
Village of Middleville

Barry County Michigan



HIGH STREET RECONSTRUCTION

CONTRACT SPECIFICATIONS

williams&works
engineers | surveyors | planners

Project No. 222158



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The following drawings are attached hereto and form a part of the Contract Documents. Generally entitled "High Street Reconstruction Project" they include:

<u>Sheet No.</u>	<u>Title</u>
1	Cover Sheet
2-3	Typical Sections
4	Details
5-7	Removals
8-13	Water Main
14-18	Construction
19-20	Grading Details
21-23	Pavement Marking & Signage

ADVERTISEMENT
FOR
HIGH STREET RECONSTRUCTION PROJECT
VILLAGE OF MIDDLEVILLE

The Village of Middleville is soliciting sealed proposals for the High Street Reconstruction Project. The work includes the reconstruction of High Street with utility replacement including storm sewer improvements, lining of sanitary sewer, watermain abandonment and replacement, water service replacement, and restoration of all disturbed areas.

Sealed proposals will be received by the Village of Middleville at the Village Hall; located at 100 E. Main Street, Middleville, Michigan 49333 until 2:00 p.m. local time, Tuesday, March 19, 2024, at which time they will be publicly opened and read aloud.

Contract Documents may be obtained at www.williams-works.com, the offices of Williams and Works, 549 Ottawa NW, Grand Rapids, MI 49503, (616) 224-1500. Contract Documents are also available at www.mitn.info.

Each proposal shall be accompanied by a certified check or bid bond by a recognized surety in the amount of five percent (5%) of the total of the bid price.

After the time of opening, no bid may be withdrawn for a period of Sixty (60) days.

The Village of Middleville reserves the right to accept any bid, reject any or all bids, to waive informalities and make the award in any manner deemed in the best interest of the Village of Middleville.

Village of Middleville
BY ORDER OF:

Craig Stolsonburg
Village Manager

ARTICLE 1 - BASIS OF PROPOSAL

- 1.1 The Bid is based on unit and lump sum prices as stipulated in the Bid Form. The totals of the extensions of unit and lump sum prices will be used as a basis for determining the total bid price.
- 1.2 All work necessary for completion of the Contract, but not specifically listed as a pay item, will be considered to be covered under one or more of the Bid items.

ARTICLE 2 - QUALIFICATIONS OF BIDDERS

Bids are solicited only from responsible BIDDERS skilled and regularly engaged in work of similar character and magnitude.

ARTICLE 3 - EXAMINATION OF CONTRACT DOCUMENTS AND SITE

- 3.1 Before submitting a Bid, each BIDDER shall:
 - A. Examine the Contract Documents thoroughly;
 - B. Visit the Site to become familiar with local conditions that may in any manner affect cost, progress, performance or timely completion of the Work;
 - C. Become familiar with all laws, rules and regulations that may in any manner affect cost, progress, performance or timely completion of the Work; and
 - D. Study and carefully correlate BIDDER's observations with the Contract Documents.
- 3.2 Surveys, investigations, and reports of subsurface or latent physical conditions at the Site which have been relied upon by ENGINEER in preparing the Drawings and Specifications are not guaranteed as to accuracy or completeness. Each BIDDER shall, at his own expense, make additional surveys and investigations as necessary to determine his Bid for the performance of the Work.

ARTICLE 4 - INTERPRETATION

Questions about the meaning or intent of the Contract Documents shall be submitted to the ENGINEER not less than seven (7) days prior to date of opening of Bids. Replies will be issued by Addenda mailed or delivered to Planholders of Record not less than three (3) days before Bids are due. ENGINEER may issue other Addenda at any time prior to opening of Bids. Only answers given by Addenda shall be binding. Oral and other interpretations or clarifications shall be without legal effect.

ARTICLE 5 - BID SECURITY

- 5.1 The type and amount of Bid Security is stated in the Advertisement. Bid Security from each BIDDER on the Work shall be by a single Surety.
- 5.2 A Bid Bond when used as Bid Security, shall be issued by a Surety named in U.S. Treasury Circular 570 licensed to conduct business in the state in which the Work is located.
- 5.3 The Bid Security of the successful BIDDER will be retained until the executed Agreement, Bonds, insurance certificates and other required information is delivered by the BIDDER to the OWNER.
- 5.4 Failure of the successful BIDDER to execute and deliver the Agreement, Bonds, insurance certificates and other required information within ten (10) days of the Notice of Award shall be just cause for OWNER to annul the Notice of Award and declare the Bid and Bid Security forfeited.
- 5.5 The Bid Security of any BIDDER whom OWNER believes to have a reasonable chance of receiving the award may be retained by OWNER until either the executed Agreement, Bonds, insurance certificates and other required information are delivered by the successful BIDDER to the OWNER or the expiration of the time limit specified for the Bid Hold Period, whichever occurs first.
- 5.6 Unless specifically requested, Bid Bond will not be returned to BIDDER.

ARTICLE 6 - CONTRACT TIME

The time(s) for completion of the Work shall be as stipulated in the Agreement. If the time requirement(s) cannot be met, the BIDDER is requested to stipulate in the Bid Form his schedule for performance of the Work. Consideration will be given to time in evaluating Bids.

ARTICLE 7 - LIQUIDATED DAMAGES AND EXPENSES

Provisions for liquidated damages and expenses for failure to complete on time are set forth in the Agreement.

ARTICLE 8 - BID PREPARATION

- 8.1 Submit the Bid on the separate Proposal and Bid Form with Bid Security and other required documents. The bound copy is for BIDDER's records.
- 8.2 No change shall be made in the wording of the form or in any of the items. Bids should be typed or filled out legibly in ink.
- 8.3 All names must be printed or typed below the signature.
- 8.4 The Proposal shall contain an acknowledgement of receipt of all Addenda.
- 8.5 Bid by partnership shall be executed in the partnership name and signed by a partner. Partner's title must appear under signature.
- 8.6 Bid submitted by two or more firms will not be considered (i.e. no joint bids).
- 8.7 Bid by corporation must be executed in the corporate name by a corporate officer accompanied by evidence of authority to sign. The corporate address and state of incorporation shall be listed.
- 8.8 Agreement will be on the basis of material and equipment described in the Contract Documents without consideration of substitute or "or-equal" items; except for alternates which may be offered by the BIDDER in the Bid Form and accepted by the OWNER prior to execution of the Agreement. Applications for substitutions will be considered only after the Agreement has been executed. The procedure for substitutions is set forth in the General Conditions.
- 8.9 On unit price Bids, BIDDERS shall show the unit price for each item listed, the total price for the quantity of each item, and the total price for all items. If ENGINEER finds any errors in the Bidder's computations, ENGINEER reserves the right to make corrections.

