as the acquisition and disposition of real property and the provision of CDBG assistance to individuals, businesses and other private entities, the following provisions shall apply.

Except for eligible administrative or personnel costs, the general rule is that no person who is an employee, agent, consultant, officer, or elected or appointed official of the State or a unit of general local government or any designated public agencies or subrecipient which are receiving CDBG funds who exercise or have exercised any function or responsibilities with respect to CDBG activities assisted herein or are in a position to participate in a decision making process or gain inside information with regard to such activities, may obtain a financial interest or benefit from the activity, or have an interest in any contract, subcontract or agreement with respect thereto, or the proceeds thereunder either for themselves or those with whom they have family or business ties during their tenure or for one year thereafter. Exceptions may be granted by the State on a case by case basis as requested upon full disclosure in writing.

Should any governmental entity, contractor, subcontractor, employee or official know or perceive any breach of ethical standards or conflict of interest under the CDBG grant awarded to the Grantee or any other CDBG grant, they shall immediately notify in writing the MEDC. If the State finds any circumstances that may give rise to a breach of ethical standards or conflict of interest, under any grant, they shall notify the participating governmental entity and the State Ethics Commission as appropriate. The State may undertake any administrative remedies it deems appropriate, where there is a breach of ethical standards or conflict of interest under the regulations governing the CDBG Program and the State policies.

14. **Applicable Law:** In addition to the applicable Federal laws and regulations, this Contract is also made under and shall be construed in accordance with the laws of the State. By execution of this Contract, the Contractor agrees to submit to the jurisdiction of the State for all matters arising or to arise hereunder, including but not limited to performance of said Contract and payment of all licenses and taxes of whatever kind or nature applicable hereto.

15. **Limitation of Liability:** The Contractor will not assert in any legal action by claim or defense, or take the position in any administrative or legal procedures that he is an agent or employee of the Owner. This provision is not applicable to contracts for CDBG administration services where the Contractor is a Council of Government. The State shall not be liable for failure on the part of the Grantee or any other party to perform all work in accordance with all applicable laws and regulations. The Grantee agrees to defend, indemnify, and hold harmless the State from and against all claims, demands, judgments, damages, actions, causes of actions, injuries, administrative orders, consent agreement and orders, liabilities, penalties, costs, and expenses of any kind whatsoever, including, without limitation, claims arising out of loss of life, injury to persons, property, or business or damage to natural resources in connection with the activities of the Grantee and any other third parties in a contractual relationship with the Grantee, or a subsidiary, whether or not occasioned wholly or in part by any condition, accident, or event caused by any act or omission of the State as a result of the Assistance.
16. **Legal Services:** No attorney-at-law shall be engaged through the use of any funds provided under this Contract in any legal action or proceeding against the State, the Grantee, any local public body or any political subdivision.
17. **Contract:** If any provision in this Contract shall be held to be invalid or unenforceable, the remaining portions shall remain in effect. In the event such invalid or unenforceable provision is considered an essential element of this Contract, the parties shall promptly negotiate a replacement provision, which addresses the intent of such provision.
18. **Amendments:** Any changes to this Contract affecting the scope of work of the Project must be approved, in writing, by the Owner and the Contractor and shall be incorporated in writing into this Contract. Any amendments of the original contract must have written approval by the State prior to execution.
19. **Termination for Convenience:** This Contract may be terminated for convenience in accordance with 2 CFR Part 200.
20. **Sanctions:** If the Contractor fails or refuses to comply with the provisions set forth herein, the State or Owner may take any or all of the following actions: cancel, terminate or suspend in whole or in any part the contract, or refrain from extending any further funds to the Contractor until such time as the Contractor is in full compliance.
21. **Subcontracting:** If any part of the work covered by this Contract is to be subcontracted, the Contractor shall identify the subcontracting organization and the contractual arrangements made therewith to the Owner and to the State. All subcontracts must be approved by the Owner and the State to insure they are not debarred or suspended by the Federal or State governments and to insure the Owner and the State understand the arrangements.
22. **Subcontracting with Small and Minority Firms, Women's Business Enterprise and Labor Surplus Areas:** It is national policy to award a fair share of contracts to disadvantaged business enterprises (DBEs), small business enterprises (SBEs), minority business enterprises (MBEs) and women's business enterprises (WBEs). Accordingly, affirmative steps must be taken to assure that DBEs, SBEs, MBEs and WBEs are utilized when possible as sources of supplies, equipment, construction and services. Affirmative steps shall include the following:

- (a) Including qualified DBEs, SBEs, MBEs and WBEs on solicitation lists;
- (b) Assuring that DBEs, SBEs, MBEs and WBEs are solicited whenever they are potential sources;
- (c) Whenever economically feasible, dividing total requirements into smaller tasks or quantities so as to permit maximum participation by DBEs, SBEs, MBEs and WBEs;
- (d) Where the requirement permits, establishing delivery schedules which will encourage participation by DBEs, SBEs, MBEs and WBEs;
- (e) Using the services and assistance of the Small Business Administration, Minority Business Development Agency, the State Office of Small and Minority Business Assistance, the U.S. Department of Commerce and the Community Services Administration as required; and
- (f) Requiring the subcontractor, if any, to take the affirmative actions outlined in (1) – (5) above.

23. **Debarment Certification:** The Contractor must comply with Executive Orders 12549 and 12689 regarding Federal debarment and suspension regulations prior to entering into a financial agreement for any transaction as outlined below.

- (a) Any procurement contract for goods and services, regardless of type, expected to equal or exceed the Federal procurement small purchase threshold (which is \$250,000 and is cumulative amount from all federal funding sources).
- (b) Any procurement contract for goods and services, regardless of amount, under which the Contractor will have a critical influence on or substantive control over the transaction.

In addition, no contract may be awarded to any contractors who are ineligible to receive contracts under any applicable regulations of the State.

24. **Equal Employment Opportunity:** The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the State.

In carrying out the Project, the Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor must take affirmative action to insure that applicants for employment are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor shall post in conspicuous places, available to employees and applicants for employment, notices to be provided by the State setting forth the provisions of this non-discrimination clause. The Contractor shall state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin. The Contractor will, in all solicitations or advertisements for employees by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin. The Contractor shall incorporate the foregoing requirements of this paragraph in all of its subcontracts for

the Project unless exempted by rules, regulations, or orders of the State issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor.

The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided by the State advising the said labor union or workers' representatives of the Contractor's commitment under this Section and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by the rules, regulations, and orders of the State, or pursuant thereto, and will permit access to its books, records, and accounts by HUD and the State for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

In the event of the Contractor's noncompliance with the non-discrimination clauses of this Contract or with any of such rules, regulations, or orders, this Contract may be canceled, terminated or suspended in whole or in part and the Contractor may be declared ineligible for further State government contracts or federally assisted construction contract procedures authorized in Executive Order 11246 of September 24, 1965, or by rules, regulations, or orders of the State, or as otherwise provided by law.

25. **Age Discrimination:** In accordance with 45 CFR, Parts 90 and 91, the Contractor agrees there shall be no bias or age discrimination as to benefits and participation under this Contract.
26. **Section 109 of the Housing and Community Development Act of 1974:** No person in the United States shall on the grounds of race, color, national origin or sex be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity funded in whole or in part with funds made available under the CDBG program of the State.
27. **Section 504 of the Rehabilitation Act of 1973, as amended:** The Contractor agrees that no otherwise qualified individual with disabilities shall, solely by reason of his disability, be denied the benefits, or be subjected to discrimination including discrimination in employment, any program or activity that receives the benefits from the Assistance.
28. **Section 3, Compliance and Provision of Training, Employment and Business Opportunities:** The work to be performed under this Contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, (12 USC § 1701u). The purpose of Section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by Section 3 shall, to the greatest extent feasible be directed to low and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

The parties to this said Contract agree to comply with HUD's regulations in 24 CFR Part 135, which implement Section 3. As evidenced by their execution of this Contract, the parties to this Contract certify that they are under no contractual or other impediment that would prevent them from complying with the 24 CFR Part 135 regulations.

The contractor agrees to send to each labor organization or representative of workers with which the Contractor has a collective bargaining agreement or other understanding, if any, a notice advising the organization or workers' representative of the contractor's commitments under this Section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the Section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions; the qualifications for each; and the name and location of person(s) taking applications for each of the positions; and the anticipated date the work shall begin. The Contractor agrees to include this Section 3 clause in every subcontract subject to compliance with regulations in 24 CFR Part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this Section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR Part 135. The Contractor will not subcontract with any subcontractor where the Contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR Part 135.

The Contractor will certify that any vacant employment positions including training positions, that are filled (1) after the Contractor is selected but before this Contract has been executed, and (2) with persons other than those to whom the regulations of 24 CFR Part 135 require employment opportunities to be directed, were not filled to circumvent the Contractor's obligations under 24 CFR Part 135.

The Contractor agrees to submit such reports as required to document compliance with 24 CFR Part 135. Noncompliance with the regulations in 24 CFR Part 135 may result in sanctions, termination of this Contract for default, and debarment or suspension from future HUD assisted contracts.

29. **Lead-Based Paint:** The construction or rehabilitation of residential structures with any portion of the Assistance is subject to the HUD Lead-Based Paint regulations found at 24 CFR Part 35. Any grants or loans made by the Grantee for the rehabilitation of residential structures with any portion of the Assistance shall be made subject to the provisions for the elimination of lead-based paint hazards under subpart B of said regulations, and the Grantee shall be responsible for the inspections and certifications required under Section 35.14(f) thereof.
30. **Compliance with Air and Water Acts:** (Applicable to construction contracts and related subcontracts exceeding \$100,000) This Contract is subject to the requirements of the Clean Air Act, as amended, 42 USC § 7401 et seq., the Federal Water Pollution Control Act (Clean Water Act), as amended, 33 USC § 1251 et seq., and the regulations of the Environmental Protection Agency with respect to 40 CFR Part 15, as amended from time to time. In particular, the following are required:
- (a) A stipulation by the Contractor or subcontractor that any facility to be utilized in the performance of any nonexempt contract or subcontract is not listed on the List of Violating Facilities, issued by the Environmental Protection Agency (EPA) pursuant to 40 CFR § 15.20.
 - (b) Agreement by the Contractor to comply with all the requirements of Section 114 of the Clean Air Act, as amended (42 USC § 7414) and Section 308 of the Federal Water Pollution Control Act, as amended (33 USC § 1318) relating to inspection, monitoring, entry, reports and information, as well as all other requirements specified in said Sections 114 and 308, and all regulations and guidelines issued thereunder.

- (c) A stipulation that as a condition of award of contract prompt notice will be given of any notification received from the Director, Office of Federal Activities, EPA, indicating that a facility utilized or to be utilized for the contract under consideration is to be listed on the EPA list of Violating Facilities.
- (d) Agreement by the Contractor that the Contractor will include or cause to be included the criteria and requirements in these subparagraphs (1) through (4), in every nonexempt subcontract and requiring that the Contractor will take such action as the State may direct as a means of enforcing such provisions.

In no event shall any amount of the Assistance be utilized with respect to a facility which has given rise to a conviction under section 113(c)(1) of the Clean Air Act or Section 309(c) of the Federal Water Pollution Control Act.

31. Federal Labor Standards Provisions: *(Applicable to construction contracts in excess of \$2,000 or residential rehabilitation contracts involving more than eight units)*

The Project or program to which the construction work covered by this Contract pertains is being assisted by the United States of America and the Federal Labor Standards Provisions as set forth on Attachment 1 are included in this Contract pursuant to the provisions applicable to such Federal assistance. These provisions must be complied with or sanctions will be instituted.

ATTACHMENT 1

U.S. Department of Housing and Urban Development, Office of Labor Relations form HUD4010 (06/2009)
ref. Handbook 1344.1

A. 1. (i) Minimum Wages. All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached thereto and made a part thereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5 (a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification of the time actually work therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible, place where it can be easily seen by the workers.

(ii) (a) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

- (1)** The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (2)** The classification is utilized in the area by the construction industry; and
- (3)** The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment

Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 12150140.)

(c) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1214-0140.)

(d) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

2. Withholding. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federal-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension or any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for an on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

3. (i) Payrolls and basic records. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section I (b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section I(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment of provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices and trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

(ii) (a) the contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i). This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, DC 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget Under OMB Control Number 1215-0129.)

(b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays for supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be maintained under 29 CFR 5.5 (a)(3)(i) and that such information is correct and complete;

(2) That each laborer or mechanic (including each apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph A.3.(ii)(b).

(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under subparagraph A.3.(i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and Trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they perform when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment Training Administration, Office of Apprenticeship Training, Employer and Training Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen in any craft classification shall not be greater than the ratio permitted to the contractor as to his entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as state above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ration permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every Trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs 1 through 11 of this paragraph A and such other clauses as HUD or its designee may by appropriate instructions require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.

7. Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any

if its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

10. (i) Certification of Eligibility. By entering into this contract the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1010, Title 18, U.S.C., "Federal Housing Administration transactions", provided in part: "Whoever, for the purpose of . . . influencing in any way the action of such Administration..... makes, utters or publishes any statement knowing the same to be false..... shall be fined not more than \$5,000 or imprisoned not more than two years, or both."

11. Complaints, Proceedings, or Testimony by Employees. No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

B. Contract Work Hours and Safety Standards Act. The provisions of this paragraph B are applicable only where the amount of the prime contract exceeds \$100,000. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

(1) Overtime Requirements. No Contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violations of the clause set forth in subparagraph (1) of this paragraph, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in subparagraph (1) of this paragraph.

(3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract, or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

C. Health and Safety. The provisions of this paragraph C are applicable only where the amount of the prime contract exceeds \$100,000.

(1) No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to this health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

(2) The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, 40 USC 3701 et. seq.

(3) The Contractor shall include the provisions of this paragraph in every subcontract so that such provisions will be binding on each subcontractor. The Contractor shall take such action with respect to any subcontract as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

A. APPLICABILITY

The Project or Program to which the construction work covered by this Contract pertains is being assisted by the United States of America, and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

(1) MINIMUM WAGES

- (i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment, computed at rates not less than those contained in the wage determination of the Secretary of Labor (which is attached hereto and made a part hereof), regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH1321)) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place, where it can be easily seen by the workers.

(ii) Additional Classifications.

- (A) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:
- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination;
 - (2) The classification is utilized in the area by the construction industry; and
 - (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
- (B) If the contractor, the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division ("Administrator"), Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget ("OMB") under OMB control number 1235-0023.)
- (C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, or HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1235-0023.)

(D) The wage rate (including fringe benefits, where appropriate) determined pursuant to subparagraphs (1)(ii)(B) or (C) of this paragraph, shall be paid to all workers performing work in the classification under this Contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1235-0023.)

(2) **Withholding.** HUD or its designee shall, upon its own action or upon written request of an authorized representative of the U.S. Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Department of Labor shall make such disbursements in the case of direct Davis-Bacon Act contracts.

(3) **Payrolls and basic records.**

(i) **Maintaining Payroll Records.** Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification(s), hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid.

Whenever the Secretary of Labor has found, under 29 CFR 5.5(a)(1)(iv), that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits.

Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1235-0023 and 1215-0018)

(ii) **Certified Payroll Reports.**

(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead, the payrolls only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <https://www.dol.gov/agencies/whd/forms> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee, the contractor, or the Wage and Hour Division of the U.S. Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this subparagraph for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to HUD or its designee. (Approved by the Office of Management and Budget under OMB Control Number 1235-0008.)

- (B)** Each payroll submitted shall be accompanied by a “Statement of Compliance,” signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
- (1)** That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;
 - (2)** That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;
 - (3)** That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract; and
- (C)** The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the “Statement of Compliance” required by subparagraph (a)(3)(ii)(b).
- (D)** The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under subparagraph (a)(3)(i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the U.S. Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and Trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency (where appropriate), to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman’s hourly rate) specified in the contractor’s or subcontractor’s registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice’s level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination.

Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program.

If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringe benefits shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- (ii) **Trainees.** Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed, unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- (iii) **Equal employment opportunity.** The utilization of apprentices, trainees, and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

- (5) **Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this Contract.
- (6) **Subcontracts.** The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs (1) through (11) in this paragraph (a) and such other clauses as HUD or its designee may, by appropriate instructions, require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.
- (7) **Contract termination; debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.
- (8) **Compliance with Davis-Bacon and Related Act Requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this Contract.
- (9) **Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this Contract shall not be subject to the general disputes clause of this Contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.
- (10) **Certification of Eligibility.**
- (i) By entering into this Contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this Contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(iii) Anyone who knowingly makes, presents, or submits a false, fictitious, or fraudulent statement, representation or certification is subject to criminal, civil and/or administrative sanctions, including fines, penalties, and imprisonment (e.g., 18 U.S.C. §§ 287, 1001, 1010, 1012; 31 U.S.C. §§ 3729, 3802).

(11) Complaints, Proceedings, or Testimony by Employees. No laborer or mechanic, to whom the wage, salary, or other labor standards provisions of this Contract are applicable, shall be discharged or in any other manner discriminated against by the contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

B. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The provisions of this paragraph (b) are applicable where the amount of the prime contract exceeds **\$100,000**. As used in this paragraph, the terms “laborers” and “mechanics” include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work, which may require or involve the employment of laborers or mechanics, shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek, unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in subparagraph B(1) of this paragraph, the contractor, and any subcontractor responsible therefor, shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph B(1) of this paragraph, in the sum of **\$27** for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in subparagraph B(1) of this paragraph. In accordance with the Federal Civil Penalties Inflation Adjustment Act of 1990 (28 U.S.C. § 2461 Note), the Department of Labor adjusts this civil monetary penalty for inflation no later than January 15 each year.

(3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall, upon its own action or upon written request of an authorized representative of the U.S. Department of Labor, withhold or cause to be withheld from any moneys payable on account of work performed by the contractor or subcontractor under any such contract, or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages, as provided in the clause set forth in subparagraph B(2) of this paragraph.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph B(1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs B(1) through (4) of this paragraph.

C. HEALTH AND SAFETY

The provisions of this paragraph (c) are applicable where the amount of the prime contract exceeds **\$100,000**.

(1) No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his or her health and safety, as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

(2) The contractor shall comply with all regulations issued by the Secretary of Labor pursuant to 29 CFR Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96), 40 U.S.C. § 3701 et seq.

(3) The contractor shall include the provisions of this paragraph in every subcontract, so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.



Office of Federal Contract Compliance Programs

Executive Order 11246, As Amended

Executive Order 11246 — Equal Employment Opportunity

SOURCE: The provisions of Executive Order 11246 of Sept. 24, 1965, appear at 30 FR 12319, 12935, 3 CFR, 1964–1965 Comp., p.339, unless otherwise noted.

Under and by virtue of the authority vested in me as President of the United States by the Constitution and statutes of the United States, it is ordered as follows:

Part I — Nondiscrimination in Government Employment

[Part I superseded by EO 11478 of Aug. 8, 1969, 34 FR 12985, 3 CFR, 1966–1970 Comp., p. 803]

Part II – Nondiscrimination in Employment by Government Contractors and Subcontractors

Subpart A – Duties of the Secretary of Labor

SEC. 201

The Secretary of Labor shall be responsible for the administration and enforcement of Parts II and III of this Order. The Secretary shall adopt such rules and regulations and issue such orders as are deemed necessary and appropriate to achieve the purposes of Parts II and III of this Order.