ARTICLE 9 - SUBMISSION OF BIDS

- 9.1 Bids, Bid Security and other required documents shall be submitted prior to the time and at the place indicated in the Advertisement.
- 9.2 Submit Bid Documents, in a sealed envelope, properly identified.
- 9.3 If the Bid Documents are sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face thereof.
- 9.4 Bid documents may not be sent by facsimile. Bids must be submitted in a sealed envelope as stated in part 9.2

ARTICLE 10 - MODIFICATION AND WITHDRAWAL OF BIDS

- 10.1 Bids may be modified or withdrawn by an appropriate document duly executed and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.
- 10.2 If, within 24 hours after Bids are opened, any BIDDER files a duly signed notice with OWNER and promptly thereafter demonstrates to the reasonable satisfaction of OWNER that there was a material

and substantial mistake in the preparation of Bid, that BIDDER may withdraw its Bid, and the Bid Security will be returned by OWNER.

ARTICLE 11 - OPENING OF BIDS

The Bid opening location and time will be as indicated in the Advertisement.

ARTICLE 12 - BID HOLD PERIOD

All bids shall remain firm, after the day of the Bid opening, for the period stipulated in the Advertisement.

ARTICLE 13 - AWARD OF CONTRACT(S)

- 13.1 BIDDER will be required to complete Bid documentation and correct irregularities as a condition of award. OWNER reserves the right to reject any and all Bids and waive any and all irregularities. OWNER further reserves the right to accept or reject nonconforming, qualified, alternate or conditional Bids.
- 13.2 In evaluating Bids, OWNER will consider the qualifications of the BIDDERS, whether or not the Bids comply with the prescribed requirements and include completed alternates and unit prices if requested in the Bid Form. OWNER may conduct investigations to establish the responsibility, qualifications and financial ability of the BIDDERS and proposed Subcontractors to do the Work within the prescribed time. OWNER reserves the right to reject the Bid of any BIDDER who does not pass such evaluation to OWNER's satisfaction.
- 13.3 Subject to the rights reserved by the OWNER, it is intended that a contract will be awarded to the low responsible, responsive BIDDER whose evaluation indicates to OWNER that such award will be in the best interests of the OWNER.
- 13.4 Prior to the Notice of Award, ENGINEER will notify the apparent successful BIDDER if OWNER, after due investigation, has reasonable objection to any listed Subcontractor(s), where such listing is requested in the Bid Form. Failure of OWNER to make objection prior to Notice of Award will constitute acceptance of the listed Subcontractor(s), but not a waiver of any right of OWNER to reject defective work, material or equipment, or material and equipment not in conformance with the requirements of the Contract Documents.
- 13.5 If, prior to the Notice of Award, OWNER refuses to accept any listed Subcontractor(s), the apparent successful BIDDER may:
 - A. Submit an acceptable substitute without an increase in bid price; or
 - B. Withdraw Bid and Bid Security.
- 13.6 If, after Notice of Award, OWNER refuses to accept any Subcontractor, CONTRACTOR shall submit an acceptable substitute and the Contract Price will be adjusted by the difference in cost occasioned by such substitution.
- 13.7 Concurrently with execution and delivery of Agreement, CONTRACTOR shall deliver to OWNER the Bonds, insurance certificates and other information as required by the Contract Documents.
- 13.8 If Bidder is a business entity (i.e., corporation, partnership, joint venture, etc.) organized under the laws of a state other than the state of the location of the Work, Bidder must provide evidence of proper registration to do business in the state of the location of the Work as a condition to execution of the Agreement.
- 13.9 The Agreement and such other documents as required will be signed by OWNER and CONTRACTOR within 25 days of the Notice of Award. OWNER will sign Agreement within 10 days of receipt of required Bonds, insurance certificates, other required information, and CONTRACTOR executed Agreement. OWNER, CONTRACTOR, SURETY and ENGINEER will each receive an executed copy of the Agreement.

VILLAGE OF MIDDLEVILLE
HIGH STREET RECONSTRUCTIONARTICLE 1-SCHEDULE OF PRICES

For the entire Work outlined in these Contract Documents complete as specified, using equipment and materials only of the type and manufacturers where specifically named, for the following unit and lump sum prices:

<u>Unit No.</u>	<u>Description</u>	<u>Unit</u>	<u>Qty</u>	<u>Unit Price</u>	<u>Total Price</u>
1	General Conditions, Bonds, Insurance, Max 5%	Lsum	0.33	\$_____	\$_____
2	Mobilization, Max 10%	Lsum	0.67	\$_____	\$_____
3	Curb and Gutter, Rem	Ft	2950	\$_____	\$_____
4	Sidewalk, Rem	Syd	1065	\$_____	\$_____
5	Pavt, Rem, Modified	Syd	6110	\$_____	\$_____
6	Sewer, Rem, Less than 24 inch	Ft	142	\$_____	\$_____
7	Plug, 12 inch Storm Penetration	Ea	2	\$_____	\$_____
8	Machine Grading, Road	Sta	18	\$_____	\$_____
9	Machine Grading, Sidewalk	Sta	18	\$_____	\$_____
10	Erosion Control, Inlet Protection, Fabric Drop	Ea	11	\$_____	\$_____
11	Erosion Control, Silt Fence	Ft	1000	\$_____	\$_____
12	Subbase, CIP	Cyd	2290	\$_____	\$_____
13	Aggregate Base, 8 inch	Syd	6310	\$_____	\$_____
14	Dr Structure Cover, Adj, Case 1	Ea	16	\$_____	\$_____
15	Dr Structure Cover, Type B	Ea	8	\$_____	\$_____
16	Dr Structure Cover, Type K	Ea	6	\$_____	\$_____
17	Dr Structure, 48 inch Dia	Ea	2	\$_____	\$_____
18	Storm Sewer, C76 CI III, 12 inch	Ft	90	\$_____	\$_____
19	HMA, 3EL	Ton	764	\$_____	\$_____
20	HMA, 5EL	Ton	764	\$_____	\$_____
21	Driveway, Nonreinf Conc, 6 inch	Syd	440	\$_____	\$_____

SECTION 00 41 00

00 41 00.2
BID FORM

22	Curb and Gutter, Conc, Det F4	Ft	3635	\$ _____	\$ _____
23	Valley Gutter, Conc	Ft	70	\$ _____	\$ _____
24	Detectable Warning Surface	Ft	68	\$ _____	\$ _____
25	Sidewalk, Conc, 4 inch	Sft	15030	\$ _____	\$ _____
26	Curb Ramp, Conc, 6 inch	Sft	1280	\$ _____	\$ _____
27	Mailbox, Relocate	Ea	18	\$ _____	\$ _____
28	Minor Traf Devices	Lsum	1	\$ _____	\$ _____
29	Traf Regulator Control	Lsum	1	\$ _____	\$ _____
30	Slope Restoration, Non-Freeway, Type B	Syd	2406	\$ _____	\$ _____
31	Hydrant, Rem	Ea	2	\$ _____	\$ _____
32	Valve and Box, Rem	Ea	1	\$ _____	\$ _____
33	Gate Box, Adj, Temp, Case 1	Ea	2	\$ _____	\$ _____
34	Water Main, 8 inch	Ft	1830	\$ _____	\$ _____
35	Water Service, Copper, 1 inch (Main to Curb Box)	Ft	630	\$ _____	\$ _____
36	Water Service, Copper, 1 inch (Curb Box to Meter), Allowance	Ft	450	\$ _____	\$ _____
37	Plumbing Allowance for Lead Service Replacement	Lsum	1	\$ _____	\$ _____
38	Water Main, 6 inch	Ft	22	\$ _____	\$ _____
39	Curb Stop and Box on Water Service, 1 inch	Ea	15	\$ _____	\$ _____
40	Valve and Box, 8 inch	Ea	13	\$ _____	\$ _____
41	Reconnect Existing 1 inch Water Service	Ea	15	\$ _____	\$ _____
42	Connect to Ex. 8 Water Main, Main St.	Ea	1	\$ _____	\$ _____
43	Connect to Ex. 6 Water Main, Alley	Ea	1	\$ _____	\$ _____
44	Connect to Ex. 4 Water Main, Dibble & Dayton	Ea	2	\$ _____	\$ _____
45	Connect to Ex. 6 Water Main, Railroad	Ea	1	\$ _____	\$ _____
46	Connect to Ex. 6 Water Main, Fremont	Ea	1	\$ _____	\$ _____

SECTION 00 41 0000 41 00.3
BID FORM

47	Tee, 8 inch x 8 inch x 8 inch	Ea	4	\$ _____	\$ _____
48	Tee, 8 inch x 8 inch x 6 inch	Ea	6	\$ _____	\$ _____
49	Valve and Box, 6 inch	Ea	1	\$ _____	\$ _____
50	Bend, 45 Degree, 8 inch	Ea	25	\$ _____	\$ _____
51	Bend, 11 Degree, 8 inch	Ea	2	\$ _____	\$ _____
52	Bend, 22 Degree, 8 inch	Ea	1	\$ _____	\$ _____
53	Reducer, 8 inch x 6 inch	Ea	2	\$ _____	\$ _____
54	Reducer, 8 inch x 4 inch	Ea	2	\$ _____	\$ _____
55	Hydrant Assembly	Ea	4	\$ _____	\$ _____
56	Bend, 45 Degree, 6 inch	Ea	2	\$ _____	\$ _____
57	Sanitary Sewer, Heavy Clean & Televis, 8 inch	Ft	740	\$ _____	\$ _____
58	Cured In-Place Pipe Liner, 8 inch	Ft	740	\$ _____	\$ _____
59	Clearing	Acre	0.14	\$ _____	\$ _____
60	Abandon and Fill Underground Utilities	Ft	2000	\$ _____	\$ _____
61	Pavt Mrkg, Polyurea, 4 inch, White	Ft	175	\$ _____	\$ _____
62	Pavt Mrkg, Polyurea, 4 inch, Yellow	Ft	2915	\$ _____	\$ _____
63	Pavt Mrkg, Polyurea, 6 inch, Crosswalk	Ft	432	\$ _____	\$ _____
64	Pavt Mrkg, Polyurea, 24 inch, Stop Bar	Ft	75	\$ _____	\$ _____
65	Sign, Type IIIA	Sft	126.5	\$ _____	\$ _____
66	Post, Steel, 3 pound	Ft	245	\$ _____	\$ _____
Total Base Bid					\$ _____

ARTICLE 2-MATERIAL AND EQUIPMENT ALTERNATES

The Contract Documents stipulate that the Base Bid price shall include materials and equipment selected from the designated items and manufacturers listed therein. This is done to establish uniformity in bidding and to establish standards of quality for the items named.

If the BIDDER wishes to quote alternate items for consideration by the OWNER, he may do so under this Article. A complete description of the item and the proposed price differential are to be provided. Unless approved at the time of

award, substitutions, where items are specifically named, will be considered only in accordance with the terms set forth in the General Conditions.

<u>Item No.</u>	<u>Description</u>	<u>Add/Deduct Amount (Dollars)</u>
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ARTICLE 3-TIME ALTERNATE

If the BIDDER takes exception to the time(s) stipulated in Article 3 - Contract Time of the Agreement, he is requested to stipulate below his proposed time for performance of the Work. Consideration will be given to time in evaluating bids.

ARTICLE 4-SUBCONTRACTOR LISTING

Bid is submitted on the basis of the use of the following Subcontractors:

<u>WORK ITEM</u>	<u>FIRM</u>	<u>CITY</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Please note if work is to be performed by BIDDER. Failure to list Subcontractors with the Bid waives BIDDER'S rights to a change in Contract Time or Price or withdrawal of Bid and Bid Security; in the event OWNER has reasonable objection to any Subcontractor.

OWNER shall have the right to reject any Subcontractor for reasonable cause. If Subcontractors are not identified in the Bid, the BIDDER/CONTRACTOR shall engage a Subcontractor acceptable to OWNER and waives the right to withdraw Bid and Bid Security, and further, waives right to a change in Contract Time or Price due to failure to list.

VILLAGE OF MIDDLEVILLE
HIGH STREET RECONSTRUCTION PROJECT

Village of Middleville
100 E. Main Street
Middleville, MI 49333

Gentlemen:

ARTICLE 1-CONTRACT PRICE

Having carefully examined the site of the proposed Work; being fully informed of the conditions to be met in the prosecution and completion of the Work; having read and examined the Contract Documents applicable to this Work and agreeing to be bound thereby; the undersigned proposes to perform all services, and furnish all necessary labor, materials, tools, and equipment to complete the Work described in the Contract Documents for the amounts set forth in the accompanying Bid Form.

ARTICLE 2-CONTRACT TIME

If awarded a Contract, undersigned agrees to prosecute the Work regularly and diligently to ensure full completion within the Contract Time(s) indicated in the Agreement.

ARTICLE 3-LIQUIDATED DAMAGES

The undersigned agrees that liquidated damages, in the amount stipulated in the Agreement, shall be assessed for each day that expires after the completion time(s), stipulated in the Agreement, until the Work is complete.

ARTICLE 4 -BIDDER'S QUALIFICATIONS

The undersigned agrees to furnish, upon request, a list of projects of a similar nature completed in the last 3 years.

ARTICLE 5-WAIVER

The undersigned certifies the price(s) entered in the Bid Form are correct and complete and that all information given or furnished in connection therewith is correct, complete and submitted as intended. The undersigned waives any right to:

- 5.1 claims he may now have or which may accrue to him,
- 5.2 refuse to execute the Contract if awarded to him,
- 5.3 demand the return of the Bid Security,
- 5.4 be relieved from any obligation by reason of any errors, mistakes or omissions, subject to right of withdrawal of Bid as provided in the Instructions to Bidders.

ARTICLE 6-BID NON-COLLUSIVE

The undersigned certifies that this Proposal is fair, genuine and not collusive or sham, and has not in any manner, directly or indirectly, agreed or colluded with any other person, firm or association to submit a sham Bid, to refrain from bidding, or in any way to fix the amount of this Bid or that of any other BIDDER, or to secure any advantage against the OWNER. The undersigned further certifies that no officer or employee of the OWNER is personally or financially interested, directly or indirectly, in this Bid or in the undersigned.