[Sec. 201 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

Subpart B – Contractors' Agreements

SEC. 202

Except in contracts exempted in accordance with Section 204 of this Order, all Government contracting agencies shall include in every Government contract hereafter entered into the following provisions:

During the performance of this contract, the contractor agrees as follows:

1. The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.
2. The contractor will, in all solicitations or advancements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.
3. The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the

employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.

4. The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the contractor's commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
5. The contractor will comply with all provisions of Executive Order No. 11246 of Sept. 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
6. The contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
7. In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be cancelled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of Sept. 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
8. The contractor will include the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the contractor may request the United States to enter into such litigation to protect the interests of the United States. [Sec. 202 amended by EO 11375 of Oct. 13, 1967, 32 FR 14303, 3 CFR, 1966-1970 Comp., p. 684, EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230, EO 13665 of April 8, 2014, 79 FR 20749, EO 13672 of July 21, 2014, 79 FR 42971]

SEC. 203

- a. Each contractor having a contract containing the provisions prescribed in Section 202 shall file, and shall cause each of his subcontractors to file, Compliance Reports with the contracting agency or the Secretary of Labor as may be directed. Compliance Reports shall be filed within such times and shall contain such information as to the practices, policies, programs, and employment policies, programs, and employment statistics of the contractor and each subcontractor, and shall be in such form, as the Secretary of Labor may prescribe.

- b. Bidders or prospective contractors or subcontractors may be required to state whether they have participated in any previous contract subject to the provisions of this Order, or any preceding similar Executive order, and in that event to submit, on behalf of themselves and their proposed subcontractors, Compliance Reports prior to or as an initial part of their bid or negotiation of a contract.
- c. Whenever the contractor or subcontractor has a collective bargaining agreement or other contract or understanding with a labor union or an agency referring workers or providing or supervising apprenticeship or training for such workers, the Compliance Report shall include such information as to such labor union's or agency's practices and policies affecting compliance as the Secretary of Labor may prescribe: Provided, that to the extent such information is within the exclusive possession of a labor union or an agency referring workers or providing or supervising apprenticeship or training and such labor union or agency shall refuse to furnish such information to the contractor, the contractor shall so certify to the Secretary of Labor as part of its Compliance Report and shall set forth what efforts he has made to obtain such information.
- d. The Secretary of Labor may direct that any bidder or prospective contractor or subcontractor shall submit, as part of his Compliance Report, a statement in writing, signed by an authorized officer or agent on behalf of any labor union or any agency referring workers or providing or supervising apprenticeship or other training, with which the bidder or prospective contractor deals, with supporting information, to the effect that the signer's practices and policies do not discriminate on the grounds of race, color, religion, sex, sexual orientation, gender identity, or national origin, and that the signer either will affirmatively cooperate in the implementation of the policy and provisions of this Order or that it consents and agrees that recruitment, employment, and the terms and conditions of employment under the proposed contract shall be in accordance with the purposes and provisions of the order. In the event that the union, or the agency shall refuse to execute such a statement, the Compliance Report shall so certify and set forth what efforts have been made to secure such a statement and such additional factual material as the Secretary of Labor may require.

[Sec. 203 amended by EO 11375 of Oct. 13, 1967, 32 FR 14303, 3 CFR, 1966–1970 Comp., p. 684; EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230, EO 13672 of July 21, 2104, 79 FR 42971]

SEC. 204

- a. The Secretary of Labor may, when the Secretary deems that special circumstances in the national interest so require, exempt a contracting agency from the requirement of including any or all of the provisions of Section 202 of this **Order** in any specific contract, subcontract, or purchase **order**.
- b. The Secretary of Labor may, by rule or regulation, exempt certain classes of contracts, subcontracts, or purchase orders (1) whenever work is to be or has been performed outside the United States and no recruitment of workers within the limits of the United States is involved; (2) for standard commercial supplies or raw materials; (3) involving less than specified amounts of money or specified numbers of workers; or (4) to the extent that they involve subcontracts below a specified tier.
- c. Section 202 of this **Order** shall not apply to a Government contractor or subcontractor that is a religious corporation, association, educational institution, or society, with respect to the employment of individuals of a particular religion to perform work connected with the carrying on by such corporation, association, educational institution, or society of its activities. Such contractors and subcontractors are not exempted or excused from complying with the other requirements contained in this **Order**.

- d. The Secretary of Labor may also provide, by rule, regulation, or order, for the exemption of facilities of a contractor that are in all respects separate and distinct from activities of the contractor related to the performance of the contract: provided, that such an exemption will not interfere with or impede the effectuation of the purposes of this **Order**: and provided further, that in the absence of such an exemption all facilities shall be covered by the provisions of this **Order**.

[Sec. 204 amended by EO 13279 of Dec. 16, 2002, 67 FR 77141, 3 CFR, 2002 Comp., p. 77141 – 77144]

Subpart C – Powers and Duties of the Secretary of Labor and the Contracting Agencies

SEC. 205

The Secretary of Labor shall be responsible for securing compliance by all Government contractors and subcontractors with this Order and any implementing rules or regulations. All contracting agencies shall comply with the terms of this Order and any implementing rules, regulations, or orders of the Secretary of Labor. Contracting agencies shall cooperate with the Secretary of Labor and shall furnish such information and assistance as the Secretary may require.

[Sec. 205 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

SEC. 206

- a. The Secretary of Labor may investigate the employment practices of any Government contractor or subcontractor to determine whether or not the contractual provisions specified in Section 202 of this Order have been violated. Such investigation shall be conducted in accordance with the procedures established by the Secretary of Labor.
- b. The Secretary of Labor may receive and investigate complaints by employees or prospective employees of a Government contractor or subcontractor which allege discrimination contrary to the contractual provisions specified in Section 202 of this Order.

[Sec. 206 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

SEC. 207

The Secretary of Labor shall use his/her best efforts, directly and through interested Federal, State, and local agencies, contractors, and all other available instrumentalities to cause any labor union engaged in work under Government contracts or any agency referring workers or providing or supervising apprenticeship or training for or in the course of such work to cooperate in the implementation of the purposes of this Order. The Secretary of Labor shall, in appropriate cases, notify the Equal Employment Opportunity Commission, the Department of Justice, or other appropriate Federal agencies whenever it has reason to believe that the practices of any such labor organization or agency violate Title VI or Title VII of the Civil Rights Act of 1964 or other provision of Federal law.

[Sec. 207 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

SEC. 208

- a. The Secretary of Labor, or any agency, officer, or employee in the executive branch of the Government designated by rule, regulation, or order of the Secretary, may hold such hearings, public or private, as the Secretary may deem advisable for compliance, enforcement, or educational purposes.
- b. The Secretary of Labor may hold, or cause to be held, hearings in accordance with Subsection of this Section prior to imposing, ordering, or recommending the imposition of penalties and sanctions under this Order. No order for debarment of any contractor from further Government contracts under Section 209(6) shall be made without affording the contractor an opportunity for a hearing.

Subpart D – Sanctions and Penalties

SEC. 209

In accordance with such rules, regulations, or orders as the Secretary of Labor may issue or adopt, the Secretary may:

1. Publish, or cause to be published, the names of contractors or unions which it has concluded have complied or have failed to comply with the provisions of this Order or of the rules, regulations, and orders of the Secretary of Labor.
2. Recommend to the Department of Justice that, in cases in which there is substantial or material violation or the threat of substantial or material violation of the contractual provisions set forth in Section 202 of this Order, appropriate proceedings be brought to enforce those provisions, including the enjoining, within the limitations of applicable law, of organizations, individuals, or groups who prevent directly or indirectly, or seek to prevent directly or indirectly, compliance with the provisions of this Order.
3. Recommend to the Equal Employment Opportunity Commission or the Department of Justice that appropriate proceedings be instituted under Title VII of the Civil Rights Act of 1964.
4. Recommend to the Department of Justice that criminal proceedings be brought for the furnishing of false information to any contracting agency or to the Secretary of Labor as the case may be.
5. After consulting with the contracting agency, direct the contracting agency to cancel, terminate, suspend, or cause to be cancelled, terminated, or suspended, any contract, or any portion or portions thereof, for failure of the contractor or subcontractor to comply with equal employment opportunity provisions of the contract. Contracts may be cancelled, terminated, or suspended absolutely or continuance of contracts may be conditioned upon a program for future compliance approved by the Secretary of Labor.
6. Provide that any contracting agency shall refrain from entering into further contracts, or extensions or other modifications of existing contracts, with any noncomplying contractor, until such contractor has satisfied the Secretary of Labor that such contractor has established and will carry out personnel and employment policies in compliance with the provisions of this Order.

(b) Pursuant to rules and regulations prescribed by the Secretary of Labor, the Secretary shall make reasonable efforts, within a reasonable time limitation, to secure compliance with the contract provisions of this Order by methods of conference, conciliation, mediation, and persuasion before proceedings shall be instituted under subsection (a)(2) of this Section, or before a contract shall be cancelled or terminated in whole or in part under subsection (a)(5) of this Section.

[Sec. 209 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

SEC. 210

Whenever the Secretary of Labor makes a determination under Section 209, the Secretary shall promptly notify the appropriate agency. The agency shall take the action directed by the Secretary and shall report the results of the action it has taken to the Secretary of Labor within such time as the Secretary shall specify. If the contracting agency fails to take the action directed within thirty days, the Secretary may take the action directly.

[Sec. 210 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p 230]

SEC. 211

If the Secretary shall so direct, contracting agencies shall not enter into contracts with any bidder or prospective contractor unless the bidder or prospective contractor has satisfactorily complied with the provisions of this Order or submits a program for compliance acceptable to the Secretary of Labor.

[Sec. 211 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

SEC. 212

When a contract has been cancelled or terminated under Section 209(a)(5) or a contractor has been debarred from further Government contracts under Section 209(a)(6) of this Order, because of noncompliance with the contract provisions specified in Section 202 of this Order, the Secretary of Labor shall promptly notify the Comptroller General of the United States.

[Sec. 212 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

Subpart E – Certificates of Merit

SEC. 213

The Secretary of Labor may provide for issuance of a United States Government Certificate of Merit to employers or labor unions, or other agencies which are or may hereafter be engaged in work under Government contracts, if the Secretary is satisfied that the personnel and employment practices of the employer, or that the personnel, training, apprenticeship, membership, grievance and representation, upgrading, and other practices and policies of the labor union or other agency conform to the purposes and provisions of this Order.

SEC. 214

Any Certificate of Merit may at any time be suspended or revoked by the Secretary of Labor if the holder thereof, in the judgment of the Secretary, has failed to comply with the provisions of this Order.

SEC. 215

The Secretary of Labor may provide for the exemption of any employer, labor union, or other agency from any reporting requirements imposed under or pursuant to this Order if such employer, labor union, or other agency has been awarded a Certificate of Merit which has not been suspended or revoked.

Part III – Nondiscrimination Provisions in Federally Assisted Construction Contracts

SEC. 301

Each executive department and agency, which administers a program involving Federal financial assistance shall require as a condition for the approval of any grant, contract, loan, insurance, or guarantee thereunder, which may involve a construction contract, that the applicant for Federal assistance undertake and agree to incorporate, or cause to be incorporated, into all construction contracts paid for in whole or in part with funds obtained from the Federal Government or borrowed on the credit of the Federal Government pursuant to such grant, contract, loan, insurance, or guarantee, or undertaken pursuant to any Federal program involving such grant, contract, loan, insurance, or guarantee, the provisions prescribed for Government contracts by Section 202 of this Order or such modification thereof, preserving in substance the contractor's obligations thereunder, as may be approved by the Secretary of Labor, together with such additional provisions as the Secretary deems appropriate to establish and protect the interest of the United States in the enforcement of those obligations. Each such applicant shall also undertake and agree (1) to assist and cooperate actively with the Secretary of Labor in obtaining the compliance of contractors and subcontractors with those contract provisions and with the rules, regulations and relevant orders of the Secretary, (2) to obtain and to furnish to the Secretary of Labor such information as the Secretary may require for the supervision of such compliance, (3) to carry out sanctions and penalties for violation of such obligations imposed upon contractors and subcontractors by the Secretary of Labor pursuant to Part II, Subpart D, of this Order, and (4) to refrain from entering into any contract subject to this Order, or extension or other modification of such a contract with a contractor debarred from Government contracts under Part II, Subpart D, of this Order.

[Sec. 301 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

SEC. 302

- a. "Construction contract" as used in this Order means any contract for the construction, rehabilitation, alteration, conversion, extension, or repair of buildings, highways, or other improvements to real property.
- b. The provisions of Part II of this Order shall apply to such construction contracts, and for purposes of such application the administering department or agency shall be considered the contracting agency referred to therein.
- c. The term "applicant" as used in this Order means an applicant for Federal assistance or, as determined by agency regulation, other program participant, with respect to whom an application for any grant, contract, loan, insurance, or guarantee is not finally acted upon prior to the effective date of this Part, and it includes such an applicant after he/she becomes a recipient of such Federal assistance.

SEC. 303

- a. The Secretary of Labor shall be responsible for obtaining the compliance of such applicants with their undertakings under this Order. Each administering department and agency is directed to cooperate with the Secretary of Labor

and to furnish the Secretary such information and assistance as the Secretary may require in the performance of the Secretary's functions under this Order.

- b. In the event an applicant fails and refuses to comply with the applicant's undertakings pursuant to this Order, the Secretary of Labor may, after consulting with the administering department or agency, take any or all of the following actions: (1) direct any administering department or agency to cancel, terminate, or suspend in whole or in part the agreement, contract or other arrangement with such applicant with respect to which the failure or refusal occurred; (2) direct any administering department or agency to refrain from extending any further assistance to the applicant under the program with respect to which the failure or refusal occurred until satisfactory assurance of future compliance has been received by the Secretary of Labor from such applicant; and (3) refer the case to the Department of Justice or the Equal Employment Opportunity Commission for appropriate law enforcement or other proceedings.
- c. In no case shall action be taken with respect to an applicant pursuant to clause (1) or (2) of subsection (b) without notice and opportunity for hearing.

[Sec. 303 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

SEC. 304

Any executive department or agency which imposes by rule, regulation, or order requirements of nondiscrimination in employment, other than requirements imposed pursuant to this Order, may delegate to the Secretary of Labor by agreement such responsibilities with respect to compliance standards, reports, and procedures as would tend to bring the administration of such requirements into conformity with the administration of requirements imposed under this Order: Provided, That actions to effect compliance by recipients of Federal financial assistance with requirements imposed pursuant to Title VI of the Civil Rights Act of 1964 shall be taken in conformity with the procedures and limitations prescribed in Section 602 thereof and the regulations of the administering department or agency issued thereunder.

Part IV – Miscellaneous

SEC. 401

The Secretary of Labor may delegate to any officer, agency, or employee in the Executive branch of the Government, any function or duty of the Secretary under Parts II and III of this Order.

[Sec. 401 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

SEC. 402

The Secretary of Labor shall provide administrative support for the execution of the program known as the "Plans for Progress."

SEC. 403

- a. Executive Orders Nos. 10590 (January 19, 1955), 10722 (August 5, 1957), 10925 (March 6, 1961), 11114 (June 22, 1963), and 11162 (July 28, 1964), are hereby superseded and the President's Committee on Equal Employment Opportunity established by Executive Order No. 10925 is hereby abolished. All records and property in the custody of the Committee shall be transferred to the Office of Personnel Management and the Secretary of Labor, as appropriate.
- b. Nothing in this Order shall be deemed to relieve any person of any obligation assumed or imposed under or pursuant to any Executive Order superseded by this Order. All rules, regulations, orders, instructions, designations, and other directives issued by the President's Committee on Equal Employment Opportunity and those issued by the heads of various departments or agencies under or pursuant to any of the Executive orders superseded by this Order, shall, to the extent that they are not inconsistent with this Order, remain in full

force and effect unless and until revoked or superseded by appropriate authority. References in such directives to provisions of the superseded orders shall be deemed to be references to the comparable provisions of this Order.

[Sec. 403 amended by EO 12107 of Dec. 28, 1978, 44 FR 1055, 3 CFR, 1978 Comp., p, 264]

SEC. 404

The General Services Administration shall take appropriate action to revise the standard Government contract forms to accord with the provisions of this Order and of the rules and regulations of the Secretary of Labor.

SEC. 405

This Order shall become effective thirty days after the date of this Order.

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Office of Federal Contract Compliance Programs

An agency within the U.S. Department of Labor
200 Constitution Ave NW
Washington, DC 20210
[1-866-4-USA-DOL](tel:1-866-4-USA-DOL)
[1-866-487-2365](tel:1-866-487-2365)
www.dol.gov

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SECTION 3 CLAUSE per CFR PART 75 (FINAL RULE)

All Section 3 covered contracts shall include the following clause (referred to as the "Section 3 Clause"):

A. The work to be performed under this contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended by the Housing and Community Development Act of 1992 (Section 3). The purpose of Section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by Section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

B. The parties to this contract agree to comply with HUD's regulations in 24 CFR Part 75, which implement Section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 75 regulations.

C. The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this Section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the Section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.

D. The contractor agrees to include this Section 3 clause in every subcontract subject to compliance with regulations in 24 CFR Part 75, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this Section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR Part 75. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR Part 75.

E. The contractor will certify that any vacant employment positions, including training positions that are filled (1) after the contractor is selected by before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 75 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR part 75.

F. Noncompliance with HUD's regulations in 24 CFR part 75 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

G. With respect to work performed in connection with Section 3 covered Indian housing assistance, section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible (i) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of Section 3 and Section 7(b) agree to comply with Section 3 to the maximum extent feasible, but not in derogation of compliance with Section 7(b).

NOTICE OF CONTRACT AWARD

Date Received

MEDC requires mutual written agreement between the parties if the time between the bid opening and contract award exceeds 45 days.

1. The CDBG Contract:

Grantee Name

CDBG Contract #

2. A prime construction contract has been awarded as follows:

Name of prime contractor

Type of work to be done

Bid Opening Date

Date of contract award

Estimated date of start of construction

3. Components of the above listed contract identified by source, purpose and amount:

<u>Source</u>	<u>Purpose</u>	<u>Amount</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

4. Total Amount of Award (All funds—Local, CDBG, etc.):

5. Comments: _____ :

6. Signed: _____ :

Grantee’s Labor Compliance Officer or CEO

7. Date: _____ :

8. Complete and fax or mail this form along with a copy of the certified and itemized bid tab to _____. Documents are to be received by _____ within 30 days of the award date.