ARTICLE 7-BID SECURITY

The undersigned encloses a Bid Security in the form and amount required by the Advertisement. The undersigned agrees to contract for the Work and to furnish the necessary Bonds, Insurance Certificates and other information, as stipulated in the Instructions to Bidders. If this Proposal shall be accepted by the OWNER and the undersigned shall fail to contract as aforesaid and to furnish the required Bonds, Insurance Certificates and other information, then the

undersigned shall be considered to have abandoned the Contract and the Bid Security accompanying this Proposal shall become due and payable to the OWNER.

ARTICLE 8-OWNERS' RIGHTS

In submitting this Bid, it is understood that the right is reserved by the OWNER to accept any Bid, or reject any or all Bids, or to waive irregularities and/or informalities in any Bid and to make the award in any manner deemed in the best interest of the OWNER.

ARTICLE 9-RECEIPT OF ADDENDA

Receipt of Addenda _____ through _____ is acknowledged.

SIGNED THIS _____ DAY OF _____, 2024.

(Firm Name)

(Signature)

(Street Address)

(Name Printed)

(City, State and Zip)

(Title)

(Telephone No.)

LEGAL STATUS OF BIDDER: (Fill out appropriate form and cross out others.)

*Joint BIDDERS including:

Firm Name	City	State
_____	_____	_____
_____	_____	_____
_____	_____	_____

We hereby authorize _____ to sign the Bid on behalf of the firms listed:

_____	_____
Signature and Title	Firm
_____	_____
Signature and Title	Firm
_____	_____
Signature and Title	Firm

*A Corporation, duly organized in good standing and doing business under the laws of the state of _____, for whom _____ bearing the office title of _____ whose signature is affixed to this proposal, is duly authorized to execute contracts. If a foreign corporation, the BIDDER states this corporation is qualified to and will register in state in which project Work is located.

*A Partnership, all members of which with address are:

_____	_____
_____	_____
_____	_____
_____	_____

*An Individual whose name with address is:

_____	_____
-------	-------

This Agreement is dated the _____ day of _____ 2024, by and between the Village of Middleville, hereinafter called OWNER, and _____, hereinafter called CONTRACTOR.

OWNER and CONTRACTOR, in consideration of the mutual covenants set forth herein, agree as follows:

ARTICLE 1-WORK

CONTRACTOR shall complete the Work as specified or indicated in the Contract Documents, generally described as follows:

Village of Middleville
2024 High Street Reconstruction Project

ARTICLE 2-ENGINEER

The Work has been designed by the firm of Williams & Works, Inc., who will act as ENGINEER on the Work, unless Notice is otherwise given by the OWNER.

ARTICLE 3-CONTRACT TIME

- 3.1 The Work to be completed under this Contract shall be commenced immediately after receipt of a fully executed Contract and Notice to Proceed. The Notice to Proceed will be issued at the time of the contract signing.
- 3.2 The Work under this Contract shall commence after the Contract is signed, and a Notice to Proceed is issued. The CONTRACTOR will have one-hundred and seventeen (117) calendar days to complete the work, which shall be the Contract Time.
- 3.3 OWNER and CONTRACTOR recognize that time is of the essence of this Contract and that OWNER will suffer financial loss if the Work is not completed within the Contract Time(s) plus any extensions as provided for in the General Conditions. They recognize that the financial loss suffered by OWNER in the event that CONTRACTOR fails to complete the Work within the Contract Time(s) would be most difficult to determine accurately in any legal or arbitration proceedings. Instead of requiring such proof, OWNER and CONTRACTOR agree that as liquidated damages, but not as a penalty, CONTRACTOR shall pay OWNER Five Hundred Dollars (\$1500.00) for each day of delay in the completion of the Work beyond the Contract Time(s).
- 3.4 CONTRACTOR agrees to pay, in addition to liquidated damages, expenses arising from failure to complete the Work within the Contract Time including expenses for engineering services, attorney's fees, technical services and administration costs.

ARTICLE 4-CONTRACT PRICE

- 4.1 OWNER shall pay CONTRACTOR for performance of the Work in accordance with the Contract Documents in current funds as follows: Dollar amount _____ (\$_____).
- 4.2 The amount paid shall be equitably adjusted to cover changes in the Work ordered by the ENGINEER but not required by the specifications. Such increases or decreases in the Contract Price shall be determined by agreement between the OWNER and CONTRACTOR.

ARTICLE 5-PAYMENTS

- 5.1 CONTRACTOR will prepare and submit monthly and final payment requests in accordance with the General Conditions.
- 5.2 OWNER will make bi-weekly and final payments in accordance with the GENERAL CONDITIONS.
- 5.3 All monies not paid when due shall bear interest at the greater of the rate of 7% per annum, or the highest rate allowed by law.

ARTICLE 6-CONTRACT DOCUMENTS

- 6.1 The complete Contract between OWNER and CONTRACTOR consists of the following Contract Documents:

Advertisement
Instruction to Bidders
Proposal
Bid Form
Bonds
Agreement
General Conditions
Specifications
Drawings
Modifications

- 6.2 In resolving conflicts, errors and discrepancies, the Contract Documents shall be given precedence in the following order: Modifications, Agreement, Addenda, Supplemental Conditions, General Conditions, Specifications, Drawings, Advertisement, Instructions to Bidders, Proposal/Bid Form, and Bonds.

ARTICLE 7-MISCELLANEOUS

- 7.1 Terms used in this Agreement are defined in the General Conditions.
- 7.2 Neither party shall assign, in whole or in part, any of its rights or obligations, including any monies due, or to become due, under the terms of the Contract Documents without the written prior consent of the other party. This paragraph shall not be construed to limit the powers vested in the OWNER under the General Conditions.
- 7.3 The OWNER and CONTRACTOR each binds itself, successors and assigns to the other party hereto in respect to all covenants, agreements, and obligations contained in the Contract Documents.
- 7.4 The Contract Documents may only be altered, amended, or repealed by a Modification.

IN TESTIMONY WHEREOF, the parties hereto have executed this contract in at least four (4) counterparts, each of which shall be deemed an original, the day and year first above written.

WITNESS

CONTRACTOR

(Contractor)

By _____
(Signature)

Title _____

WITNESS

OWNER

Village of Middleville

(Owner)

Craig Stolsonburg

By _____
(Signature)

Title Village Manager

APPROVED AS TO FORM:

OWNER's Attorney

LEGAL STATUS OF CONTRACTOR: (Fill out appropriate form and cross out others.)

*A Corporation: The same officer shall not execute both the Agreement and this certificate, unless only one person occupies all corporation offices.

I, _____, certify that I am the _____ of the corporation named as CONTRACTOR herein; that _____, who signed this Agreement on behalf of the corporation, was then _____ of the corporation, that the Agreement was duly signed for and in behalf of the corporation by authority of its board of directors, and is within the scope of its corporate powers. If a foreign corporation, this corporation is qualified to and will register in state in which project Work is located.

(Date) (Signature) LS

*A Partnership: The same officer shall not execute both the Agreement and this certificate, unless only one person occupies all partnership offices.

I, _____, certify that I am the _____ of the partnership named as CONTRACTOR herein; that _____, who signed this Agreement on behalf of the partnership, was then _____ of the partnership, that the Agreement was duly signed for and in behalf of the partnership by authority of its partners, and is within the scope of its partnership powers. If a foreign partnership, this partnership is qualified to and will register in state in which project Work is located.

(Date) (Signature) L.S.

*A Joint Venture: The same officer shall not execute both the Agreement and this certificate, unless only one person occupies all offices.

I, _____, certify that I am the _____ of _____, a _____ engaged in a Joint Venture with _____, a _____, pursuant to a Joint Venture Agreement dated _____, 2024; that _____, who signed this Agreement on behalf of _____, was then its _____, that this Agreement was duly signed for and in behalf of the Joint Venture in accordance with the Joint Venture Agreement and by authority of the members of the Joint Venture.

(Date) (Signature) LS

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that _____, as Principal, and _____, a Corporation, organized and existing under the laws of the State of _____, and duly authorized to transact business in the State of Michigan, as Surety, are held and firmly bound unto _____, as obligee, and hereinafter called OWNER, in the just and full sum of _____ Dollars (\$_____) lawful money of the United States of America, for the payment whereof the Principal and Surety bind themselves, their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above Principal has entered into a written Contract with the OWNER, dated the _____ day of _____, 2024, for _____ in accordance with plans and specifications prepared by Williams & Works, Inc., 549 Ottawa Avenue, N.W., Grand Rapids, Michigan, 49503 which Contract is hereby referred to and made a part hereof as full and to the same extent as if the same were entirely written herein.

NOW, THEREFORE, the conditions of this obligation are such, that if the said Principal shall in all respects well and truly keep and perform the said Contract, and shall pay all sums of money due or to become due, for any labor, materials, apparatus, fixtures or equipment furnished for the purpose of constructing the work provided in said Contract, and shall defend, indemnify and save harmless the OWNER against any and all liens, incumbrances, damages, demands, expenses, costs and charges of every kind except as otherwise provided in said Contract Documents, arising out of or in relation to the performance of said Work and the provisions of said Contract, and shall remove and replace any defects in workmanship or materials which may be apparent or may develop within a period for one year from the date of final acceptance, then this obligation shall be null and void; otherwise it shall remain in full force and effect;

AND PROVIDED, that any alterations which may be made in the terms of said Contract, or in the Work to be done under it, or any extension of time for the performance of said Contract, or any forbearance on the part of either party to the other, or the placing of an inspector or resident engineer thereon by the OWNER, shall not in any way release the Principal and Surety or either of them, their heirs, executors, administrators, successors or assigns from any liability hereunder; notice to the surety of any such alteration, extension or forbearance being hereby waived.

Signed and sealed this _____ day of _____ A.D., 2024

WITNESS:

PRINCIPAL:

By _____ (Seal)
By _____

WITNESS:

SURETY:

By _____ (Seal)
Title _____

LOCAL ADDRESS OF AGENT FOR SURETY:

Street City State Zip Code

PAYMENT BOND

(under Act 213 of 1963)

KNOW ALL MEN BY THESE PRESENTS, that _____, as Principal, and _____, a Corporation, organized and existing under the laws of the State of _____, and duly authorized to transact business in the State of Michigan, as Surety, are held and firmly bound unto the (City/Village/Township) of _____, as obligee, and hereinafter called OWNER, in the just and full sum of (\$_____) lawful money of the United States of America, or the payment whereof the Principal and Surety bind themselves, their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above Principal has entered into a written Contract with the OWNER, dated the ____ day of _____, 2024 for _____ in accordance with plans and specifications prepared by Williams & Works Inc., 549 Ottawa Avenue N.W., Grand Rapids, MI 49503 which Contract is hereby referred to and made a part hereof as fully and to the same extent as if the same were entirely written herein;

AND WHEREAS, this bond is given in compliance with subject to the provisions of Act. No. 213 of the Public Acts of Michigan, for the year 1963, as amended by subsequent acts to date.

NOW, THEREFORE, the condition of this obligation is that if the Principal and his Subcontractors shall make all payments as they become due and payable of all amounts owing to Subcontractors and to parties supplying labor or materials to the Principal or to his Subcontractors in the prosecution of the Work provided for in said Contract (intending to include herein all claimants as defined in Section 6 of Act 213 of 1963, as amended), then this obligation shall be void, otherwise the same shall be in full force and effect;

AND PROVIDED, that any alterations which may be made in the terms of said Contract, or in the Work to be done under it, or the giving by the party of the first part of said Contract, any extension of time for the performance of said Contract or any other forbearance on the part of either party to the other, shall not in any way release the Principal and the Surety or either of them, their heirs, executors, administrators, successors or assigns from any liability hereunder; notice to the Surety of any alterations, extensions of or of any forbearance being hereby waived.

Signed and sealed this _____ day of _____ A.D., 2024

WITNESS:

PRINCIPAL:

By _____ (Seal)
By _____

WITNESS:

SURETY:

By _____ (Seal)
Title _____

LOCAL ADDRESS OF AGENT FOR SURETY:

Street City State Zip Code

ARTICLE 1-DEFINITIONS

Wherever used in these General Conditions or in the other Contract Documents, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof:

Act of God	Unpredictable phenomenon of nature such as earthquake, flood or cyclone.
Addendum	A document issued by ENGINEER prior to the receipt of bids which sets forth additional provisions, changes or clarifications of the Contract Documents.
Advertisement	The notice published by OWNER to solicit Bids.
Affidavit of Completion	A document which includes the CONTRACTOR's sworn statement that the Work has been completed in accordance with the Contract Documents and that labor and material men have been paid and the Surety's consent to final payment.
Agreement	An instrument, signed by OWNER and CONTRACTOR covering the Work to be performed and setting forth the Contract Time, the Contract Price and other matters.
Allowance	A fixed sum stipulated in the Contract Documents, to be used in total or in part, as determined by the OWNER, for a specific service, product or group of products to be furnished by CONTRACTOR. All cash allowances shall be included in the Contract Price.
Bid	The offer of the BIDDER submitted on the prescribed forms setting forth the conditions under and prices for which the Work will be performed.
Bid Documents	The Bid and additional documents required to be submitted with the Bid as set forth in the Instructions to Bidders.
BIDDER	Any person, firm, joint venture or corporation submitting a Bid for the Work.
Bid Security	Bid Bond or other instrument of security furnished by BIDDER.
Bonds	Bid, Performance and Payment Bonds furnished by CONTRACTOR.
Bulletin	A document issued by ENGINEER which clarifies and interprets the Contract Documents or which directs minor changes or alterations in the Work not involving extra cost.
Certificate of Completion	Notice from ENGINEER to OWNER that the Work has been completed and establishing a one year bonded correction period.
Change Order	An order to CONTRACTOR signed by OWNER authorizing an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Time or both, issued after execution of the Agreement.
Construction Schedule	The timetable outline of CONTRACTOR's sequence of operations.
Contract	The agreement between OWNER and CONTRACTOR set forth in the Contract Documents.
Contract Documents	The Agreement and all related documents as identified in the Agreement.
Contract Price	The total moneys payable to CONTRACTOR for the Work.
Contract Time	The stated date or number of days for the completion of the Work.
CONTRACTOR	The person, firm, joint venture or corporation with whom OWNER has executed the Contract.
Day	Calendar day of 24 hours from midnight to the next midnight.
Defective Work	Work that does not conform to the requirements of the Contract Documents and damaged Work.
Drawings	The Drawings prepared or approved by ENGINEER and approved by OWNER, which show the character and scope of the Work to be performed.
Effective Date of Contract	The date shown in the Agreement.