Instructions for Notice of Contract Award

1. Grantee Name Contract Number	Name of Municipality or County that is the recipient of grant funds. Contract number between the state and grant recipient.															
2. A prime...contract...	<p>Name: of prime contractor.</p> <p>Type of Work: Examples: fire station, sewer treatment plant, etc.</p> <p>Bid Opening Date: self-explanatory.</p> <p>Date of Award: official date by action of municipality or county.</p> <p>Estimate: an educated guess on start date of construction.</p>															
3. Components of the above listed contract source, purpose, & amount	<p>Components of the construction contract must be identified by source, purpose and amount. Example:</p> <table border="1"> <thead> <tr> <th><u>Source</u></th> <th><u>Purpose</u></th> <th><u>Amount</u></th> </tr> </thead> <tbody> <tr> <td>CDBG</td> <td>Sewer lines, engineering</td> <td>500,000.00</td> </tr> <tr> <td>CDBG</td> <td>Hooks up on private property</td> <td>100,000.00</td> </tr> <tr> <td>USDA</td> <td>Sewer treatment plant</td> <td>300,000.00</td> </tr> <tr> <td>Local</td> <td>Engineering</td> <td>50,000.00</td> </tr> </tbody> </table> <p>Some construction contracts involve only CDBG funds and have a single purpose. For such cases, use only a one-line entry.</p> <p>Other contracts will require more than a one-line entry. For instance, if there are hook-ups on private property that are under the CDBG activity of "rehabilitation", the components will require at least two entries.</p>	<u>Source</u>	<u>Purpose</u>	<u>Amount</u>	CDBG	Sewer lines, engineering	500,000.00	CDBG	Hooks up on private property	100,000.00	USDA	Sewer treatment plant	300,000.00	Local	Engineering	50,000.00
<u>Source</u>	<u>Purpose</u>	<u>Amount</u>														
CDBG	Sewer lines, engineering	500,000.00														
CDBG	Hooks up on private property	100,000.00														
USDA	Sewer treatment plant	300,000.00														
Local	Engineering	50,000.00														
4. Total amount of contract award	Components amounts added together should equal the total of the prime construction contract referred to under item "2". From the example in "3", above, the total would be \$950,000.00.															
5. Comments	Comments about any pertinent fact. If none, leave blank.															
6. Signed	The grantee's Labor Compliance Officer is the usual signor.															
7. Date	The date on which this form is completed is the appropriate date.															
8. Complete and submit...	Obtain the certified and itemized bid tabulation from the engineer. Fax or mail that tabulation and this Notice of Contract Award, together, to _____.															

Public reporting burden for this collection of information is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

HUD may not collect this information, and you are not required to complete this form, unless it displays a currently valid OMB control number.

This information collection is necessary to ensure that viable projects are developed. It is important to obtain information from applicants to assist HUD in determining if nonprofit organizations initially funded continue to have the financial and administrative capacity needed to develop a project and that the project design meets the needs of the residents. The Department will use this information to determine if the project meets statutory requirements with respect to the development and operation of the project, as well as ensuring the continued marketability of the projects. This information is required in order to obtain benefits. This information is considered non-sensitive and no assurance of confidentiality is provided.

Privacy Act Notice: The United States Department of Housing and Urban Development, Federal Housing Administration, is authorized to solicit the information requested in the form by virtue of Title 12, United States Code, Section 1701 et seq., and regulations promulgated thereunder at Title 12, Code of Federal Regulations. While no assurance of confidentiality is pledged to respondents, HUD generally discloses this data only in response to a Freedom of Information Act request.

Know All Men By These Presents, That We,

of

as Principal, (hereinafter called the Principal) and _____, a

as Surety, (herinafter called the Surety) are held and firmly bound unto _____

Owner, (hereinafter called the "Owner-Obligee") and unto _____,

its successors and assigns, of _____ (hereinafter called the "Lender")

as their respective interests may appear, as OBLIGEES, in the sum of _____

Dollars (\$ _____), lawful money of the United States of America, for the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has entered into a Construction Contract dated _____
with

Owner-Obligee for the construction of a Housing Project designated as _____

a copy of which Construction Contract is by reference made a part hereof; and

WHEREAS, Lender has agreed to lend to Owner-Obligee a sum of money to be secured by a mortgage on said project and to be used in making payments under said Contract, and desires protection as its interests may appear, in event of default by Principal under said Contract, said protection to be subject to the performance by the Obligees, or either of them, of the obligations to Principal in connection with said Contract.

NOW, THEREFORE, the condition of this obligation is such that, if Principal shall well and truly perform all the undertakings, covenants, terms, conditions and agreements of said Contract on its part, and fully indemnify and save harmless Obligees from all cost and damage which they may suffer by reason of failure so to do, and fully reimburse and repay Obligees all outlay and expense which Obligees may incur in making good any such default, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The foregoing, however, is subject to the following further provisions:

1. The Surety shall not be liable under this Bond to the Obligees, or either of them, unless the said Obligees, or either of them, shall make payments to the Principal strictly in accordance with the terms of said Contract as to payments, and shall perform all the other obligations to be performed under said Contract at the time and in the manner therein set forth.

2. Surety agrees that any right of action that either of Obligees herein might have under this bond may be assigned to the Secretary of Housing and Urban Development, acting by and through the Federal Housing Commissioner, and that such assignment will in no manner invalidate or qualify this instrument.

3. No suit, action, or proceeding by reason of any default whatever shall be brought on this bond after two years from the day on which the final payment under the Contract falls due.

4. The prior written approval of Surety shall be required with regard to any changes or alterations in said Contract where the cost thereof, added to prior changes or alterations, causes the aggregate cost of all changes and alterations to exceed 10 percent of the original Contract price; but, except as to the foregoing, any alterations which may be made in the terms of the Contract, or in the work to be done under it, or the giving by the Obligees of any extension of time for the performance of the Contract, or any other forbearance on the part of either the Obligees or Principal to the other, shall not in any way release Surety or Principal of the obligations of this instrument, notice to Surety of any such alteration, extension, or forbearance being hereby waived.

5. The aggregate liability of Surety hereunder to the Obligees or their assigns is limited to the penal sum above stated, and Surety, upon making any payment hereunder, shall be subrogated to, and shall be entitled to an assignment of, all rights of the payee, either against Principal or against any other party liable to the payee in connection with the loss which is the subject of the payment.

SIGNED and SEALED this _____ day of _____ 20____

Witness as to Principal

(Principal) (SEAL)

By

(Surety)

By

\$ _____

(Surety)

PERFORMANCE BOND-DUAL OBLIGEE

No. _____

On Behalf of

Date _____, 20 _____

Expires _____, 20 _____

If collecting SSN or EIN:

Privacy Act Statement: The Department of Housing and Urban Development is authorized to collect this information by the National Housing Act, Section 235(b), P.L. 479, 48 Stat. 12 U.S.C. 1701 et seq. HUD is authorized to collect the Social Security Number (SSN) by Section 165(a) of the Housing and Community Development Act of 1987, P.L. 100-242, and by Section 904 of the Stewart B. McKinney Homeless Assistance Amendments Act of 1988, P.L. 100-628. The information is being collected to determine the amount of assistance (if any) the applicant is entitled. The information is also used as a tool for managing the program(s) related to this form, and for protecting the Government's financial interests. **The information may be used to conduct computer-matching programs to check for underreported or unreported income.** The SSN is used as a unique identifier. The information may be released to appropriate Federal, State, and local agencies, and when relevant, to civil, criminal, or regulatory investigators and/or prosecutors. This information will not be otherwise disclosed or released outside of HUD except as permitted or required by law. It is mandatory that you provide all of the requested information, including all SSN(s), for you and all other household members age six years and older. Failure to provide SSN(s) and required documents will result in a delay or loss of assistance payments.

If not collecting SSN or EIN:

Privacy Act Notice: The United States Department of Housing and Urban Development, Federal Housing Administration, is authorized to solicit the information requested in the form by virtue of Title 12, United States Code, Section 1701 et seq., and regulations promulgated thereunder at Title 12, Code of Federal Regulations. While no assurance of confidentiality is pledged to respondents, HUD generally discloses this data only in response to a Freedom of Information Act request.

Payment Bond
Section 242

**U.S. Department of Housing
and Urban Development**
Office of Hospital Facilities

OMB Approval No. 2502-0602
(Exp. 11/30/2022)

Public reporting burden for this collection of information is estimated to average 4 hours. This includes the time for collecting, reviewing, and reporting the data. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Reports Management Officer, QDAM, U.S. Department of Housing and Urban Development, Washington, DC 20410-5000. Do not send this completed form to the above address. The information requested is required to obtain the benefit under Section 242 of the National Housing Act. No confidentiality is assured. The information is being collected to obtain the supportive documentation which must be submitted to HUD for approval and is necessary to ensure that viable projects are developed and maintained. The Department will use this information to determine if properties meet HUD requirements with respect to development, operation and/or asset management, as well as ensuring the continued marketability of the properties. This agency may not collect this information, and you are not required to complete this form, unless it displays a currently valid OMB control number.

Warning: Federal law provides that anyone who knowingly or willfully submits (or causes to submit) a document containing any false, fictitious, misleading, or fraudulent statement/certification or entry may be criminally prosecuted and may incur civil administrative liability. Penalties upon conviction can include a fine and imprisonment, as provided pursuant to applicable law, which includes, but is not limited to, 18 U.S.C. 1001, 1010, 1012; 13 U.S.C. 3729, 3802, 24 C.F.R. Parts 25, 28 and 30, and 2 C.F.R. Parts 180 and 2424.

CONTRACTOR/PRINCIPAL (Name and Address):

LENDER (Name and Address):

OWNER (Name and Address):

SURETY (Name and Principal Place of Business):

PROJECT (Name, FHA Project Number and Location):

CONSTRUCTION CONTRACT:

Date:

Amount:

BOND:

Date:

Amount:

RIDERS TO THIS BOND: Yes No

This Payment Bond is issued simultaneously with a Performance Bond-Dual Obligee (**Performance Bond**) issued in connection with the Project. As used herein, "**Obligees**" shall mean Owner, Lender, Secretary of Housing and Urban Development ("**HUD**") and the additional obligee(s), if any, identified in a Rider to this Bond and "**Obligee**" shall mean any of the Obligees.

1. Contractor has entered into a Construction Contract with Owner for the construction of the Project (“**Contract**”), which as the same may now or hereafter be amended by change order or otherwise, is made a part hereof by reference.
2. Contractor and Surety, jointly and severally (“**Obligors**”), bind themselves, their heirs, executors, administrators, successors and assigns, to Obligees, for the use and benefit of Claimants as hereinafter defined in paragraph 3, in the sum of _____ Dollars (\$ _____), to pay for labor, materials and equipment furnished for use in the performance of the Contract. Any approved increase in the total Contract price shall increase the monetary obligation of Obligors accordingly.
3. A Claimant (“**Claimant**”) is defined as one having a direct contract with Contractor or with a subcontractor of Contractor for labor, materials or equipment used in the performance of the Contract, including without limitation in the terms “labor, materials or equipment” that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract, architectural and engineering services required for performance of the work of Contractor and Contractor’s subcontractors, and all other items for which a mechanic’s lien may be asserted in the jurisdiction where the labor, materials or equipment was furnished.
4. This obligation shall be null and void if Contractor promptly makes payment to all Claimants for all labor, material, or equipment used in the performance of the Contract.
5. Contractor and Surety hereby jointly and severally agree with Obligees that every Claimant, who has not been paid in full before the expiration of a period of ninety (90) days after having last performed labor or last furnished materials or equipment, may sue on this Payment 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. No Obligee shall be liable for the payment of any costs or expenses of any such suit.
6. Surety shall have no obligation to Claimants under this Payment Bond unless:
 - a. Claimants, who do not have a direct contract with Contractor, have given notice to any two (2) of the above-named parties, those being Contractor, Owner or Surety, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the claim, stating that a claim is being made under this Payment Bond and, with substantial accuracy, the amount claimed and the name of the party to whom the materials or equipment were furnished, or for whom the work or labor was done or performed.
 - b. Any suit, action or proceeding brought by Claimants under this Payment Bond shall be instituted within one (1) year from the later of the date on which (i) Claimants gave the notice required by paragraph 6a, or (ii) the later of the date that Claimants either perform the last labor and/or service or furnish the last materials or equipment under the Contract. If this limitation is deemed to be in contravention of any

controlling law, this provision of the Payment Bond is deemed amended so as to substitute the minimum period of limitation permitted by such controlling law for the above limitation.

7. The amount of this Payment Bond shall be reduced by any payment(s) made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens that may be filed of record against Project, whether or not the claim for the amount of such lien is presented under and against this Payment Bond. Notwithstanding the foregoing, no amounts paid without the written consent of Lender shall reduce the liability of Surety to Lender under this Payment Bond.
8. Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders and other obligations.
9. Notice to Surety, Owner, or Contractor shall be served by mailing the same by registered mail or certified mail, postage prepaid, to the address shown on this Payment Bond or to such other address as may have been previously specified by the recipient in a notice given in accordance herewith.

Each signatory below hereby certifies under penalty of perjury such signatory's statements and representations contained in this Payment Bond and all supporting documentation provided by such signatory are true, accurate, and complete. This Payment Bond has been made, presented, and delivered for the purpose of influencing an official action of HUD in insuring the Loan, and may be relied upon by HUD as a true statement of the facts contained therein.

SIGNED and SEALED this _____ day of _____, 20__.

Witness as to Contractor:

CONTRACTOR:

By: _____

Name and Title (Printed)

SURETY:

By: _____

Name and Title (Printed)

Project Name: _____
FHA Project No.: _____

ADDITIONAL OBLIGEE RIDER

(Additional obligee only allowed with prior HUD approval.)

1. This Additional Obligee Rider is attached to and made a part of that certain Payment Bond, dated _____, 20__ executed and delivered by _____, as Contractor, and _____, as Surety, in favor of Obligees, in the sum of _____ (\$_____) with respect to the Project referenced above.
2. All of the terms, conditions and provisions of the Payment Bond are hereby incorporated herein by this reference as if fully set forth herein.
3. All defined terms as set forth in the Payment Bond shall have the same meaning herein.
4. _____ is hereby added to the Payment Bond as an additional named Obligee.
5. Nothing herein shall alter or affect any of the terms, conditions and other provisions of the Payment Bond, including especially but without limitation, the aggregate liability of Surety as described in paragraph 2 of the Payment Bond.

SIGNED and SEALED this _____ day of _____, 20__.

Witness as to Contractor: _____ CONTRACTOR: _____

_____ By: _____

Name and Title (Printed)

SURETY: _____

By: _____

Name and Title (Printed)

Project Name: _____
FHA Project Number: _____

ADDITIONAL SURETY RIDER

(Additional surety only allowed with prior HUD approval.)

1. This Additional Surety Rider is attached to and made a part of that certain Payment Bond, dated _____, 20__executed and delivered by _____, as Contractor, and _____, as Surety, in favor of Obligees, in the sum of _____ (\$_____) with respect to the Project referenced above.
2. All of the terms, conditions and provisions of the Payment Bond are hereby incorporated herein by this reference as if fully set forth herein.
3. All defined terms as set forth in the Payment Bond shall have the same meaning herein.
4. _____ (“**Additional Surety**”) is hereby added to the Payment Bond as an additional named Surety, and all references in the Payment Bond to “Surety” shall include the Additional Surety.
5. Each Surety and Additional Surety (collectively, “**Surety**”) is held and firmly bound, jointly and severally, onto Obligees. Further, each undersigned Surety binds itself in the aforesaid full sum jointly and severally, as well as severally, for the purpose of allowing joint action or singular action against any or all of them in the full amount of this Payment Bond and for all other purposes each Surety binds itself, jointly and severally with Contractor, for the payment of the full sums above stated.
6. Nothing herein shall alter or affect any of the terms, conditions and other provisions of the Payment Bond, including especially but without limitation, the aggregate liability of Surety as described in paragraph 2 of the Payment Bond.

SIGNED AND SEALED this _____ day of _____, 20__.

Witness as to Contractor:

CONTRACTOR:

By: _____

Name and Title (Printed)

SURETY

By: _____

Names and Title (Printed)

ADDITIONAL SURETY:

By: _____

Name and Title (Printed)

Equal Employment Opportunity is **THE LAW**

Private Employers, State and Local Governments, Educational Institutions, Employment Agencies and Labor Organizations

Applicants to and employees of most private employers, state and local governments, educational institutions, employment agencies and labor organizations are protected under Federal law from discrimination on the following bases:

RACE, COLOR, RELIGION, SEX, NATIONAL ORIGIN

Title VII of the Civil Rights Act of 1964, as amended, protects applicants and employees from discrimination in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment, on the basis of race, color, religion, sex (including pregnancy), or national origin. Religious discrimination includes failing to reasonably accommodate an employee's religious practices where the accommodation does not impose undue hardship.

DISABILITY

Title I and Title V of the Americans with Disabilities Act of 1990, as amended, protect qualified individuals from discrimination on the basis of disability in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment. Disability discrimination includes not making reasonable accommodation to the known physical or mental limitations of an otherwise qualified individual with a disability who is an applicant or employee, barring undue hardship.

AGE

The Age Discrimination in Employment Act of 1967, as amended, protects applicants and employees 40 years of age or older from discrimination based on age in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment.

SEX (WAGES)

In addition to sex discrimination prohibited by Title VII of the Civil Rights Act, as amended, the Equal Pay Act of 1963, as amended, prohibits sex discrimination in the payment of wages to women and men performing substantially equal work, in jobs that require equal skill, effort, and responsibility, under similar working conditions, in the same establishment.

GENETICS

Title II of the Genetic Information Nondiscrimination Act of 2008 protects applicants and employees from discrimination based on genetic information in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment. GINA also restricts employers' acquisition of genetic information and strictly limits disclosure of genetic information. Genetic information includes information about genetic tests of applicants, employees, or their family members; the manifestation of diseases or disorders in family members (family medical history); and requests for or receipt of genetic services by applicants, employees, or their family members.

RETALIATION

All of these Federal laws prohibit covered entities from retaliating against a person who files a charge of discrimination, participates in a discrimination proceeding, or otherwise opposes an unlawful employment practice.

WHAT TO DO IF YOU BELIEVE DISCRIMINATION HAS OCCURRED

There are strict time limits for filing charges of employment discrimination. To preserve the ability of EEOC to act on your behalf and to protect your right to file a private lawsuit, should you ultimately need to, you should contact EEOC promptly when discrimination is suspected:

The U.S. Equal Employment Opportunity Commission (EEOC), 1-800-669-4000 (toll-free) or 1-800-669-6820 (toll-free TTY number for individuals with hearing impairments). EEOC field office information is available at www.eeoc.gov or in most telephone directories in the U.S. Government or Federal Government section. Additional information about EEOC, including information about charge filing, is available at www.eeoc.gov.

Employers Holding Federal Contracts or Subcontracts

Applicants to and employees of companies with a Federal government contract or subcontract are protected under Federal law from discrimination on the following bases:

RACE, COLOR, RELIGION, SEX, NATIONAL ORIGIN

Executive Order 11246, as amended, prohibits job discrimination on the basis of race, color, religion, sex or national origin, and requires affirmative action to ensure equality of opportunity in all aspects of employment.

INDIVIDUALS WITH DISABILITIES

Section 503 of the Rehabilitation Act of 1973, as amended, protects qualified individuals from discrimination on the basis of disability in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment. Disability discrimination includes not making reasonable accommodation to the known physical or mental limitations of an otherwise qualified individual with a disability who is an applicant or employee, barring undue hardship. Section 503 also requires that Federal contractors take affirmative action to employ and advance in employment qualified individuals with disabilities at all levels of employment, including the executive level.