ENGINEER	The designated representative of the OWNER.
General Requirements	The Sections of Division 1 of the Specifications.
Inspect, Inspection, Inspector	Observe the work of the CONTRACTOR as it relates to implementing CONSULTANT's plans, specifications, reports, and other instruments of professional service. An inspector has no authority or responsibility to direct any construction workers, and may not stop the work. An inspector is not responsible for the means, methods, sequences, or operations of construction, or safety procedures attendant thereto.
Insurance Certificate	The documents issued by CONTRACTOR's insurer listing policies and extent of coverage applicable to the Work.
Liens	Claims, security interests, and encumbrances.
Modification	(a) An amendment of the Contract Documents signed by both parties, (b) a Change Order, or (c) Bulletin. A Modification may only be issued after the Effective Date of the Contract.
Notice	A written communication between the parties specifically called for by the Contract Documents.
Notice of Award	The Notice by OWNER to BIDDER that BIDDER has been awarded the Contract.
Notice of Termination	Notice from OWNER to CONTRACTOR terminating services of the CONTRACTOR.
Notice to Proceed	A Notice by ENGINEER to CONTRACTOR fixing the date on which the Contract Time will commence and on which CONTRACTOR shall start the Work.
OWNER	The public body or authority, corporation, association, partnership, or individual with whom CONTRACTOR has entered into the Contract and for whom the Work is to be performed.
Partial Completion	For the Work that is being constructed in phases, Partial Completion is Substantial Completion of a defined portion of the Work. Partial Completion is reached whenever the defined portion of the Work is ready for use by OWNER. To be considered partially complete, use must not be prevented by other activities of CONTRACTOR. When use is delayed by factors that are beyond CONTRACTOR's control, the designated portion of the Work shall be considered partially complete.
Partial Utilization	Partial Utilization is placing a portion of the Work or facility in service for the purpose for which it was intended or for a related use before reaching Partial Completion or Substantial Completion.
Planholders of Record	Parties recorded by ENGINEER as having received a copy of Contract Documents and a separate set of Bid Documents and as making required deposit therefor, under their own name.
Product	Materials, systems, and equipment incorporated or to be incorporated in the Work.
Product Data	Catalog data, illustrations, standard schedules, performance charts, instructions, and other information prepared by manufacturer or supplier.
Project	Work and other related facilities of the OWNER.
Project Manual	The volume or volumes containing the bidding information, schedules, equipment uses, page-size details, and the Contract Documents for the Work except large drawings and modifications.
Proposal	The document which forms a portion of the Bid.
Provide	Furnish and install.
Resident Project Representative	The authorized representative of ENGINEER who is assigned to the Work site or any part thereof.

Schedule of Values	The breakdown of the Bid into component parts aggregating the total Bid.
Shop Drawings	All drawings, diagrams, illustrations, schedules and other data specifically prepared by CONTRACTOR, a Subcontractor, manufacturer, fabricator, supplier or distributor to illustrate the equipment, material or some portion of the Work.
Site	The location(s) where the Work is to be performed.
Specifications	Those portions of the Contract Documents consisting of technical descriptions of materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative details applicable thereto, specifically Divisions 1 through 16.
Subcontractor	An individual, firm, joint venture or corporation having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the Site.
Substantial Completion	The stage in construction when the Work can be utilized for the purposes for which it was intended. At Substantial Completion, minor items and items that are seasonally restricted need not be completed, but the items that affect operational integrity and function of the Work must be capable of continuous use.
Supplier	Firm providing products to CONTRACTOR.
Surety	A company which provides a Bond.
Work	The entire completed construction and the various separately identified parts thereof required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor, and furnishing and incorporating Products into the construction as required by the Contract Documents.

ARTICLE 2-PRELIMINARY MATTERS

COPIES OF DOCUMENTS

- 2.1 OWNER will furnish CONTRACTOR up to 10 copies of the Contract Documents. Additional copies will be furnished, upon request, as ENGINEER determines are necessary for execution of the Work. Copies requested beyond these limits are available at the cost of reproduction.

CONTRACTOR'S REPRESENTATION

- 2.2 By executing the Agreement, CONTRACTOR represents that CONTRACTOR has visited the Site and assumes full responsibility for being familiar with the nature and extent of the Contract Documents, Work, locality, local conditions and availability of manpower, materials and machinery that may in any manner affect the Work to be done, the Contract Price or the Contract Time.

CONTRACT TIME

- 2.3 The Contract Time will commence on the day indicated in the Notice to Proceed; but in no event shall the Contract Time commence later than the later of 30 days after the time stipulated for Bids to remain firm or 30 days after the Effective Date of Contract.
- 2.4 The date of beginning and the Contract Time for completion of the Work are essential conditions of the Contract Documents. Time requirements are for the benefit of OWNER, CONTRACTOR and other Project Contractors.
- 2.5 CONTRACTOR shall proceed with the Work at a rate of progress to ensure completion within the stipulated Contract Time. It is expressly agreed by CONTRACTOR that the Contract Time is reasonable, taking into consideration the average climatic and economic conditions and the availability of manpower, products, and construction machinery prevailing at the locality of the Work.

BEFORE STARTING THE WORK

- 2.6 CONTRACTOR shall carefully study and compare the Contract Documents and check and verify all figures shown thereon and all field measurements. CONTRACTOR shall, within 48 hours, report to ENGINEER any conflict, error or discrepancy which CONTRACTOR may discover before proceeding with the Work.
- 2.7 CONTRACTOR shall submit to the ENGINEER:
Construction Schedules;
Schedule of Values; and
Schedule of Shop Drawings, Product Data and samples submittals.
- 2.8 A preconstruction meeting will be held to review the Construction Schedules, to establish procedures for handling Shop Drawings and other submissions and for processing payments, and to establish working relationships between the parties.

STARTING THE WORK

- 2.9 CONTRACTOR shall start to perform the Work on the date when the Contract Time commences.
- 2.10 CONTRACTOR shall attend a progress meeting a minimum of once each month at a time and place designated by the ENGINEER.

ARTICLE 3-CONTRACT DOCUMENTS INTENT

GENERAL

- 3.1 It is the intent that the Contract Documents comprise the entire agreement between OWNER and CONTRACTOR and may be altered only by a Modification.
- 3.2 All communications between OWNER, CONTRACTOR, and ENGINEER intended to affect or modify any of the terms or obligations contained in the Contract Documents shall be in writing in order to be valid. Communications intended to affect or modify the Contract Documents include the following terms: claim, submission, notice, request, acceptance, report, objection, order, consent, advise, communicate, communications, certify, authorize, authorization, issue, or like terms.
- 3.3 No oral order, objection, claim or notice by OWNER, CONTRACTOR or ENGINEER shall affect or modify any of the terms or obligations contained in the Contract Documents.
- 3.4 The Contract Documents are complementary; what is called for by one is as binding as if called for by all. In resolving conflicts, errors and discrepancies, the documents shall be given precedence in the order stipulated in the Agreement. Detailed drawings shall govern over general drawings. Any Work that may reasonably be inferred from the Contract Documents as being required to produce the intended result shall be supplied whether or not it is specifically called for. Work, materials or equipment described in words which, so applied, have a well-known technical or trade meaning shall be deemed to refer to such recognized standards or meanings.
- 3.5 The Contract Documents shall be governed by the law of the place of the Work.

REUSE OF DOCUMENTS

- 3.6 Neither CONTRACTOR nor any Subcontractor, manufacturer, fabricator, supplier or distributor shall have or acquire any title to or ownership rights in any of the Drawings, Specifications or other documents or copies thereof prepared by or bearing the seal of ENGINEER; and they shall not reuse any of them on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adaptation by ENGINEER.

ARTICLE 4-LANDS AND CONTROLS

GENERAL

- 4.1 OWNER will, upon request, furnish to CONTRACTOR copies of all available boundary surveys and subsurface tests.

AVAILABILITY OF LANDS

- 4.2 OWNER will furnish, not later than CONTRACTOR's Construction Schedule starting date, the lands or rights-of-way upon which or within which the Work is to be performed, rights-of-way for access thereto, and lands designated for the use of CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained by OWNER. CONTRACTOR shall obtain all additional lands and access required for temporary construction facilities and storage of materials and equipment.

UNFORESEEN SUBSURFACE CONDITIONS

- 4.3 The underground conditions indicated in the Contract Documents represent the information available at the time of preparation and are not guaranteed as to accuracy or completeness. CONTRACTOR shall within 48 hours after discovery notify OWNER and ENGINEER of any subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents. ENGINEER will investigate within 72 hours after Notice and, if warranted, advise OWNER to obtain additional investigations and tests. If said additional investigations and tests show subsurface or latent physical conditions to be materially different and which could not have reasonably been anticipated by CONTRACTOR, a Change Order will be issued incorporating the necessary revision.

REFERENCE POINTS

- 4.4 CONTRACTOR shall be responsible for the preservation of established property corners, monuments, bench marks and similar reference points outside of the normal working area. CONTRACTOR shall report to ENGINEER whenever any reference point is lost, destroyed or requires relocation.
- 4.5 Replacement of reference points within the normal working area are the responsibility of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point is in danger of being lost or destroyed or requires relocation.
- 4.6 Construction stakes will be provided by the OWNER to the extent as may be set forth in the Specifications.

ARTICLE 5 - BONDS AND INSURANCE

PERFORMANCE AND PAYMENT BONDS:

- 5.1 CONTRACTOR shall furnish separate Bonds as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. Each of these Bonds shall be in amounts at least equal to the Contract Price and in such form and with such Sureties as are acceptable to OWNER. Bond forms for the aforementioned securities are a part of the Contract Documents and CONTRACTOR shall ensure that each executed copy of the Bond form is complete and sealed.
- A. Bonds shall be issued by a Surety named in U.S. Treasury Circular 570 licensed to conduct business in the state where the Work is located.
- B. If the Surety on any Bond is declared bankrupt or becomes insolvent or its right to do business is terminated in the state where the Work is located, or it ceases to be listed as an acceptable Surety in U.S. Treasury Circular 570, CONTRACTOR shall, within 5 days thereafter, substitute another Bond from an acceptable Surety.

CONTRACTOR'S LIABILITY INSURANCE

- 5.2 CONTRACTOR shall purchase and maintain such comprehensive general liability and other insurance from an insurance company authorized to write casualty insurance in the state where the Work is located and

shall provide protection from claims set forth below which may arise out of, or result from, CONTRACTOR's performance of the Work and CONTRACTOR's other obligations under the Contract Documents, whether such performance is by CONTRACTOR, by any Subcontractor, by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable.

- A. Claims under worker's compensation, disability benefits, and other similar employee benefits.
- B. Claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR's employees.
- C. Claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR's employees.
- D. Claims for damages insured by personal injury liability coverage which are sustained by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR or by any other person for any other reason.
- E. Claims for damages because of injury to, or destruction of, tangible property, including loss of use resulting therefrom.
- F. Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

5.3 This insurance shall be written for the following minimum limits of liability and shall have an endorsement covering all CONTRACTOR'S obligations under the Contract Documents:

- A. Worker's Compensation & Employer's Liability Insurance:

Worker's Compensation	Statutory
Employer's Liability	\$500,000

- B. Comprehensive General Liability (personal injury, bodily injury and property damage) - covering premises; underground, explosion and collapse hazard; products completed operations; independent contractors' property damage; personal injury and blanket broad form contractual liability.

General Aggregate	\$2,000,000
Each Occurrence	\$1,000,000

This Policy Must Include coverage for the liability assumed by the CONTRACTOR under the indemnity provisions of the Contract.

- C. Automobile Liability Insurance (bodily injury and property damage) - covering all owned, hired and non-owned automobile equipment.

Combined Single Limit	\$1,000,000
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Coverage will also comply with all applicable automobile statutes and no-fault laws.

Comprehensive General Liability and Comprehensive Automobile Liability Insurance may be arranged under a single policy for the full limits required or a combination of underlying policies with the balance provided by an Excess or Umbrella Liability Policy.

OWNER'S LIABILITY INSURANCE

5.4 CONTRACTOR shall obtain Owner's Protective liability insurance in the name of OWNER and ENGINEER as agent for OWNER, with such provisions as will protect OWNER and ENGINEER from contingent liability under this Contract, and shall maintain and pay the premiums of such insurance. The amounts of coverage shall be the same as CONTRACTOR's liability insurance requirements in this Article.