DISABLED, RECENTLY SEPARATED, OTHER PROTECTED, AND ARMED FORCES SERVICE MEDAL VETERANS

The Vietnam Era Veterans' Readjustment Assistance Act of 1974, as amended, 38 U.S.C. 4212, prohibits job discrimination and requires affirmative action to employ and advance in employment disabled veterans, recently separated veterans (within

three years of discharge or release from active duty), other protected veterans (veterans who served during a war or in a campaign or expedition for which a campaign badge has been authorized), and Armed Forces service medal veterans (veterans who, while on active duty, participated in a U.S. military operation for which an Armed Forces service medal was awarded).

RETALIATION

Retaliation is prohibited against a person who files a complaint of discrimination, participates in an OFCCP proceeding, or otherwise opposes discrimination under these Federal laws.

Any person who believes a contractor has violated its nondiscrimination or affirmative action obligations under the authorities above should contact immediately:

The Office of Federal Contract Compliance Programs (OFCCP), U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, D.C. 20210, 1-800-397-6251 (toll-free) or (202) 693-1337 (TTY). OFCCP may also be contacted by e-mail at OFCCP-Public@dol.gov, or by calling an OFCCP regional or district office, listed in most telephone directories under U.S. Government, Department of Labor.

Programs or Activities Receiving Federal Financial Assistance

RACE, COLOR, NATIONAL ORIGIN, SEX

In addition to the protections of Title VII of the Civil Rights Act of 1964, as amended, Title VI of the Civil Rights Act of 1964, as amended, prohibits discrimination on the basis of race, color or national origin in programs or activities receiving Federal financial assistance. Employment discrimination is covered by Title VI if the primary objective of the financial assistance is provision of employment, or where employment discrimination causes or may cause discrimination in providing services under such programs. Title IX of the Education Amendments of 1972 prohibits employment discrimination on the basis of sex in educational programs or activities which receive Federal financial assistance.

INDIVIDUALS WITH DISABILITIES

Section 504 of the Rehabilitation Act of 1973, as amended, prohibits employment discrimination on the basis of disability in any program or activity which receives Federal financial assistance. Discrimination is prohibited in all aspects of employment against persons with disabilities who, with or without reasonable accommodation, can perform the essential functions of the job.

If you believe you have been discriminated against in a program of any institution which receives Federal financial assistance, you should immediately contact the Federal agency providing such assistance.

EMPLOYEE RIGHTS

UNDER THE DAVIS-BACON ACT

FOR LABORERS AND MECHANICS EMPLOYED ON FEDERAL OR FEDERALLY ASSISTED CONSTRUCTION PROJECTS

PREVAILING WAGES

You must be paid not less than the wage rate listed in the Davis-Bacon Wage Decision posted with this Notice for the work you perform.

OVERTIME

You must be paid not less than one and one-half times your basic rate of pay for all hours worked over 40 in a work week. There are few exceptions.

ENFORCEMENT

Contract payments can be withheld to ensure workers receive wages and overtime pay due, and liquidated damages may apply if overtime pay requirements are not met. Davis-Bacon contract clauses allow contract termination and debarment of contractors from future federal contracts for up to three years. A contractor who falsifies certified payroll records or induces wage kickbacks may be subject to civil or criminal prosecution, fines and/or imprisonment.

APPRENTICES

Apprentice rates apply only to apprentices properly registered under approved Federal or State apprenticeship programs.

PROPER PAY

If you do not receive proper pay, or require further information on the applicable wages, contact the Contracting Officer listed below:

or contact the U.S. Department of Labor's Wage and Hour Division.



WAGE AND HOUR DIVISION
UNITED STATES DEPARTMENT OF LABOR

1-866-487-9243
TTY: 1-877-889-5627
www.dol.gov/whd



EMPLOYEE RIGHTS UNDER THE FAMILY AND MEDICAL LEAVE ACT

THE UNITED STATES DEPARTMENT OF LABOR WAGE AND HOUR DIVISION

LEAVE ENTITLEMENTS

Eligible employees who work for a covered employer can take up to 12 weeks of unpaid, job-protected leave in a 12-month period for the following reasons:

- The birth of a child or placement of a child for adoption or foster care;
- To bond with a child (leave must be taken within one year of the child's birth or placement);
- To care for the employee's spouse, child, or parent who has a qualifying serious health condition;
- For the employee's own qualifying serious health condition that makes the employee unable to perform the employee's job;
- For qualifying exigencies related to the foreign deployment of a military member who is the employee's spouse, child, or parent.

An eligible employee who is a covered servicemember's spouse, child, parent, or next of kin may also take up to 26 weeks of FMLA leave in a single 12-month period to care for the servicemember with a serious injury or illness.

An employee does not need to use leave in one block. When it is medically necessary or otherwise permitted, employees may take leave intermittently or on a reduced schedule.

Employees may choose, or an employer may require, use of accrued paid leave while taking FMLA leave. If an employee substitutes accrued paid leave for FMLA leave, the employee must comply with the employer's normal paid leave policies.

While employees are on FMLA leave, employers must continue health insurance coverage as if the employees were not on leave.

Upon return from FMLA leave, most employees must be restored to the same job or one nearly identical to it with equivalent pay, benefits, and other employment terms and conditions.

An employer may not interfere with an individual's FMLA rights or retaliate against someone for using or trying to use FMLA leave, opposing any practice made unlawful by the FMLA, or being involved in any proceeding under or related to the FMLA.

An employee who works for a covered employer must meet three criteria in order to be eligible for FMLA leave. The employee must:

- Have worked for the employer for at least 12 months;
- Have at least 1,250 hours of service in the 12 months before taking leave;* and
- Work at a location where the employer has at least 50 employees within 75 miles of the employee's worksite.

*Special "hours of service" requirements apply to airline flight crew employees.

Generally, employees must give 30-days' advance notice of the need for FMLA leave. If it is not possible to give 30-days' notice, an employee must notify the employer as soon as possible and, generally, follow the employer's usual procedures.

Employees do not have to share a medical diagnosis, but must provide enough information to the employer so it can determine if the leave qualifies for FMLA protection. Sufficient information could include informing an employer that the employee is or will be unable to perform his or her job functions, that a family member cannot perform daily activities, or that hospitalization or continuing medical treatment is necessary. Employees must inform the employer if the need for leave is for a reason for which FMLA leave was previously taken or certified.

Employers can require a certification or periodic recertification supporting the need for leave. If the employer determines that the certification is incomplete, it must provide a written notice indicating what additional information is required.

Once an employer becomes aware that an employee's need for leave is for a reason that may qualify under the FMLA, the employer must notify the employee if he or she is eligible for FMLA leave and, if eligible, must also provide a notice of rights and responsibilities under the FMLA. If the employee is not eligible, the employer must provide a reason for ineligibility.

Employers must notify its employees if leave will be designated as FMLA leave, and if so, how much leave will be designated as FMLA leave.

Employees may file a complaint with the U.S. Department of Labor, Wage and Hour Division, or may bring a private lawsuit against an employer.

The FMLA does not affect any federal or state law prohibiting discrimination or supersede any state or local law or collective bargaining agreement that provides greater family or medical leave rights.

BENEFITS & PROTECTIONS

ELIGIBILITY REQUIREMENTS

REQUESTING LEAVE

EMPLOYER RESPONSIBILITIES

ENFORCEMENT

For additional information or to file a complaint:

1-866-4-USWAGE

(1-866-487-9243) TTY: 1-877-889-5627

www.dol.gov/whd

U.S. Department of Labor | Wage and Hour Division



EMPLOYEE RIGHTS

UNDER THE FAIR LABOR STANDARDS ACT

FEDERAL MINIMUM WAGE

\$7.25

 PER HOUR

BEGINNING JULY 24, 2009

The law requires employers to display this poster where employees can readily see it.

OVERTIME PAY At least 1½ times the regular rate of pay for all hours worked over 40 in a workweek.

CHILD LABOR An employee must be at least 16 years old to work in most non-farm jobs and at least 18 to work in non-farm jobs declared hazardous by the Secretary of Labor. Youths 14 and 15 years old may work outside school hours in various non-manufacturing, non-mining, non-hazardous jobs with certain work hours restrictions. Different rules apply in agricultural employment.

TIP CREDIT Employers of “tipped employees” who meet certain conditions may claim a partial wage credit based on tips received by their employees. Employers must pay tipped employees a cash wage of at least \$2.13 per hour if they claim a tip credit against their minimum wage obligation. If an employee’s tips combined with the employer’s cash wage of at least \$2.13 per hour do not equal the minimum hourly wage, the employer must make up the difference.

NURSING MOTHERS The FLSA requires employers to provide reasonable break time for a nursing mother employee who is subject to the FLSA’s overtime requirements in order for the employee to express breast milk for her nursing child for one year after the child’s birth each time such employee has a need to express breast milk. Employers are also required to provide a place, other than a bathroom, that is shielded from view and free from intrusion from coworkers and the public, which may be used by the employee to express breast milk.

ENFORCEMENT The Department has authority to recover back wages and an equal amount in liquidated damages in instances of minimum wage, overtime, and other violations. The Department may litigate and/or recommend criminal prosecution. Employers may be assessed civil money penalties for each willful or repeated violation of the minimum wage or overtime pay provisions of the law. Civil money penalties may also be assessed for violations of the FLSA’s child labor provisions. Heightened civil money penalties may be assessed for each child labor violation that results in the death or serious injury of any minor employee, and such assessments may be doubled when the violations are determined to be willful or repeated. The law also prohibits retaliating against or discharging workers who file a complaint or participate in any proceeding under the FLSA.

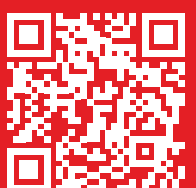
ADDITIONAL INFORMATION

- Certain occupations and establishments are exempt from the minimum wage, and/or overtime pay provisions.
- Special provisions apply to workers in American Samoa, the Commonwealth of the Northern Mariana Islands, and the Commonwealth of Puerto Rico.
- Some state laws provide greater employee protections; employers must comply with both.
- Some employers incorrectly classify workers as “independent contractors” when they are actually employees under the FLSA. It is important to know the difference between the two because employees (unless exempt) are entitled to the FLSA’s minimum wage and overtime pay protections and correctly classified independent contractors are not.
- Certain full-time students, student learners, apprentices, and workers with disabilities may be paid less than the minimum wage under special certificates issued by the Department of Labor.



WAGE AND HOUR DIVISION
UNITED STATES DEPARTMENT OF LABOR

1-866-487-9243
TTY: 1-877-889-5627
www.dol.gov/whd



SECTION 3 CONTRACTOR PLAN

(Contractor) agrees to implement affirmative steps to comply with the Section 3 requirements set forth at 24 CFR 75 directed at increasing the utilization of lower income residents and businesses within the **City/County/Township/Village** of .

- A. To implement Section 3 requirements by seeking the assistance of local officials in determining the exact boundaries of the applicable project area.
- B. To attempt to recruit from within the City/County/Township/Village lower income workers through local advertising media, signs placed at the proposed site for the project, and community organizations and public or private institutions operating within or serving the project area.
- C. To insert this Section 3 Plan and the Section 3 Contractors Packet (Form 4-T) in all bid documents, and to require all bidders/contractors and subcontractors to submit a Section 3 affirmative action plan including utilization goals and the specific steps planned to accomplish these goals.
- D. To maintain records, including copies of correspondence, memoranda, etc., which document that all the above affirmative action steps have been taken. See Section 3 Contractor & Worker Solicitation (Form 9-D).
- E. To list all permanent workforce for this project by job title. See Contractor Permanent Workforce Plan (Form 9-M).
- F. To list all projected workforce needs for this project by job classification and time frame for potential hire.
- G. To complete and submit the required Section 3 Forms to municipality for MEDC reporting (Form 9-N).

As representative of _____ (Bidder), the undersigned has read and fully agree to the above and become a party to the full implementation of this program.

Signature		Date
Print Name		
Title		
Company Name		

SECTION 3 WORKER-TARGETED WORKER CERTIFICATION

A Section 3 Worker seeking the preference in training and employment provided by this part shall certify, or submit evidence to the recipient contractor or subcontractor, if requested, that the person is a Section 3 Worker, as defined in Section 75.5.

Date:	
Worker Name:	
Worker Apartment Complex Name (if applicable):	
Worker Address (will be verified):	
Worker Email Address:	

To meet the income qualifications, the Worker must earn at or below of the 80% AMI income limit.	
County (project location)	
80% AMI Income Limit (1 person)	\$
Worker Annual Income	\$

Place a check mark beside all the following that apply:
<input type="checkbox"/> My income for the previous year was below the amount listed above. Section 3 income qualification limits are based on the location of the project.
<input type="checkbox"/> I am employed by a Section 3 Business
<input type="checkbox"/> I am a YouthBuild participant
<input type="checkbox"/> I reside in public housing or Section 8-assisted housing
<input type="checkbox"/> I reside within one mile of the work site

I hereby certify that the information provided by me to be true and correct and understand any falsification of any of the information could subject me to disqualification from participation and punishment under the law.	
Signature of Worker	Date
Printed Name	

CONTRACTOR PERMANENT WORKFORCE

This form is provided at contract signing to identify the employees already employed by the bidding contractor/subcontractor. It will be used to determine the base number of employees and help identify Section 3 Workers.

Contractor/Company Name	
County (project location)	
80% Area Median Income (AMI) Limit (1 person)	\$

	EMPLOYEE NAME	JOB TITLE	ANNUAL SALARY	**ANNUAL SALARY AT OR BELOW 80% AMI AMT (provided above) YES or NO	CERTIFIED SECTION 3 WORKER? YES or NO
1					
2					
3					
4					
5					
6					
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11					
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20					

I certify the above employees are permanent employees of _____. I certify the above employees are on our regular payroll and have their W-2 tax forms for our records. If requested, these records will be available to the **County/City/Township/Village Name** for the above referenced project for verification purposes. I understand that falsifying information is perjury and subject to legal ramifications.

Signature:	Date:
Print Name, Title	

** If Yes, Employee is a Section 3 Worker

SECTION 3 CONTRACTOR LABOR HOURS TRACKING

Report is due at end of project.

LABOR HOURS TAB INSTRUCTIONS

Labor Hours tab allows for up to 150 workers and 100 payroll weeks.

It is recommended to complete the Labor Hours tab intermittently throughout the project.

- 1 Click on the Labor Hours tab and complete all yellow highlighted cells at the top.
- 2 Use Tab or Arrow key on keyboard to move to next cell.
- 3 Enter Payroll # beginning at Cell I16.
- 4 List payroll numbers for all weeks on the project. If no work occurred, enter zero (0) for each worker.
- 5 Enter information requested in table for each worker beginning at Cell C19.
- 6 For Columns D and E, use drop down or type "Yes" or "No"
- 7 After project is complete and all payroll weeks are entered:
 - a. Review Cell F12. If there is an **ERROR** message, make necessary corrections.
 - b. Review Column F (SECTION 3 CHECK) for any **FALSE** error messages and make necessary corrections.
 - c. Review Cells D11 and D12, if either number is **red**, complete the Safe Harbor tab.
- 8 Contact CGA/UGLG with any questions.

SAFE HARBOR TAB INSTRUCTIONS

*Required when the Total Section 3 Worker Hours percentage (Cell D11) is less than 25% **and/or** the Targeted Section 3 Labor Hours (Cell D12) is less than 5%.*

- 9 Enter Date completed in Cell E7.
- 10 For items 1-14, enter "**X**" for each applicable item (beginning at Cell B10).
- 11 Sign, electronic signature allowed.

SUBMISSION INSTRUCTIONS

- 12 **Email this Excel, signed Safe Harbor (if applicable) and Section 3 Contractor & Worker Solicitation (Form 9-D) to CGA/UGLG.**

Also email Section 3 Business Concern Certification (Form 9-A1) and Section 3 Worker-Targeted Worker Certification (Form 9-L), if applicable.

SECTION 3 LABOR HOURS TRACKING

UGLG Name	
Grant #	
Project Name	
Contractor Name	
Date	

	Number	%
Total Labor Hours for Project	0.00	
Section 3 Worker Hours	0.00	
Targeted Section 3 Worker Hours	0.00	

FALSE = Targeted Section 3 cannot be YES if Section 3 is NO, correction is required.

	Worker Name	Section 3 Worker	Targeted Section 3 Worker	SECTION 3 CHECK	TOTAL HOURS	Week #	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6
						Payroll #						
						Tot Wk Hrs	0.00	0.00	0.00	0.00	0.00	0.00
1				TRUE	0.00							
2				TRUE	0.00							
3				TRUE	0.00							
4				TRUE	0.00							
5				TRUE	0.00							
6				TRUE	0.00							
7				TRUE	0.00							
8				TRUE	0.00							
9				TRUE	0.00							
10				TRUE	0.00							
11				TRUE	0.00							
12				TRUE	0.00							
13				TRUE	0.00							
14				TRUE	0.00							
15				TRUE	0.00							
16				TRUE	0.00							
17				TRUE	0.00							
18				TRUE	0.00							
19				TRUE	0.00							
20				TRUE	0.00							
21				TRUE	0.00							

Wk 7	Wk 8	Wk 9	Wk 10	Wk 11	Wk 12	Wk 13	Wk 14	Wk 15	Wk 16	Wk 17	Wk 18	Wk 19	Wk 20	Wk 21	Wk 22
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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SAFE HARBOR

UGLG NAME	0
GRANT #	0
PROJECT NAME	0
CONTRACTOR NAME	0
DATE	

Pursuant to 24 CFR 75.23, Safe Harbor reporting is required if Section 3 benchmarks are not met.

Enter "X" for each applicable item below.

- 1 Engaged in outreach efforts to generate job applicants who are Targeted Section 3 workers.
- 2 Provided training or apprenticeship opportunities.
- 3 Provided technical assistance to help Section 3 workers compete for jobs (e.g., resume assistance, coaching).
- 4 Provided or connected Section 3 workers with assistance in seeking employment including: drafting resumes, preparing for interviews, and finding job opportunities connecting residents to job placement services.
- 5 Held one or more job fairs.
- 6 Provided or referred Section 3 workers to services supporting work readiness and retention (e.g., work readiness activities, interview clothing, test fees, transportation, child care).
- 7 Provided assistance to apply for/or attend community college, a four-year educational institution, or vocational/technical training.
- 8 Assisted Section 3 workers to obtain financial literacy training and/or coaching.
- 9 Engaged in outreach efforts to identify and secure bids from Section 3 business concerns.
- 10 Provided technical assistance to help Section 3 business concerns understand and bid on contracts.
- 11 Divided contracts into smaller jobs to facilitate participation by Section 3 business concerns.
- 12 Provided bonding assistance, guarantees, or other efforts to support viable bids from Section 3 business concerns.
- 13 Promoted use of business registries designed to create opportunities for disadvantaged and small businesses.
- 14 Outreach, engagement, or referrals with the state one-stop system as defined in Section 121(e)(2) of the Workforce Innovation and Opportunity Act.

SIGN:

TYPE: Business Owner or Designee Name

PAYROLL

(For Contractor's Optional Use; See Instructions at www.dol.gov/whd/forms/wh347instr.htm)



Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

Rev. Dec. 2008

NAME OF CONTRACTOR	OR SUBCONTRACTOR	ADDRESS	OMB No.:1235-0008 Expires: 07/31/2024
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PAYROLL NO.	FOR WEEK ENDING	PROJECT AND LOCATION	PROJECT OR CONTRACT NO.
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(1) NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER	(2) NO. OF WITHHOLDING EXEMPTIONS	(3) WORK CLASSIFICATION	OT OR ST.	(4) DAY AND DATE							(5) TOTAL HOURS	(6) RATE OF PAY	(7) GROSS AMOUNT EARNED	(8) DEDUCTIONS					(9) NET WAGES PAID FOR WEEK
				HOURS WORKED EACH DAY										FICA	WITH- HOLDING TAX	OTHER	TOTAL DEDUCTIONS		
			O																
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While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act (40 U.S.C. § 3145) contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) regulations at 29 C.F.R. § 5.5(a)(3)(ii) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

Public Burden Statement

We estimate that it will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W. Washington, D.C. 20210

PAYROLL DEDUCTION AUTHORIZATION AUTHORIZATION TO MAKE OTHER DEDUCTIONS

I, Fred Hall , hereby authorize my employer,
Picot Construction , to make deductions not otherwise
listed as permissible deductions on wages earned while employed on the following project.

PROJECT NUMBER: _____
PROJECT NAME: _____
PROJECT LOCATION: _____

These deductions are voluntary and are authorized for the purpose of:

<u>Purpose</u>	<u>Amount Per Week</u>	<u>PPE Deduction Period</u>	<u>Comments</u>
Insurance	\$50.00	1/15/12	
AFLAC	\$20.00	1/15/12	
Loan	\$50.00	1/7/12	For five pay periods

Employee Signature

Date

"General Decision Number: MI20230001 02/17/2023

Superseded General Decision Number: MI20220001

State: Michigan

Construction Types: Highway (Highway, Airport & Bridge xxxxx and Sewer/Incid. to Hwy.)

Counties: Michigan Statewide.

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least \$16.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2023.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least \$12.15 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2023.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number	Publication Date
0	01/06/2023
1	02/03/2023
2	02/17/2023

CARP0004-004 06/01/2019

REMAINDER OF STATE

	Rates	Fringes
CARPENTER (Piledriver).....	\$ 27.62	20.59

CARP0004-005 06/01/2018

LIVINGSTON (Townships of Brighton, Deerfield, Genoa, Hartland, Oceola & Tyrone), MACOMB, MONROE, OAKLAND, SANILAC, ST. CLAIR AND WAYNE COUNTIES

	Rates	Fringes
CARPENTER (Piledriver).....	\$ 30.50	27.28

ELEC0017-005 06/01/2022

STATEWIDE

	Rates	Fringes
Line Construction		
Groundman/Driver.....	\$ 29.57	7.20+32%
Journeyman Signal Tech, Communications Tech, Tower Tech & Fiber Optic Splicers.	\$ 43.90	7.20+32%
Journeyman Specialist.....	\$ 50.49	7.20+32%
Operator A.....	\$ 37.13	7.20+32%
Operator B.....	\$ 34.67	7.20+32%

Classifications

Journeyman Specialist: Refers to a crew of only one person working alone.
 Operator A: Shall be proficient in operating all power equipment including: Backhoe, Excavator, Directional Bore and Boom/Digger truck.
 Operator B: Shall be proficient in operating any 2 of the above mentioned pieces of equipment listed under Operator A.

ENGI0324-003 06/01/2022

ALCONA, ALPENA, ARENAC, BAY, CHEBOYGAN, CLARE, CLINTON, CRAWFORD, GENESEE, GLADWIN, GRATIOT, HURON, INGHAM, IOSCO, ISABELLA, JACKSON, LAPEER, LENAWEE, LIVINGSTON, MACOMB, MIDLAND, MONROE, MONTMORENCY, OAKLAND, OGEMAW, OSCODA, OTSEGO, PRESQUE ISLE, ROSCOMMON, SAGINAW, ST. CLAIR, SANILAC, SHIAWASSEE, TUSCOLA, WASHTENAW AND WAYNE COUNTIES:

	Rates	Fringes
OPERATOR: Power Equipment (Steel Erection)		
GROUP 1.....	\$ 51.02	24.85
GROUP 2.....	\$ 52.02	24.85
GROUP 3.....	\$ 49.52	24.85
GROUP 4.....	\$ 50.52	24.85

GROUP 5.....	\$ 48.02	24.85
GROUP 6.....	\$ 49.02	24.85
GROUP 7.....	\$ 47.75	24.85
GROUP 8.....	\$ 48.75	24.85
GROUP 9.....	\$ 47.30	24.85
GROUP 10.....	\$ 48.30	24.85
GROUP 11.....	\$ 46.57	24.85
GROUP 12.....	\$ 47.57	24.85
GROUP 13.....	\$ 46.21	24.85
GROUP 14.....	\$ 47.21	24.85
GROUP 15.....	\$ 45.57	24.85
GROUP 16.....	\$ 42.37	24.85
GROUP 17.....	\$ 27.89	12.00
GROUP 18.....	\$ 31.38	24.85

FOOTNOTE:

Paid Holidays: New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas Day.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Engineer when operating combination of boom and jib 400' or longer

GROUP 2: Engineer when operating combination of boom and jib 400' or longer on a crane that requires an oiler

GROUP 3: Engineer when operating combination of boom and jib 300' or longer

GROUP 4: Engineer when operating combination of boom and jib 300' or longer on a crane that requires an oiler

GROUP 5: Engineer when operating combination of boom and jib 220' or longer

GROUP 6: Engineer when operating combination of boom and jib 220' or longer on a crane that requires an oiler

GROUP 7: Engineer when operating combination of boom and jib 140' or longer

GROUP 8: Engineer when operating combination of boom and jib 140' or longer on a crane that requires an oiler

GROUP 9: Tower crane & derrick operator (where operator's work station is 50 ft. or more above first sub-level)

GROUP 10: Tower crane & derrick operator (where operator's work station is 50 ft. or more above first sub-level) on a crane that requires an oiler

GROUP 11: Engineer when operating combination of boom and jib 120' or longer

GROUP 12: Engineer when operating combination of boom and jib 120' or longer on a crane that requires an oiler

GROUP 13: Crane operator; job mechanic and 3 drum hoist and excavator

GROUP 14: Crane operator on a crane that requires an oiler

GROUP 15: Hoisting operator; 2 drum hoist and rubber tired

backhoe

GROUP 16: Forklift and 1 drum hoist

GROUP 17: Compressor or welder operator

GROUP 18: Oiler

ENGI0324-004 06/01/2022

AREA 1: ALLEGAN, BARRY, BERRIEN, BRANCH, CALHOUN, CASS, EATON, HILLSDALE, IONIA, KALAMAZOO, KENT, LAKE, MANISTEE, MASON, MECOSTA, MONTCALM, MUSKEGON, NEWAYGO, OCEANA, OSCEOLA, OTTAWA, ST. JOSEPH, VAN BUREN

AREA 2: ANTRIM, BENZIE, CHARLEVOIX, EMMET, GRAND TRAVERSE, KALKASKA, LEELANAU, MISSAUKEE AND WEXFORD COUNTIES:

	Rates	Fringes
OPERATOR: Power Equipment (Steel Erection)		
AREA 1		
GROUP 1.....	\$ 51.02	24.85
GROUP 2.....	\$ 47.75	24.85
GROUP 3.....	\$ 46.21	24.85
GROUP 4.....	\$ 42.37	24.85
GROUP 5.....	\$ 27.89	12.00
GROUP 6.....	\$ 31.38	24.85
AREA 2		
GROUP 1.....	\$ 51.02	24.85
GROUP 2.....	\$ 47.75	24.85
GROUP 3.....	\$ 46.21	24.85
GROUP 4.....	\$ 42.37	24.85
GROUP 5.....	\$ 27.89	12.00
GROUP 6.....	\$ 31.38	24.85

FOOTNOTES:

Crane operator with main boom and jib 300' or longer: \$1.50 additional to the group 1 rate. Crane operator with main boom and jib 400' or longer: \$3.00 additional to the group 1 rate.

PAID HOLIDAYS: New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas Day.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS:

GROUP 1: Crane Operator with main boom & jib 400', 300', or 220' or longer.

GROUP 2: Crane Operator with main boom & jib 140' or longer, Tower Crane; Gantry Crane; Whirley Derrick.

GROUP 3: Regular Equipment Operator, Crane, Dozer, Loader, Hoist, Straddle Wagon, Mechanic, Grader and Hydro Excavator.

GROUP 4: Air Tugger (single drum), Material Hoist Pump 6" or over, Elevators, Brokk Concrete Breaker.

GROUP 5: Air Compressor, Welder, Generators, Conveyors

GROUP 6: Oiler and fire tender

AREA 1: GENESEE, LAPEER, LIVINGSTON, MACOMB, MONROE, OAKLAND,
 ST. CLAIR, WASHTENAW AND WAYNE COUNTIES

AREA 2: ALCONA, ALLEGAN, ALGER, ALPENA, ANTRIM, ARENAC, BARAGA,
 BARRY, BAY, BENZIE, BERRIEN, BRANCH, CALHOUN, CASS,
 CHARLEVOIX, CHEBOYGAN, CHIPPEWA, CLARE, CLINTON, CRAWFORD,
 DELTA, DICKINSON, EATON, EMMET, GLADWIN, GOGEBIC, GRAND
 TRAVERSE, GRATIOT, HILLSDALE, HOUGHTON, HURON, INGHAM, IONIA,
 IOSCO, IRON, ISABELLA, JACKSON, KALAMAZOO, KALKASKA, KENT,
 KWEENAW, LAKE, LEELANAU, LENAWEE, LUCE, MACKINAC, MANISTEE,
 MARQUETTE, MASON, MECOSTA, MENOMINEE, MIDLAND, MISSAUKEE,
 MONTCALM, MONTMORENCY, MUSKEGON, NEWAYGO, OCEANA, OGEMAW,
 ONTONAGON, OSCEOLA, OSCODA, OTSEGO, OTTAWA, PRESQUE ISLE,
 ROSCOMMON, SAGINAW, SANILAC, SCHOOLCRAFT, SHIAWASSEE, ST.
 JOSEPH, TUSCOLA, VAN BUREN AND WEXFORD COUNTIES

	Rates	Fringes
OPERATOR: Power Equipment (Underground construction (including sewer))		
AREA 1:		
GROUP 1.....	\$ 39.38	24.85
GROUP 2.....	\$ 34.65	24.85
GROUP 3.....	\$ 33.92	24.85
GROUP 4.....	\$ 33.35	24.85
GROUP 5.....	\$ 24.90	12.05
AREA 2:		
GROUP 1.....	\$ 37.67	24.85
GROUP 2.....	\$ 32.78	24.85
GROUP 3.....	\$ 32.28	24.85
GROUP 4.....	\$ 32.00	24.85
GROUP 5.....	\$ 24.90	12.05

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Backfiller tamper; Backhoe; Batch plant operator
 (concrete); Clamshell; Concrete paver (2 drums or larger);
 Conveyor loader (Euclid type); Crane (crawler, truck type
 or pile driving); Dozer; Dragline; Elevating grader;
 Endloader; Gradall (and similar type machine); Grader;
 Mechanic; Power shovel; Roller (asphalt); Scraper
 (self-propelled or tractor drawn); Side boom tractor (type
 D-4 or equivalent and larger); Slip form paver; Slope
 paver; Trencher (over 8 ft. digging capacity); Well
 drilling rig; Concrete pump with boom operator; Hydro
 Excavator

GROUP 2: Boom truck (power swing type boom); Crusher; Hoist;
 Pump (1 or more - 6-in. discharge or larger - gas or
 diesel- powered or powered by generator of 300 amperes or
 more - inclusive of generator); Side boom tractor (smaller
 than type D-4 or equivalent); Tractor (pneu-tired, other
 than backhoe or front end loader); Trencher (8-ft. digging
 capacity and smaller); Vac Truck and End dump operator;

GROUP 3: Air compressors (600 cfm or larger); Air compressors
 (2 or more-less than 600 cfm); Boom truck (non-swinging,
 non- powered type boom); Concrete breaker (self-propelled
 or truck mounted - includes compressor); Concrete paver (1

drum-1/2 yd. or larger); Elevator (other than passenger); Maintenance person; Pump (2 or more-4-in. up to 6-in. discharge-gas or diesel powered - excluding submersible pumps); Pumpcrete machine (and similar equipment); Wagon drill (multiple); Welding machine or generator (2 or more-300 amp. or larger - gas or diesel powered)

GROUP 4: Boiler; Concrete saw (40 hp or over); Curing machine (self-propelled); Farm tractor (with attachment); Finishing machine (concrete); Hydraulic pipe pushing machine; Mulching equipment; Pumps (2 or more up to 4-in. discharge, if used 3 hours or more a day, gas or diesel powered - excluding submersible pumps); Roller (other than asphalt); Stump remover; Trencher (service); Vibrating compaction equipment, self-propelled (6 ft. wide or over); Sweeper (Wayne type); Water wagon and Extend-a boom forklift

Group 5: Fire Person, Oiler

 * ENGI0324-006 06/01/2022

GENESEE, MACOMB, MONROE, OAKLAND, WASHTENAW, WAYNE, ALCONA, ALGER, ALLEGAN, ALPENA, ANTRIM, ARENAC, BARAGA, BARRY, BAY, BENZIE, BERRIEN, BRANCH, CALHOUN, CASS, CHARLEVOIX, CHEBOYGAN, CHIPPEWA, CLARE, CLINTON, CRAWFORD, DELTA, DICKINSON, EATON, EMMET, GLADWIN, GOGEBIC, GRAND TRAVERSE, GRATIOT, HILLSDALE, HOUGHTON, HURON, INGHAM, IONIA, IOSCO, IRON, ISABELLA, JACKSON, KALAMAZOO, KALKASKA, KENT, KEWEENAW, LAKE, LAPEER, LEELANAU, LENAWEE, LIVINGSTON, LUCE, MACKINAC, MANISTEE, MARQUETTE, MASON, MECOSTA, MENOMINEE, MIDLAND, MISSAUKEE, MONTCALM, MONTMORENCY, MUSKEGON, NEWAYGO, OCEANA, OGEMAW, ONTONAGON, OSCEOLA, OSCODA, OTSEGO, OTTAWA, PRESQUE ISLE, ROSCOMMON, SAGINAW, ST. CLARE, ST. JOSEPH, SANILAC, SCHOOLCRAFT, SHIAWASSEE, TUSCOLA, VAN BUREN AND WEXFORD COUNTIES

	Rates	Fringes
Power equipment operators: (AIRPORT, BRIDGE & HIGHWAY CONSTRUCTION)		
GROUP 1.....	\$ 38.86	24.85
GROUP 2.....	\$ 32.13	24.85
GROUP 3.....	\$ 31.57	24.85
GROUP 4.....	\$ 31.40	24.85

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Asphalt plant operator; Crane operator (does not include work on bridge construction projects when the crane operator is erecting structural components); Dragline operator; Shovel operator; Locomotive operator; Paver operator (5 bags or more); Elevating grader operator; Pile driving operator; Roller operator (asphalt); Blade grader operator; Trenching machine operator (ladder or wheel type); Auto-grader; Slip form paver; Self-propelled or tractor-drawn scraper; Conveyor loader operator (Euclid type); Endloader operator (1 yd. capacity and over); Bulldozer; Hoisting engineer; Tractor operator; Finishing machine operator (asphalt); Mechanic; Pump operator (6-in. discharge or over, gas, diesel powered or generator of 300 amp. or larger); Shouldering or gravel distributing machine operator (self-propelled); Backhoe (with over 3/8 yd. bucket); Side boom tractor (type D-4 or equivalent or

larger); Tube finisher (slip form paving); Gradall (and similar type machine); Asphalt paver (self-propelled); Asphalt planer (self-propelled); Batch plant (concrete-central mix); Slurry machine (asphalt); Concrete pump (3 in. and over); Roto-mill; Swinging boom truck (over 12 ton capacity); Hydro demolisher (water blaster); Farm-type tractor with attached pan; Vacuum truck operator; Batch Plant (concrete dry batch); Concrete Saw Operator (40h.p. or over; Tractor Operator (farm type); Finishing Machine Operator (concrete); Grader Operator (self-propelled fine grade or form (concrete)).

GROUP 2: Screening plant operator; Washing plant operator; Crusher operator; Backhoe (with 3/8 yd. bucket or less); Side boom tractor (smaller than D-4 type or equivalent); Sweeper (Wayne type and similar equipment); Greese Truck; Air Compressor Operator (600 cu.ft. per min or more); Air Compressor Operator (two or more, less than 600 cfm);

GROUP 3: Boiler fire tender; Tractor operator (farm type with attachment); Concrete Breaker; Wagon Drill Operator;

GROUP 4: Oiler; Fire tender; Trencher (service); Flexplane operator; Cleftplane operator; Boom or winch hoist truck operator; Endloader operator *under 1 yd. capacity); Roller Operator (other than asphalt); Curing equipment operator (self-propelled); Power bin operator; Plant drier (6 ft. wide or over); Guard post driver operator (power driven); All mulching equipment; Stump remover; Concrete pump (under 3-in.); Mesh installer (self-propelled); End dump; Skid Steer.

 ENGI0324-007 05/01/2022

ALGER, BARAGA, CHIPPEWA, DELTA, DICKINSON, GOGEBIC, HOUGHTON, IRON, KEWEENAW, LUCE, MACKINAC MARQUETTE, MENOMINEE, ONTONAGON AND SCHOOLCRAFT COUNTIES:

	Rates	Fringes
OPERATOR: Power Equipment (Steel Erection)		
Compressor, welder and forklift.....	\$ 37.40	24.60
Crane operator, main boom & jib 120' or longer.....	\$ 43.87	24.60
Crane operator, main boom & jib 140' or longer.....	\$ 44.17	24.60
Crane operator, main boom & jib 220' or longer.....	\$ 44.17	24.60
Mechanic with truck and tools.....	\$ 43.00	24.60
Oiler and fireman.....	\$ 35.86	24.60
Regular operator.....	\$ 41.22	24.60

 ENGI0324-008 10/01/2020

ALCONA, ALGER, ALLEGAN, ALPENA, ANTRIM, ARENAC, BARAGA, BARRY, BAY, BENZIE, BERRIEN, BRANCH, CALHOUN, CASS, CHARLEVOIX, CHEBOYGAN, CHIPPEWA, CLARE, CLINTON, CRAWFORD, DELTA, DICKINSON, EATON, EMMET, GENESEE, GLADWIN, GOGEBIC, GRAND TRAVERSE, GRATIOT, HILLSDALE, HOUGHTON, HURON, INGHAM, IONIA, IOSCO, IRON, ISABELLA, JACKSON, KALAMAZOO, KALKASKA, KENT,

KEWEENAW, LAKE, LAPEER, LEELANAU, LENAWEE, LIVINGSTON, LUCE, MACKINAC, MACOMB, MANISTEE, MARQUETTE, MASON, MECOSTA, MENOMINEE, MIDLAND, MISSAUKEE, MONTCALM, MONTMORENCY, MONROE, MUSKEGON, NEWAYGO, OAKLAND, OCEANA, OGEMAW, ONTONAGON, OSCEOLA, OSCODA, OTSEGO, OTTAWA, PRESQUE ISLE, ROSCOMMON, SAGINAW, ST. CLARE, ST. JOSEPH, SANILAC, SCHOOLCRAFT, SHIAWASSEE, TUSCOLA, VAN BUREN, WASHTENAW, WAYNE AND WEXFORD COUNTIES

	Rates	Fringes
OPERATOR: Power Equipment (Sewer Relining)		
GROUP 1.....	\$ 35.37	14.31
GROUP 2.....	\$ 33.33	14.31

SEWER RELINING CLASSIFICATIONS

GROUP 1: Operation of audio-visual closed circuit TV system, including remote in-ground cutter and other equipment used in connection with the CCTV system

GROUP 2: Operation of hot water heaters and circulation systems, water jettors and vacuum and mechanical debris removal systems

ENGI0325-012 05/01/2022

	Rates	Fringes
Power equipment operators - gas distribution and duct installation work:		
GROUP 1.....	\$ 34.83	24.85
GROUP 2.....	\$ 32.55	24.85

SCOPE OF WORK: The construction, installation, treating and reconditioning of pipelines transporting gas vapors within cities, towns, subdivisions, suburban areas, or within private property boundaries, up to and including private meter settings of private industrial, governmental or other premises, more commonly referred to as "distribution work," starting from the first metering station, connection, similar or related facility, of the main or cross country pipeline and including duct installation.

Group 1: Backhoe, crane, grader, mechanic, dozer (D-6 equivalent or larger), side boom (D-4 equivalent or larger), trencher(except service), endloader (2 yd. capacity or greater).

GROUP 2: Dozer (less than D-6 equivalent), endloader (under 2 yd. capacity), side boom (under D-4 capacity), backfiller, pumps (1 or 2 of 6-inch discharge or greater), boom truck (with powered boom), tractor (wheel type other than backhoe or front endloader). Tamper (self-propelled), boom truck (with non-powered boom), concrete saw (20 hp or larger), pumps (2 to 4 under 6-inch discharge), compressor (2 or more or when one is used continuously into the second day) and trencher(service). Oiler, hydraulic pipe pushing machine, grease person and hydrostatic testing operator.

IRON0008-007 06/01/2022

ALGER, BARAGA, CHIPPEWA, DELTA, DICKINSON, GOGEBIC, HOUGHTON,
 IRON, KEWEENAW, LUCE, MACKINAC MARQUETTE, MENOMINEE, ONTONAGON
 AND SCHOOLCRAFT COUNTIES:

	Rates	Fringes
Ironworker - pre-engineered metal building erector.....	\$ 23.70	6.95
IRONWORKER		
General contracts		
\$10,000,000 or greater.....	\$ 38.14	28.70
General contracts less		
than \$10,000,000.....	\$ 38.14	28.70

Paid Holidays: New Year's Day, Memorial Day, July 4th, Labor
 Day, Thanksgiving Day & Christmas Day.

 IRON0025-002 06/01/2022

ALCONA, ALPENA, ARENAC, BAY, CHEBOYGAN, CLARE, CLINTON,
 CRAWFORD, GENESEE, GLADWIN, GRATIOT, HURON, INGHAM, IOSCO,
 ISABELLA, JACKSON, LAPEER, LIVINGSTON, MACOMB, MIDLAND,
 MONTMORENCY, OAKLAND, OGEMAW, OSCODA, OTSEGO, PRESQUE ISLE,
 ROSCOMMON, SAGINAW, SANILAC, SHIAWASSEE, ST. CLAIR, TUSCOLA,
 WASHTENAW AND WAYNE COUNTIES:

	Rates	Fringes
Ironworker - pre-engineered metal building erector		
ALLEGAN, ANTRIM, BARRY, BENZIE, BRANCH, CALHOUN, CHARLEVOIX, EATON, EMMET, GRAND TRAVERSE, HILLSDALE, IONIA, KALAMAZOO, KALKASKA, KENT, LAKE, LEELANAU, MANISTEE, MASON, MECOSTA, MISSAUKEE, MONTCALM, MUSKEGON, NEWAYGO, OCEANA, OSCEOLA, OTTAWA, ST. JOSEPH, VAN BUREN AND WEXFORD COUNTIES:..	\$ 24.59	25.43
Bay, Genesee, Lapeer, Livingston (east of Burkhardt Road), Macomb, Midland, Oakland, Saginaw, St. Clair, The University of Michigan, Washtenaw (east of U.S. 23) & Wayne...	\$ 25.81	26.43
IRONWORKER		
Ornamental and Structural...	\$ 34.50	38.44
Reinforcing.....	\$ 31.43	34.77

 IRON0055-005 07/01/2022

LENAWEE AND MONROE COUNTIES:

	Rates	Fringes
IRONWORKER		
Pre-engineered metal		

buildings.....	\$ 23.59	19.35
All other work.....	\$ 33.00	27.20

IRON0292-003 06/01/2020

BERRIEN AND CASS COUNTIES:

	Rates	Fringes
IRONWORKER (Including pre-engineered metal building erector).....	\$ 31.75	22.84

LAB00005-006 10/01/2022

	Rates	Fringes
Laborers - hazardous waste abatement: (ALCONA, ALPENA, ANTRIM, BENZIE, CHARLEVOIX, CHEBOYGAN, CRAWFORD, EMMET, GRAND TRAVERSE, IOSCO, KALKASKA, LEELANAU, MISSAUKEE, MONTMORENCY, OSCODA, OTSEGO, PRESQUE ISLE AND WEXFORD COUNTIES - Zone 10)		
Levels A, B or C.....	\$ 17.45	12.75
class b.....	\$ 18.64	12.90
Work performed in conjunction with site preparation not requiring the use of personal protective equipment; Also, Level D.....	\$ 16.45	12.75
class a.....	\$ 17.64	12.90
Zone 10		
Laborers - hazardous waste abatement: (ALGER, BARAGA, CHIPPEWA, DELTA, DICKINSON, GOGEBIC, HOUGHTON, IRON, KEWEENAW, LUCE, MACKINAC, MARQUETTE, MENOMINEE, ONTONAGON AND SCHOOLCRAFT COUNTIES - Zone 11)		
Levels A, B or C.....	\$ 25.18	12.90
Work performed in conjunction with site preparation not requiring the use of personal protective equipment; Also, Level D.....	\$ 22.58	12.90
Laborers - hazardous waste abatement: (ALLEGAN, BARRY, BERRIEN, BRANCH, CALHOUN, CASS, IONIA COUNTY (except the city of Portland); KALAMAZOO, KENT, LAKE, MANISTEE, MASON, MECOSTA, MONTCALM, MUSKEGON, NEWAYGO, OCEANA, OSCEOLA, OTTAWA, ST. JOSEPH AND VAN BUREN COUNTIES - Zone 9)		
Levels A, B or C.....	\$ 21.88	13.26
Work performed in		

conjunction with site preparation not requiring the use of personal protective equipment; Also, Level D.....\$ 20.80	12.90
Laborers - hazardous waste abatement: (ARENAC, BAY, CLARE, GLADWIN, GRATIOT, HURON, ISABELLA, MIDLAND, OGEMAW, ROSCOMMON, SAGINAW AND TUSCOLA COUNTIES - Zone 8) Levels A, B or C.....\$ 23.74	12.95
Work performed in conjunction with site preparation not requiring the use of personal protective equipment; Also, Level D.....\$ 20.80	12.90
Laborers - hazardous waste abatement: (CLINTON, EATON AND INGHAM COUNTIES; IONIA COUNTY (City of Portland); LIVINGSTON COUNTY (west of Oak Grove Rd., including the City of Howell) - Zone 6) Levels A, B or C.....\$ 26.33	12.95
Work performed in conjunction with site preparation not requiring the use of personal protective equipment; Also, Level D.....\$ 24.64	12.90
Laborers - hazardous waste abatement: (GENESEE, LAPEER AND SHIAWASSEE COUNTIES - Zone 7) Levels A, B or C.....\$ 24.20	13.80
Work performed in conjunction with site preparation not requiring the use of personal protective equipment; Also, Level D.....\$ 23.20	13.80
Laborers - hazardous waste abatement: (HILLSDALE, JACKSON AND LENAWEЕ COUNTIES - Zone 4) Levels A, B or C.....\$ 27.13	14.95
Work performed in conjunction with site preparation not requiring the use of personal protective equipment; Also, Level D.....\$ 24.17	12.90
Laborers - hazardous waste abatement: (LIVINGSTON COUNTY (east of Oak Grove Rd. and south of M-59, excluding the city of Howell); AND WASHTENAW COUNTY - Zone 3) Levels A, B or C.....\$ 29.93	14.20
Work performed in conjunction with site preparation not requiring the use of personal	

protective equipment; Also, Level D.....	\$ 28.93	14.20
Laborers - hazardous waste abatement: (MACOMB AND WAYNE COUNTIES - Zone 1)		
Levels A, B or C.....	\$ 29.93	16.90
Work performed in conjunction with site preparation not requiring the use of personal protective equipment;		
Also, Level D.....	\$ 28.93	16.90
Laborers - hazardous waste abatement: (MONROE COUNTY - Zone 4)		
Levels A, B or C.....	\$ 31.75	14.90
Work performed in conjunction with site preparation not requiring the use of personal protective equipment;		
Also, Level D.....	\$ 31.75	14.90
Laborers - hazardous waste abatement: (OAKLAND COUNTY and the Northeast portion of LIVINGSTON COUNTY bordered by Oak Grove Road on the West and M-59 on the South - Zone 2)		
Level A, B, C.....	\$ 29.93	16.90
Work performed in conjunction with site preparation not requiring the use of personal protective equipment;		
Also, Level D.....	\$ 28.93	16.90
Laborers - hazardous waste abatement: (SANILAC AND ST. CLAIR COUNTIES - Zone 5)		
Levels A, B or C.....	\$ 26.21	16.62
Work performed in conjunction with site preparation not requiring the use of personal protective equipment;		
Also, Level D.....	\$ 24.75	16.35

LAB00259-001 09/01/2022

AREA 1: MACOMB, OAKLAND AND WAYNE COUNTIES
AREA 2: ALCONA, ALGER, ALLEGAN, ALPENA, ANTRIM, ARENAC, BARAGA,
BARRY, BAY, BENZIE, BERRIEN, BRANCH, CALHOUN, CASS, CHARLEVOIX,
CHEBOYGAN, CHIPPEWA, CLARE, CLINTON, CRAWFORD, DELTA,
DICKINSON, EATON, EMMET, GENESEE, GLADWIN, GOGEBIC, GRAND
TRAVERSE, GRATIOT, HILLSDALE, HOUGHTON, HURON, INGHAM, IONIA,
IOSCO, IRON, ISABELLA, JACKSON, KALAMAZOO, KALKASKA, KENT,
KEWEENAW, LAKE, LAPEER, LEELANAU, LENAWEE, LIVINGSTON, LUCE,
MACKINAC, MANISTEE, MARQUETTE, MASON, MECOSTA, MENOMINEE,
MIDLAND, MISSAUKEE, MONROE, MONTCALM, MONTMORENCY, MUSKEGON,
NEWAYGO, OCEANA, OGEMAW, ONTONAGON, OSCEOLA, OSCODA, OTSEGO,
OTTAWA, PRESQUE ISLE, ROSCOMMON, SAGINAW, ST. CLARE, ST.
JOSEPH, SANILAC, SCHOOLCRAFT, SHIAWASSEE, TUSCOLA, VAN BUREN,
WASHTENAW AND WEXFORD COUNTIES

	Rates	Fringes
Laborers - tunnel, shaft and caisson:		
AREA 1		
GROUP 1.....	\$ 23.62	16.95
GROUP 2.....	\$ 23.73	19.95
GROUP 3.....	\$ 23.79	16.95
GROUP 4.....	\$ 23.97	16.95
GROUP 5.....	\$ 24.22	16.95
GROUP 6.....	\$ 24.55	16.95
GROUP 7.....	\$ 17.83	16.95
AREA 2		
GROUP 1.....	\$ 25.15	12.95
GROUP 2.....	\$ 25.24	12.95
GROUP 3.....	\$ 25.34	12.95
GROUP 4.....	\$ 25.50	12.95
GROUP 5.....	\$ 25.76	12.95
GROUP 6.....	\$ 26.07	12.95
GROUP 7.....	\$ 18.34	12.95

SCOPE OF WORK: Tunnel, shaft and caisson work of every type and description and all operations incidental thereto, including, but not limited to, shafts and tunnels for sewers, water, subways, transportation, diversion, sewerage, caverns, shelters, aquifers, reservoirs, missile silos and steel sheeting for underground construction.

TUNNEL LABORER CLASSIFICATIONS

GROUP 1: Tunnel, shaft and caisson laborer, dump, shanty, hog house tender, testing (on gas) and watchman

GROUP 2: Manhole, headwall, catch basin builder, bricklayer tender, mortar machine and material mixer

GROUP 3: Air tool operator (jackhammer, bush hammer and grinder), first bottom, second bottom, cage tender, car pusher, carrier, concrete, concrete form, concrete repair, cement invert laborer, cement finisher, concrete shoveler, conveyor, floor, gasoline and electric tool operator, gunite, grout operator, welder, heading dinky person, inside lock tender, pea gravel operator, pump, outside lock tender, scaffold, top signal person, switch person, track, tugger, utility person, vibrator, winch operator, pipe jacking, wagon drill and air track operator and concrete saw operator (under 40 h.p.)

GROUP 4: Tunnel, shaft and caisson mucker, bracer, liner plate, long haul dinky driver and well point

GROUP 5: Tunnel, shaft and caisson miner, drill runner, key board operator, power knife operator, reinforced steel or mesh (e.g. wire mesh, steel mats, dowel bars, etc.)

GROUP 6: Dynamite and powder

GROUP 7: Restoration laborer, seeding, sodding, planting, cutting, mulching and top soil grading; and the restoration of property such as replacing mailboxes, wood chips, planter boxes, flagstones, etc.

* LAB00334-001 09/01/2022

	Rates	Fringes
Laborers - open cut:		
ZONE 1 - MACOMB, OAKLAND AND WAYNE COUNTIES:		
GROUP 1.....	\$ 23.47	16.95
GROUP 2.....	\$ 23.58	16.95
GROUP 3.....	\$ 23.63	16.95
GROUP 4.....	\$ 23.71	16.95
GROUP 5.....	\$ 24.17	16.95
GROUP 6.....	\$ 21.22	16.95
GROUP 7.....	\$ 17.84	16.95
ZONE 2 - LIVINGSTON COUNTY (east of M-151 (Oak Grove Rd.)); MONROE AND WASHTENAW COUNTIES:		
GROUP 1.....	\$ 25.20	13.15
GROUP 2.....	\$ 24.91	12.95
GROUP 3.....	\$ 25.03	12.95
GROUP 4.....	\$ 25.10	12.95
GROUP 5.....	\$ 25.25	12.95
GROUP 6.....	\$ 22.55	12.95
GROUP 7.....	\$ 19.19	12.95
ZONE 3 - CLINTON, EATON, GENESEE, HILLSDALE AND INGHAM COUNTIES; IONIA COUNTY (City of Portland); JACKSON, LAPEER AND LENAWEE COUNTIES; LIVINGSTON COUNTY (west of M-151 Oak Grove Rd.); SANILAC, ST. CLAIR AND SHIAWASSEE COUNTIES:		
GROUP 1.....	\$ 23.39	13.15
GROUP 2.....	\$ 23.13	12.95
GROUP 3.....	\$ 23.25	12.95
GROUP 4.....	\$ 23.30	12.95
GROUP 5.....	\$ 23.44	12.95
GROUP 6.....	\$ 20.74	12.95
GROUP 7.....	\$ 17.89	12.95
ZONE 4 - ALCONA, ALLEGAN, ALPENA, ANTRIM, ARENAC, BARRY, BAY, BENZIE, BERRIEN, BRANCH, CALHOUN, CASS, CHARLEVOIX, CHEBOYGAN, CLARE, CRAWFORD, EMMET, GLADWIN, GRAND TRAVERSE, GRATIOT AND HURON COUNTIES; IONIA COUNTY (EXCEPT THE CITY OF PORTLAND); IOSCO, ISABELLA, KALAMAZOO, KALKASKA, KENT, LAKE, LEELANAU, MANISTEE, MASON, MECOSTA, MIDLAND, MISSAUKEE, MONTCALM, MONTMORENCY, MUSKEGON, NEWAYGO, OCEANA, OGEMAW, OSCEOLA, OSCODA, OTSEGO, OTTAWA, PRESQUE ISLE, ROSCOMMON, SAGINAW, ST. JOSEPH, TUSCOLA, VAN BUREN AND WEXFORD COUNTIES:		
GROUP 1.....	\$ 22.42	12.95

GROUP 2.....	\$ 22.15	12.95
GROUP 3.....	\$ 22.26	12.95
GROUP 4.....	\$ 22.33	12.95
GROUP 5.....	\$ 22.45	12.95
GROUP 6.....	\$ 19.67	12.95
GROUP 7.....	\$ 18.01	12.95

ZONE 5 - ALGER, BARAGA,
CHIPPEWA, DELTA,
DICKINSON, GOGEBIC,
HOUGHTON, IRON,
KEWEENAW, LUCE, MACKINAC,
MARQUETTE, MENOMINEE,
ONTONAGON AND SCHOOLCRAFT
COUNTIES:

GROUP 1.....	\$ 22.24	12.95
GROUP 2.....	\$ 22.38	12.95
GROUP 3.....	\$ 22.51	12.95
GROUP 4.....	\$ 22.56	12.95
GROUP 5.....	\$ 22.64	13.41
GROUP 6.....	\$ 19.99	12.95
GROUP 7.....	\$ 18.10	12.95

SCOPE OF WORK:

Open cut construction work shall be construed to mean work which requires the excavation of earth including industrial, commercial and residential building site excavation and preparation, land balancing, demolition and removal of concrete and underground appurtenances, grading, paving, sewers, utilities and improvements; retention, oxidation, flocculation and irrigation facilities, and also including but not limited to underground piping, conduits, steel sheeting for underground construction, and all work incidental thereto, and general excavation. For all areas except the Upper Peninsula, open cut construction work shall also be construed to mean waterfront work, piers, docks, seawalls, breakwalls, marinas and all incidental work. Open cut construction work shall not include any structural modifications, alterations, additions and repairs to buildings, or highway work, including roads, streets, bridge construction and parking lots or steel erection work and excavation for the building itself and back filling inside of and within 5 ft. of the building and foundations, footings and piers for the building. Open cut construction work shall not include any work covered under Tunnel, Shaft and Caisson work.

OPEN CUT LABORER CLASSIFICATIONS

GROUP 1: Construction laborer

GROUP 2: Mortar and material mixer, concrete form person, signal person, well point person, manhole, headwall and catch basin builder, headwall, seawall, breakwall and dock builder

GROUP 3: Air, gasoline and electric tool operator, vibrator operator, driller, pump person, tar kettle operator, bracer, rodder, reinforced steel or mesh person (e.g., wire mesh, steel mats, dowel bars, etc.), welder, pipe jacking and boring person, wagon drill and air track operator and concrete saw operator (under 40 h.p.), windlass and tugger person and directional boring person

GROUP 4: Trench or excavating grade person

GROUP 5: Pipe layer (including crock, metal pipe, multi-plate or other conduits)

GROUP 6: Grouting man, audio-visual television operations and all other operations in connection with closed circuit television inspection, pipe cleaning and pipe relining work and the installation and repair of water service pipe and appurtenances

GROUP 7: Restoration laborer, seeding, sodding, planting, cutting, mulching and top soil grading; and the restoration of property such as replacing mailboxes, wood chips, planter boxes, flagstones, etc.

LAB00465-001 06/01/2022

LABORER: Highway, Bridge and Airport Construction

AREA 1: GENESEE, MACOMB, MONROE, OAKLAND, WASHTENAW AND WAYNE COUNTIES

AREA 2: ALLEGAN, BARRY, BAY, BERRIEN, BRANCH, CALHOUN, CASS, CLINTON, EATON, GRATIOT, HILLSDALE, HURON, INGHAM, JACKSON, KALAMAZOO, LAPEER, LENAWEE, LIVINGSTON, MIDLAND, MUSKEGON, SAGINAW, SANILAC, SHIAWASSEE, ST. CLAIR, ST. JOSEPH, TUSCOLA AND VAN BUREN COUNTIES

AREA 3: ALCONA, ALPENA, ANTRIM, ARENAC, BENZIE, CHARLEVOIX, CHEBOYGAN, CLARE, CRAWFORD, EMMET, GLADWIN, GRAND TRAVERSE, IONIA, IOSCO, ISABELLA, KALKASKA, KENT, LAKE, LEELANAU, MANISTEE, MASON, MECOSTA, MISSAUKEE, MONTCALM, MONTMORENCY, NEWAYGO, OCEANA, OGEMAW, OSCEOLA, OSCODA, OTSEGO, OTTAWA, PRESQUE ISLE, ROSCOMMON AND WEXFORD COUNTIES

AREA 4: ALGER, BARAGA, CHIPPEWA, DELTA, DICKINSON, GOGEBIC, HOUGHTON, IRON, KEWEENAW, LUCE, MACKINAC, MARQUETTE, MENOMINEE, ONTONAGON AND SCHOOLCRAFT COUNTIES

	Rates	Fringes
LABORER (AREA 1)		
GROUP 1.....	\$ 32.02	13.95
GROUP 2.....	\$ 32.15	13.95
GROUP 3.....	\$ 32.33	13.95
GROUP 4.....	\$ 32.41	13.95
GROUP 5.....	\$ 32.62	13.95
GROUP 6.....	\$ 32.92	13.95
LABORER (AREA 2)		
GROUP 1.....	\$ 26.92	12.90
GROUP 2.....	\$ 27.12	12.90
GROUP 3.....	\$ 27.36	12.90
GROUP 4.....	\$ 27.71	12.90
GROUP 5.....	\$ 27.58	12.90
GROUP 6.....	\$ 27.92	12.90
LABORER (AREA 3)		
GROUP 1.....	\$ 26.22	12.90
GROUP 2.....	\$ 26.43	12.90
GROUP 3.....	\$ 26.72	12.90
GROUP 4.....	\$ 27.16	12.90
GROUP 5.....	\$ 26.78	12.90
GROUP 6.....	\$ 27.21	12.90
LABORER (AREA 4)		

GROUP 1.....	\$ 26.22	12.90
GROUP 2.....	\$ 26.43	12.90
GROUP 3.....	\$ 26.72	12.90
GROUP 4.....	\$ 27.16	12.90
GROUP 5.....	\$ 26.78	12.90
GROUP 6.....	\$ 27.21	12.90

LABORER CLASSIFICATIONS

GROUP 1: Asphalt shoveler or loader; asphalt plant misc.; burlap person; yard person; dumper (wagon, truck, etc.); joint filling laborer; miscellaneous laborer; unskilled laborer; sprinkler laborer; form setting laborer; form stripper; pavement reinforcing; handling and placing (e.g., wire mesh, steel mats, dowel bars); mason's tender or bricklayer's tender on manholes; manhole builder; headwalls, etc.; waterproofing, (other than buildings) seal coating and slurry mix, shoring, underpinning; pressure grouting; bridge pin and hanger removal; material recycling laborer; horizontal paver laborer (brick, concrete, clay, stone and asphalt); ground stabilization and modification laborer; grouting; waterblasting; top person; railroad track and trestle laborer; carpenters' tender; guard rail builders' tender; earth retention barrier and wall and M.S.E. wall installer's tender; highway and median installer's tender (including sound, retaining, and crash barriers); fence erector's tender; asphalt raker tender; sign installer; remote control operated equipment.

GROUP 2: Mixer operator (less than 5 sacks); air or electric tool operator (jackhammer, etc.); spreader; boxperson (asphalt, stone, gravel); concrete paddler; power chain saw operator; paving batch truck dumper; tunnel mucker (highway work only); concrete saw (under 40 h.p.) and dry pack machine; roto-mill grounds person.

GROUP 3: Tunnel miner (highway work only); finishers tenders; guard rail builders; highway and median barrier installer; earth retention barrier and wall and M.S.E. wall installer's (including sound, retaining and crash barriers); fence erector; bottom person; powder person; wagon drill and air track operator; diamond and core drills; grade checker; certified welders; curb and side rail setter's tender.

GROUP 4: Asphalt raker

GROUP 5: Pipe layers, oxy-gun

GROUP 6: Line-form setter for curb or pavement; asphalt screed checker/screw man on asphalt paving machines.

LAB01076-005 04/01/2022

MICHIGAN STATEWIDE

	Rates	Fringes
LABORER (DISTRIBUTION WORK)		
Zone 1.....	\$ 25.17	13.32
Zone 2.....	\$ 23.47	13.40
Zone 3.....	\$ 21.60	13.45
Zone 4.....	\$ 20.97	13.43
Zone 5.....	\$ 21.00	13.40

DISTRIBUTION WORK - The construction, installation, treating and reconditioning of distribution pipelines transporting coal, oil, gas or other similar materials, vapors or liquids, including pipelines within private property boundaries, up to and including the meter settings on residential, commercial, industrial, institutional, private and public structures. All work covering pumping stations and tank farms not covered by the Building Trades Agreement. Other distribution lines with the exception of sewer, water and cable television are included.

Underground Duct Layer Pay: \$.40 per hour above the base pay rate.

Zone 1 - Macomb, Oakland and Wayne

Zone 2 - Monroe and Washtenaw

Zone 3 - Bay, Genesee, Lapeer, Midland, Saginaw, Sanilac, Shiawassee and St. Clair

Zone 4 - Alger, Baraga, Chippewa, Delta, Dickinson, Gogebic, Houghton, Iron, Keweenaw, Luce, Mackinac, Marquette, Menominee, Ontonagon and Schoolcraft

Zone 5 - Remaining Counties in Michigan

 PAIN0022-002 07/01/2008

HILLSDALE, JACKSON AND LENAWEE COUNTIES; LIVINGSTON COUNTY (east of the eastern city limits of Howell, not including the city of Howell, north to the Genesee County line and south to the Washtenaw County line); MACOMB, MONROE, OAKLAND, WASHTENAW AND WAYNE COUNTIES:

	Rates	Fringes
PAINTER.....	\$ 25.06	14.75

FOOTNOTES: For all spray work and journeyman rigging for spray work, also blowing off, \$0.80 per hour additional (applies only to workers doing rigging for spray work on off the floor work. Does not include setting up or moving rigging on floor surfaces, nor does it apply to workers engaged in covering up or tending spray equipment. For all sandblasting and spray work performed on highway bridges, overpasses, tanks or steel, \$0.80 per hour additional. For all brushing, cleaning and other preparatory work (other than spraying or steeplejack work) at scaffold heights of fifty (50) feet from the ground or higher, \$0.50 per hour additional. For all preparatorial work and painting performed on open steel under forty (40) feet when no scaffolding is involved, \$0.50 per hour additional. For all swing stage work-window jacks and window belts-exterior and interior, \$0.50 per hour additional. For all spray work and sandblaster work to a scaffold height of forty (40) feet above the floor level, \$0.80 per hour additional. For all preparatorial work and painting on all highway bridges or overpasses up to forty (40) feet in height, \$0.50 per hour additional. For all steeplejack work performed where the elevation is forty (40) feet or more, \$1.25 per hour additional.

 PAIN0312-001 06/01/2018

EXCLUDES: ALLEGAN COUNTY (Townships of Dorr, Fillmore, Heath, Hopkins, Laketown, Leighton, Manlius, Monterey, Overisel, Salem, Saugatuck and Wayland); INCLUDES: Barry, Berrien, Branch, Calhoun, Cass, Hillsdale, Kalamazoo, St. Joseph, Van Buren

	Rates	Fringes
PAINTER		
Brush and roller.....	\$ 23.74	13.35
Spray, Sandblast, Sign		
Painting.....	\$ 24.94	13.35

PAIN0845-003 05/10/2018

CLINTON COUNTY; EATON COUNTY (does not include the townships of Bellevue and Olivet); INGHAM COUNTY; IONIA COUNTY (east of Hwy. M 66); LIVINGSTON COUNTY (west of the eastern city limits of Howell, including the city of Howell, north to the Genesee County line and south to the Washtenaw County line); AND SHIAWASSEE COUNTY (Townships of Bennington, Laingsbury and Perry):

	Rates	Fringes
PAINTER.....	\$ 25.49	13.74

PAIN0845-015 05/10/2018

MUSKEGON COUNTY; NEWAYGO COUNTY (except the Townships of Barton, Big Prairie, Brooks, Croton, Ensley, Everett, Goodwell, Grant, Home, Monroe, Norwich and Wilcox); OCEANA COUNTY; OTTAWA COUNTY (except the townships of Allendale, Blendone, Chester, Georgetown, Holland, Jamestown, Olive, Park, Polkton, Port Sheldon, Tallmadge, Wright and Zeeland):

	Rates	Fringes
PAINTER.....	\$ 25.49	13.74

PAIN0845-018 05/10/2018

ALLEGAN COUNTY (Townships of Dorr, Fillmore, Heath, Hopkins, Laketown, Leighton, Manlius, Monterey, Overisel, Salem, Saugatuck and Wayland); IONIA COUNTY (west of Hwy. M-66); KENT, MECOSTA AND MONTCALM COUNTIES; NEWAYGO COUNTY (Townships of Barton, Big Prairie, Brooks, Croton, Ensley, Everett, Goodwell, Grant, Home, Monroe, Norwich and Wilcox); OSCEOLA COUNTY (south of Hwy. #10); OTTAWA COUNTY (Townships of Allendale, Blendone, Chester, Georgetown, Holland, Jamestown, Olive, Park, Polkton, Port Sheldon, Tallmadge, Wright and Zeeland):

	Rates	Fringes
PAINTER.....	\$ 25.49	13.74

FOOTNOTES: Lead abatement work: \$1.00 per hour additional.

PAIN1011-003 06/02/2022

ALGER, BARAGA, CHIPPEWA, DELTA, DICKINSON, GOGEBIC, HOUGHTON,

IRON, KEWEENAW, LUCE, MACKINAC, MARQUETTE, MENOMINEE, ONTONAGON
AND SCHOOLCRAFT COUNTIES:

	Rates	Fringes
PAINTER.....	\$ 24.66	14.99

FOOTNOTES: High pay (bridges, overpasses, watertower): 30 to 80 ft.: \$.65 per hour additional. 80 ft. and over: \$1.30 per hour additional.

PAIN1474-002 06/01/2010

HURON COUNTY; LAPEER COUNTY (east of Hwy. M-53); ST. CLAIR,
SANILAC AND TUSCOLA COUNTIES:

	Rates	Fringes
PAINTER.....	\$ 23.79	12.02

FOOTNOTES: Lead abatement work: \$1.00 per hour additional. Work with any hazardous material: \$1.00 per hour additional. Sandblasting, steam cleaning and acid cleaning: \$1.00 per hour additional. Ladder work at or above 40 ft., scaffold work at or above 40 ft., swing stage, boatswain chair, window jacks and all work performed over a falling height of 40 ft.: \$1.00 per hour additional. Spray gun work, pick pullers and those handling needles, blowing off by air pressure, and any person rigging (setting up and moving off the ground): \$1.00 per hour additional. Steeplejack, tanks, gas holders, stacks, flag poles, radio towers and beacons, power line towers, bridges, etc.: \$1.00 per hour additional, paid from the ground up.

PAIN1803-003 06/01/2019

ALCONA, ALPENA, ANTRIM, ARENAC, BAY, BENZIE, CHARLEVOIX,
CHEBOYGAN, CLARE, CRAWFORD, EMMET, GLADWIN, GRAND TRAVERSE,
GRATIOT, IOSCO, ISABELLA, KALKASKA, LAKE, LEELANAU, MANISTEE,
MASON, MIDLAND, MISSAUKEE, MONTMORENCY AND OGEMAW COUNTIES;
OSCEOLA COUNTY (north of Hwy. #10); OSCODA, OTSEGO, PRESQUE
ISLE, ROSCOMMON, SAGINAW AND WEXFORD COUNTIES:

	Rates	Fringes
PAINTER Work performed on water, bridges over water or moving traffic, radio and powerline towers, elevated tanks, steeples, smoke stacks over 40 ft. of falling heights, recovery of lead-based paints and any work associated with industrial plants, except maintenance of industrial plants.....	\$ 25.39	14.68
All other work, including maintenance of industrial		

plant.....\$ 25.39 14.68

FOOTNOTES: Spray painting, sandblasting, blowdown associated with spraying and blasting, water blasting and work involving a swing stage, boatswain chair or spider: \$1.00 per hour additional. All work performed inside tanks, vessels, tank trailers, railroad cars, sewers, smoke stacks, boilers or other spaces having limited egress not including buildings, opentop tanks, pits, etc.: \$1.25 per hour additional.

PLAS0514-001 06/01/2018

ZONE 1: GENESEE, LIVINGSTON, MACOMB, MONROE, OAKLAND, SAGINAW, WASHTENAW AND WAYNE COUNTIES

ZONE 2: ALCONA, ALGER, ALLEGAN, ALPENA, ANTRIM, ARENAC, BARAGA, BARRY, BAY, BENZIE, BERRIEN, BRANCH, CALHOUN, CASS, CHARLEVOIX, CHEBOYGAN, CHIPPEWA, CLARE, CLINTON, CRAWFORD, DELTA, DICKINSON, EATON, EMMET, GLADWIN, GOGEBIC, GRAND TRAVERSE, GRATIOT, HILLSDALE, HOUGHTON, HURON, INGHAM, IONIA, IOSCO, IRON, ISABELLA, JACKSON, KALAMAZOO, KALKASKA, KENT, KEWEENAW, LAKE, LAPEER, LEELANAU, LENAWEE, LUCE, MACKINAC, MANISTEE, MARQUETTE, MASON, MECOSTA, MENOMINEE, MIDLAND, MISSAUKEE, MONTCALM, MONTMORENCY, MUSKEGON, NEWAYGO, OCEANA, OGEMAW, ONTONAGON, OSCEOLA, OSCODA, OTSEGO, OTTAWA, PRESQUE ISLE, ROSCOMMON, SANILAC, SCHOOLCRAFT, SHIAWASSEE, ST. CLAIR, ST. JOSEPH, TUSCOLA, VAN BUREN AND WEXFORD COUNTIES

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER		
ZONE 1.....	\$ 31.47	13.81
ZONE 2.....	\$ 29.97	13.81

PLUM0190-003 05/01/2015

ALCONA, ALGER, ALLEGAN, ALPENA, ANTRIM, ARENAC, BARAGA, BARRY, BAY, BENZIE, BERRIEN, BRANCH, CALHOUN, CASS, CHARLEVOIX, CHEBOYGAN, CHIPPEWA, CLARE, CLINTON, CRAWFORD, DELTA, DICKINSON, EATON, EMMET, GENESEE, GLADWIN, GOGEBIC, GRAND TRAVERSE, GRATIOT, HILLSDALE, HOUGHTON, HURON, INGHAM, IONIA, IOSCO, IRON, ISABELLA, JACKSON, KALAMAZOO, KALKASKA, KENT, KEWEENAW, LAKE, LAPEER, LEELANAU, LENAWEE, LIVINGSTON, LUCE, MACKINAC, MACOMB, MANISTEE, MARQUETTE, MASON, MECOSTA, MENOMINEE, MIDLAND, MISSAUKEE, MONTCALM, MONTMORENCY, MONROE, MUSKEGON, NEWAYGO, OAKLAND, OCEANA, OGEMAW, ONTONAGON, OSCEOLA, OSCODA, OTSEGO, OTTAWA, PRESQUE ISLE, ROSCOMMON, SAGINAW, ST. CLARE, ST. JOSEPH, SANILAC, SCHOOLCRAFT, SHIAWASSEE, TUSCOLA, VAN BUREN, WASHTENAW, WAYNE AND WEXFORD COUNTIES

	Rates	Fringes
Plumber/Pipefitter - gas distribution pipeline:		
Welding in conjunction with gas distribution pipeline work.....	\$ 33.03	20.19
All other work:.....	\$ 24.19	12.28

TEAM0007-004 06/01/2020

AREA 1: ALCONA, ALGER, ALLEGAN, ALPENA, ANTRIM, ARENAC, BARAGA, BARRY, BAY, BENZIE, BERRIEN, BRANCH, CALHOUN, CASS, CHARLEVOIX, CHEBOYGAN, CHIPPEWA, CLARE, CLINTON, CRAWFORD, DELTA, DICKINSON, EATON, EMMET, GLADWIN, GOGEBIC, GRAND TRAVERSE, GRATIOT, HILLSDALE, HOUGHTON, HURON, INGHAM, IONIA, IOSCO, IRON, ISABELLA, JACKSON, KALAMAZOO, KALKASKA, KENT, KEWEENAW, LAKE, LAPEER, LEELANAU, LENAWEE, LUCE, MACKINAC, MANISTEE, MARQUETTE, MASON, MECOSTA, MENOMINEE, MIDLAND, MISSAUKEE, MONTCALM, MONTMORENCY, MUSKEGON, NEWAYGO, OCEANA, OGEMAW, ONTONAGON, OSCEOLA, OSCODA, OTSEGO, OTTAWA, PRESQUE ISLE, ROSCOMMON, SAGINAW, SANILAC, SCHOOLCRAFT, SHIAWASSEE, ST. CLAIR, ST. JOSEPH, TUSCOLA, VAN BUREN AND WEXFORD COUNTIES

AREA 2: GENESEE, LIVINGSTON, MACOMB, MONROE, OAKLAND, WASHTENAW AND WAYNE COUNTIES

	Rates	Fringes
TRUCK DRIVER		
AREA 1		
Euclids, double bottoms and lowboys.....	\$ 28.05	.50 + a+b
Trucks under 8 cu. yds.....	\$ 27.80	.50 + a+b
Trucks, 8 cu. yds. and over.....	\$ 27.90	.50 + a+b
AREA 2		
Euclids, double bottomms and lowboys.....	\$ 24.895	.50 + a+b
Euclids, double bottoms and lowboys.....	\$ 28.15	.50 + a+b
Trucks under 8 cu. yds.....	\$ 27.90	.50 + a+b
Trucks, 8 cu. yds. and over.....	\$ 28.00	.50 + a+b

Footnote:

- a. \$470.70 per week
- b. \$68.70 daily

TEAM0247-004 04/01/2013

AREA 1: ALCONA, ALGER, ALLEGAN, ALPENA, ANTRIM, ARENAC, BARAGA, BARRY, BAY, BENZIE, BERRIEN, BRANCH, CALHOUN, CASS, CHARLEVOIX, CHEBOYGAN, CHIPPEWA, CLARE, CLINTON, CRAWFORD, DELTA, DICKINSON, EATON, EMMET, GLADWIN, GOGEBIC, GRAND TRAVERSE, GRATIOT, HILLSDALE, HOUGHTON, HURON, INGHAM, IONIA, IOSCO, IRON, ISABELLA, JACKSON, KALAMAZOO, KALKASKA, KENT, KEWEENAW, LAKE, LAPEER, LEELANAU, LENAWEE, LUCE, MACKINAC, MANISTEE, MARQUETTE, MASON, MECOSTA, MENOMINEE, MIDLAND, MISSAUKEE, MONTCALM, MONTMORENCY, MUSKEGON, NEWAYGO, OCEANA, OGEMAW, ONTONAGON, OSCEOLA, OSCODA, OTSEGO, OTTAWA, PRESQUE ISLE, ROSCOMMON, SANILAC, SCHOOLCRAFT, SHIAWASSEE, SAGINAW, ST. CLAIR, ST. JOSEPH, TUSCOLA, VAN BUREN AND WEXFORD COUNTIES

AREA 2: GENESEE, LIVINGSTON, MACOMB, MONROE, OAKLAND, WASHTENAW AND WAYNE COUNTIES

	Rates	Fringes
Sign Installer		
AREA 1		
GROUP 1.....	\$ 21.78	11.83
GROUP 2.....	\$ 25.27	11.8375
AREA 2		

GROUP 1.....	\$ 22.03	11.83
GROUP 2.....	\$ 25.02	11.8375

FOOTNOTE:

a. \$132.70 per week, plus \$17.80 per day.

SIGN INSTALLER CLASSIFICATIONS:

GROUP 1: performs all necessary labor and uses all tools required to construct and set concrete forms required in the installation of highway and street signs

GROUP 2: performs all miscellaneous labor, uses all hand and power tools, and operates all other equipment, mobile or otherwise, required for the installation of highway and street signs

TEAM0247-010 04/01/2018

AREA 1: LAPEER AND SHIAWASSEE COUNTIES

AREA 2: GENESEE, MACOMB, MONROE, OAKLAND, ST. CLAIR, WASHTENAW AND WAYNE COUNTIES

	Rates	Fringes
TRUCK DRIVER (Underground construction)		
AREA 1		
GROUP 1.....	\$ 23.82	19.04
GROUP 2.....	\$ 23.91	19.04
GROUP 3.....	\$ 24.12	19.04
AREA 2		
GROUP 1.....	\$ 24.12	19.04
GROUP 2.....	\$ 24.26	19.04
GROUP 3.....	\$ 24.45	19.04

PAID HOLIDAYS: New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas Day.

SCOPE OF WORK: Excavation, site preparation, land balancing, grading, sewers, utilities and improvements; also including but not limited to, tunnels, underground piping, retention, oxidation, flocculation facilities, conduits, general excavation and steel sheeting for underground construction. Underground construction work shall not include any structural modifications, alterations, additions and repairs to buildings or highway work, including roads, streets, bridge construction and parking lots or steel erection.

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Truck driver on all trucks (EXCEPT dump trucks of 8 cubic yards capacity or over, pole trailers, semis, low boys, Euclid, double bottom and fuel trucks)

GROUP 2: Truck driver on dump trucks of 8 cubic yards capacity or over, pole trailers, semis and fuel trucks

GROUP 3: Truck driver on low boy, Euclid and double bottom

* SUMI2002-001 05/01/2002

	Rates	Fringes
Flag Person.....	\$ 10.10 **	0.00
LINE PROTECTOR (ZONE 1: GENESEE, MACOMB, MONROE, OAKLAND, WASHTENAW AND WAYNE)....	\$ 22.89	13.45
LINE PROTECTOR (ZONE 2: STATEWIDE (EXCLUDING GENESEE, MACOMB, MONROE, OAKLAND, WASHTENAW AND WAYNE).....	\$ 20.19	13.45
Pavement Marking Machine (ZONE 1: GENESEE, MACOMB, MONROE, OAKLAND, WASHTENAW AND WAYNE COUNTIES) Group 1.....	\$ 30.52	13.45
Pavement Marking Machine (ZONE 1: GENESEE, MACOMB, MONROE, OAKLAND, WASHTENAW AND WAYNE) Group 2.....	\$ 27.47	13.45
Pavement Marking Machine (ZONE 2: STATEWIDE (EXCLUDING GENESEE, MACOMB, MONROE, OAKLAND, WASHTENAW AND WAYNE COUNTIES) Group 1.....	\$ 26.92	13.45
Pavement Marking Machine (ZONE 2: STATEWIDE (EXCLUDING GENESEE, MACOMB, MONROE, OAKLAND, WASHTENAW AND WAYNE) Group 2.....	\$ 24.23	13.45

WORK CLASSIFICATIONS:

PAVEMENT MARKER GROUP 1: Drives or operates a truck mounted striper, grinder, blaster, groover, or thermoplastic melter for the placement or removal of temporary or permanent pavement markings or markers.

PAVEMENT MARKER GROUP 2: Performs all functions involved for the placement or removal of temporary or permanent pavement markings or markers not covered by the classification of Pavement Marker Group 1 or Line Protector.

LINE PROTECTOR: Performs all operations for the protection or removal of temporary or permanent pavement markings or markers in a moving convoy operation not performed by the classification of Pavement Marker Group 1. A moving convoy operation is comprised of only Pavement Markers Group 1 and Line Protectors.

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$16.20) or 13658 (\$12.15). Please see the Note at the top of the wage determination for more information.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

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Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

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A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

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Wage and Hour Division

U.S. Department of Labor
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2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

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END OF GENERAL DECISIO"

Superseded General Decision Number: MI20220044

State: Michigan

Construction Type: Heavy

Counties: Arenac, Branch, Gladwin, Hillsdale, Huron, Lenawee, Mecosta, Midland, Osceola, Shiawassee and Tuscola Counties in Michigan.

Heavy, Includes Water, Sewer Lines and Excavation (Excludes Hazardous Waste Removal; Coal, Oil, Gas, Duct and other similar Pipeline Construction)

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least \$16.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2023.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least \$12.15 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2023.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number	Publication Date
0	01/06/2023
1	02/03/2023
2	02/17/2023

CARP0100-005 06/01/2021

MECOSTA & OSCEOLA COUNTIES

	Rates	Fringes
CARPENTER (Form Work Only).....	\$ 25.24	20.31

 CARP0525-008 06/01/2021

BRANCH & HILLSDALE COUNTIES

	Rates	Fringes
CARPENTER (Form Work Only).....	\$ 25.94	20.59

 CARP0706-014 06/01/2020

ARENAC, GLADWIN, HURON, MIDLAND & TUSCOLA COUNTIES

	Rates	Fringes
CARPENTER (Form Work Only).....	\$ 27.61	21.84

 CARP0706-018 06/01/2021

SHIAWASSEE COUNTY

	Rates	Fringes
CARPENTER (Form Work Only).....	\$ 29.48	22.00

 CARP1004-013 06/01/2021

LENAWEE COUNTY

	Rates	Fringes
CARPENTER (Form Work Only).....	\$ 27.39	20.73

 ELEC0008-012 05/25/2022

HILLSDALE & LENAWE COUNTY

	Rates	Fringes
ELECTRICIAN.....	\$ 44.79	1.5%+15.61

 ELEC0058-008 06/28/2022

HURON COUNTY

	Rates	Fringes
ELECTRICIAN.....	\$ 48.52	26.11

 ELEC0275-009 06/01/2021

MECOSTA COUNTY

	Rates	Fringes
ELECTRICIAN.....	\$ 33.06	8.94+38%

ELEC0275-014 06/01/2022		

OSCEOLA COUNTY (Townships of Richmond, Hersey, Evert & Orient)

	Rates	Fringes
ELECTRICIAN.....	\$ 34.41	9.27+28%

ELEC0445-008 06/01/2022		

BRANCH COUNTY

	Rates	Fringes
ELECTRICIAN.....	\$ 35.40	23.29

ELEC0498-012 06/01/2022		

OSCEOLA COUNTY (does not include the townships of Evert, Hersey, Orient and Richmond)

	Rates	Fringes
ELECTRICIAN.....	\$ 33.44	21.05

ELEC0557-008 06/01/2020		

MIDLAND (Townships of Ingersoll, Jasper, Mount Haley and Porter) & TUSCOLA (Townships of Almer, Arbela, Columbia, Dayton, Denmark, Elkland, Ellington, Elmwood, Fairgrove, Fremont, Gilford, Indianfields, Juniata, Kingston, Koylon, Novesta, Tuscola, Vassar, Watertown and Wells) COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 34.25	23.13

ELEC0665-018 05/31/2021		

SHIAWASSEE COUNTY (Townships of Perry & Woodhull)

	Rates	Fringes
ELECTRICIAN.....	\$ 37.50	24.04+5.5%

ELEC0692-017 06/01/2022		

ARENAC & GLADWIN COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 35.31	38.03%+9.25

ELEC0692-018 06/01/2022		

MIDLAND (All townships except Mount Haley, Jasper, Porter & Ingersoll) & TUSCOLA (Townships of Wisner & Akron) COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 35.31	38.03%+9.25

ELEC0948-008 06/01/2020		

SHIAWASSEE (All townships except Perry & Woodhull) & TUSCOLA
(Township of Millington) COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 39.17	23.51

ENGI0325-021 09/01/2022		

POWER EQUIPMENT OPERATORS: Underground Construction (Including
Sewer)

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
GROUP 1.....	\$ 37.67	24.85
GROUP 2.....	\$ 32.78	24.85
GROUP 3.....	\$ 32.28	24.85
GROUP 4.....	\$ 32.00	24.85

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Backhoe/ Excavator, Boring Machine, Bulldozer,
Crane, Scraper, Loader, Trencher (over 8 ft. digging
capacity)

GROUP 2: Trencher (8-ft digging capacity and smaller)

GROUP 3: Boom Truck (non-swinging, non- powered type boom)

GROUP 4: Broom/ Sweeper, Fork Truck, Tractor

* ENGI0326-014 06/01/2022

EXCLUDES UNDERGROUND CONSTRUCTION

AREA 1: BRANCH, HILLSDALE, MECOSTA & OSCEOLA COUNTIES

AREA 2: ARENAC, GLADWIN, HURON, MIDLAND, SHIAWASSEE & TUSCOLA
COUNTIES

	Rates	Fringes
Operating Engineer:		
AREA 1		
Group 1.....	\$ 44.13	24.85
Group 2.....	\$ 40.83	24.85
Group 3.....	\$ 38.18	24.85
Group 4.....	\$ 36.47	24.85
Group 5.....	\$ 28.13	24.85
Operating Engineers:		
AREA 2		
Group 1.....	\$ 44.13	24.85
Group 2.....	\$ 40.83	24.85

Group 3.....	\$ 38.18	24.85
Group 4.....	\$ 36.47	24.85
Group 5.....	\$ 28.13	24.85

FOOTNOTES:

Crane operator with main boom and jib 300' or longer: \$1.50 per hour above the group 1 rate.
 Crane operator with main boom and jib 400' or longer: \$3.00 per hour above the group 1 rate.

PAID HOLIDAYS: New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas Day.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Crane operator with main boom and jib 400', 300', or 220' or longer.

GROUP 2: Crane operator with main boom and jib 140' or longer, tower crane, gantry crane, whirley derrick

GROUP 3: Backhoe/Excavator; Bulldozer; Compactor; Crane; Scraper; Loader

GROUP 4: Boom truck (non-swinging)

GROUP 5: Oiler

 ENGI0326-024 06/01/2022

EXCLUDES UNDERGROUND CONSTRUCTION

LENAWEE COUNTY

	Rates	Fringes
OPERATOR: Power Equipment		
GROUP 1.....	\$ 46.44	24.95
GROUP 2.....	\$ 44.94	24.95
GROUP 3.....	\$ 43.44	24.95
GROUP 4.....	\$ 43.14	24.95
GROUP 5.....	\$ 42.32	24.95
GROUP 6.....	\$ 41.46	24.95
GROUP 7.....	\$ 40.49	24.95
GROUP 8.....	\$ 38.78	24.95

FOOTNOTES: Tower cranes: to be paid the crane operator rate determined by the combined length of the mast and the boom.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Crane with boom & jib or leads 400' or longer

GROUP 2: Crane with boom & jib or leads 300' or longer

GROUP 3: Crane with boom & jib or leads 220' or longer

GROUP 4: Crane with boom & jib or leads 140' or longer

GROUP 5: Crane with boom & jib or leads 120' or longer

GROUP 6: Regular crane operator

GROUP 7: Backhoe/Excavator, Bulldozer, Compactor, Scraper,
Loader

GROUP 8: Oiler

IRON0025-007 06/01/2022

ARENAC, GLADWIN, HURON, MIDLAND, SHIAWASSEE & TUSCOLA COUNTIES

	Rates	Fringes
IRONWORKER		
Reinforcing.....	\$ 31.43	34.77
Structural.....	\$ 34.50	38.44

IRON0025-016 06/01/2022

BRANCH, HILLSDALE, MECOSTA & OSCEOLA COUNTIES

	Rates	Fringes
IRONWORKER (REINFORCING).....	\$ 31.43	34.77
IRONWORKER (STRUCTURAL).....	\$ 34.50	38.44

IRON0055-011 07/01/2022

LENAWEE COUNTY

	Rates	Fringes
IRONWORKER, STRUCTURAL AND REINFORCING.....	\$ 33.00	27.20

* LAB00334-008 09/01/2022

SCOPE OF WORK:
OPEN CUT CONSTRUCTION: Excavation of earth and sewer,
utilities, and improvements, including underground
piping/conduit (including inspection, cleaning, restoration,
and relining)

ARENAC, BRANCH, GLADWIN, HURON, MECOSTA, MIDLAND, OSCEOLA,
TUSCOLA

	Rates	Fringes
LABORER		
(1) Common or General.....	\$ 22.42	12.95
(4) Grade Checker.....	\$ 22.73	12.95

* LAB00334-019 09/01/2022

SCOPE OF WORK:
OPEN CUT CONSTRUCTION: Excavation of earth and sewer,
utilities, and improvements, including underground
piping/conduit (including inspection, cleaning, restoration,
and relining)

HILLSDALE, LENAWE, SHIAWASSEE

	Rates	Fringes
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LABORER
 (1) Common or General.....\$ 23.39 13.15
 (4) Grade Checker.....\$ 23.70 13.15

 LAB00355-007 06/01/2022

EXCLUDES OPEN CUT CONSTRUCTION

BRANCH COUNTY

Rates Fringes

LABORER
 Common or General.....\$ 26.70 12.95

 LAB00355-015 06/01/2022

EXCLUDES OPEN CUT CONSTRUCTION

MECOSTA & OSCEOLA COUNTIES

Rates Fringes

LABORER
 Common or General.....\$ 26.70 12.95

 LAB00499-014 06/01/2022

EXCLUDES OPEN CUT CONSTRUCTION

HILLSDALE & LENAWEE COUNTIES

Rates Fringes

LABORER
 Common or General.....\$ 27.45 13.20

 LAB01075-011 06/01/2022

EXCLUDES OPEN CUT CONSTRUCTION

SHIAWASSEE COUNTY

Rates Fringes

LABORER
 Common or General.....\$ 26.41 14.05

 LAB01098-022 07/01/2022

EXCLUDES OPEN CUT CONSTRUCTION

ARENAC, GLADWIN, HURON, MIDLAND & TUSCOLA COUNTIES

Rates Fringes

LABORER
 Common or General.....\$ 23.44 12.95

 PLAS0016-009 04/01/2014

MECOSTA & OSCEOLA COUNTIES

Rates Fringes

CEMENT MASON/CONCRETE FINISHER...	\$ 22.02	12.38

PLAS0016-021 04/01/2014		
SHIAWASSEE COUNTY		
	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 25.58	12.88

PLAS0016-023 04/01/2014		
BRANCH COUNTY		
	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 24.63	12.88

PLAS0016-031 04/01/2014		
ARENAC, GLADWIN, HURON, MIDLAND & TUSCOLA COUNTIES		
	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 25.47	12.38

PLAS0886-013 08/01/2011		
HILLSDALE & LENAWEЕ COUNTIES		
	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 27.19	16.00

PLUM0085-017 05/04/2020		
ARENAC, GLADWIN, HURON (West of M-53), MIDLAND & TUSCOLA COUNTIES		
	Rates	Fringes
PLUMBER/PIPEFITTER.....	\$ 38.25	21.07

PLUM0098-008 06/01/2019		
HURON COUNTY (East of M-53)		
	Rates	Fringes
PLUMBER.....	\$ 35.77	35.13

PLUM0174-015 07/01/2020		
MECOSTA & OSCEOLA COUNTIES		
	Rates	Fringes
PLUMBER/PIPEFITTER.....	\$ 39.89	23.82

PLUM0190-012 06/01/2021		
LENAWEЕ COUNTY (Townships of Clinton, Macon & Tecumseh)		

	Rates	Fringes
PLUMBER/PIPEFITTER.....	\$ 44.31	23.70

* PLUM0333-021 06/01/2022		
BRANCH & HILLSDALE COUNTIES		
	Rates	Fringes
PLUMBER/PIPEFITTER.....	\$ 42.29	23.94

* PLUM0333-022 06/01/2022		
LENAWEE COUNTY (Remainder of County)		
	Rates	Fringes
PLUMBER/PIPEFITTER.....	\$ 42.29	23.94

PLUM0370-007 06/01/2020		
SHIAWASSEE COUNTY		
	Rates	Fringes
PLUMBER/PIPEFITTER.....	\$ 39.81	20.95

PLUM0636-008 06/05/2017		
HURON COUNTY (East of M-53)		
	Rates	Fringes
PIPEFITTER.....	\$ 40.41	29.35

TEAM0007-010 06/01/2020		
	Rates	Fringes
TRUCK DRIVER		
Lowboy/Semi-Trailer Truck...	\$ 28.15	.50 + a+b
FOOTNOTE:		
a. \$470.70 per week.		
b. \$68.70 daily.		

* SUMI2010-042 11/09/2010		
	Rates	Fringes
CARPENTER, Excludes Form Work....	\$ 23.97	6.29
LABORER: Landscape.....	\$ 10.89 **	1.74
LABORER: Mason Tender - Cement/Concrete.....	\$ 15.97 **	3.51
LABORER: Pipelayer.....	\$ 15.28 **	3.99
OPERATOR: Bobcat/Skid Steer/Skid Loader.....	\$ 12.98 **	6.12
OPERATOR: Grader/Blade.....	\$ 15.50 **	3.62

OPERATOR: Roller.....\$ 13.74 ** 7.93

TRUCK DRIVER: Dump Truck.....\$ 14.06 ** 1.25

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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