PROPERTY INSURANCE

- 5.5 CONTRACTOR shall purchase and maintain property insurance upon the Work to the full insurable value thereof. This insurance shall include the interests of OWNER, CONTRACTOR, and Subcontractors in the Work and shall insure against the perils of fire and include extended coverage and "all risk" coverage for physical loss and damage including theft, vandalism, and malicious mischief, collapse and water damage. Payment for losses, if any, shall be retained by OWNER as security for Contract and shall be released to CONTRACTOR in periodic payments as such Work progresses.
- A. Any insured loss under the property insurance policies is to be adjusted with, and made payable to, OWNER as trustee for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause.
 - B. OWNER and CONTRACTOR waive all rights against each other and the Subcontractors and their agents and employees and against ENGINEER and separate contractors' agents and employees for damages caused by fire or other perils to the extent covered by this property insurance, except such rights as they may have to the proceeds of such insurance held by OWNER as trustee. CONTRACTOR shall require similar waivers by Subcontractors.
 - C. OWNER as trustee will have the power to adjust and settle any loss with the insurers unless one of the parties in interest shall object to OWNER's exercise of this power within 15 days after the occurrence of loss. If such objection be made, arbitrators shall be chosen by the American Arbitration Association. OWNER as trustee will, in that case, make settlement with the insurers in accordance with the direction of such arbitrators. If distribution of the insurance proceeds by arbitration is required, the arbitrators will direct the distribution.
 - D. If OWNER finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion, no such use or occupancy shall commence before the insurers providing the property insurance have acknowledged notice thereof from OWNER and consented by endorsement on the policy or policies. The property insurance shall not be canceled or lapse on account of any such use or occupancy.

CERTIFICATE OF INSURANCE

- 5.6 Before commencing performance of Contract, CONTRACTOR shall furnish the OWNER with Certificates of Insurance evidencing:
- A. Insurer(s) affording coverage, acceptable to the OWNER.
 - B. Effective and expiration dates of policies.
 - C. That the OWNER will be given 30 days written notice of any cancellation, non-renewal or material change in any policy.
 - D. That the Contractual Liability Endorsement has been included in Comprehensive General Liability policy.
 - E. Any deductibles and/or self-insured retentions.
 - F. Any exclusions to policies which are not part of the standard form.

ARTICLE 6-CONTRACTOR'S RESPONSIBILITIES

GENERAL

- 6.1 CONTRACTOR will issue communications relative to the Work, to OWNER through ENGINEER.
- 6.2 CONTRACTOR shall supervise and direct the Work competently, efficiently and with skill and attention required to complete the Work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction.

CONTRACTOR shall be responsible for accurate compliance of the finished Work with the Contract Documents.

- 6.3 CONTRACTOR shall keep on the Work, at all times the Work is in progress, a competent superintendent who shall be replaced only under extraordinary circumstances with Notice to OWNER and ENGINEER. The superintendent shall have authority to act on behalf of CONTRACTOR. All communications given to the superintendent shall be binding on CONTRACTOR.
- 6.4 CONTRACTOR shall provide notice to allow all utilities to locate their facilities prior to the performance of Work. The form and time of notice, the person(s) notified and all other issues related to notice to utilities which may be effected by the Work shall be in accordance with the laws and regulations of the state in which the Work is to be performed.
- 6.5 Unless otherwise specified, restricted work times shall be as follows, except in the event of an emergency as defined in this Article: Sunday or holiday work will not be permitted; and, work will not be permitted from 7:00 p.m. to 7:00 a.m. Saturday work is permitted, provided two day's notice is given to the ENGINEER.

LABOR, MATERIALS AND EQUIPMENT

- 6.6 CONTRACTOR shall provide competent, suitably qualified personnel to execute and complete the Work as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the Site. ENGINEER may judge the competency and qualifications of personnel and, upon his written request to the CONTRACTOR, the CONTRACTOR shall cause the immediate dismissal from the Work of any personnel considered by ENGINEER to be incompetent and/or unqualified.
- 6.7 CONTRACTOR shall guarantee that he has available the quantities and quality of labor and supervision necessary to fulfill the CONTRACTOR'S obligations under the Contract Documents.
- 6.8 CONTRACTOR shall furnish all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, and all other facilities and incidentals necessary for the execution, testing, initial operation, and completion of the Work.
- 6.9 All Products shall be of good quality and new. When required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence as to the kind and quality of materials and installed equipment. CONTRACTOR shall submit to the ENGINEER Shop Drawings, Product Data and samples of Products to be incorporated in the Work.

SUBCONTRACTORS

- 6.10 CONTRACTOR shall be fully responsible for all acts and omissions of Subcontractors and of persons directly or indirectly employed by them and persons for whose acts any of them may be liable to the same extent that CONTRACTOR is responsible for the acts and omissions of persons directly employed by CONTRACTOR. Nothing in the Contract Documents shall create any contractual relationship between any Subcontractor and OWNER or ENGINEER or any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any Subcontractor, except as may otherwise be required by law. OWNER or ENGINEER may furnish to any Subcontractor, to the extent practicable, evidence of amounts paid to CONTRACTOR for specific work done.
- 6.11 The Divisions and Sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing the Work among Subcontractors or delineating work to be performed by any specific trade.
- 6.12 All work performed for CONTRACTOR by a Subcontractor shall be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor, subject to the applicable terms and conditions of the Contract Documents.

SUBSTITUTE PRODUCTS

- 6.13 Whenever Products are specified or described in the Drawings or Specifications by using the name of a proprietary item or the name of a particular manufacturer, fabricator, supplier or distributor, it is intended to establish the type, function and quality required. Unless the substitution is specifically prohibited, substitute

items may be accepted by ENGINEER. ENGINEER will be the sole judge of the acceptability of proposed substitutions. No substitution shall be ordered or installed without ENGINEER's prior acceptance. OWNER may require CONTRACTOR to furnish a special performance guarantee or other surety with respect to any substitute.

- A. During the bidding period, requests for substitutions may be given consideration by the ENGINEER, and if approved, an Addendum will be issued to incorporate the approved Product into the Contract Documents. Such requests must be received by the ENGINEER in ample time, not later than 10 days before bid due date, so that any necessary Addendum can be issued to all prospective BIDDERS before submission of the Bids.
- B. A request for substitution after award of the Contract shall be accepted from the CONTRACTOR only, shall be accompanied by manufacturer's data or other detailed description of the proposed Product and will be considered for one of the following reasons only:
 - 1. Increased value to the OWNER.
 - 2. Decreased cost to the OWNER.
 - 3. Specified item not procurable.
- C. A request for a substitution constitutes a representation that the CONTRACTOR has investigated and determined that the proposed Product is equal to or superior in all respects to that specified.
- D. CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's consultants for evaluating accepted or rejected substitutes and for resulting changes in Drawings and Specifications.

OWNER FURNISHED PRODUCTS:

- 6.14 When the Contract Documents stipulate that the OWNER will furnish Products to be incorporated in the Work, the CONTRACTOR'S responsibilities will be:
 - A. Designate the delivery for each Product in the Construction Schedule.
 - B. Review the Shop Drawings, Product Data and samples.
 - C. Submit to ENGINEER Notice of any discrepancies or problems anticipated in the use of the Product.
 - D. Receive and unload the Products at the Site.
 - E. Promptly inspect Products jointly with the OWNER, record shortages, and damaged or defective items.
 - F. Handle Products at the Site, including uncrating and storage.
 - G. Protect the Products from exposure to the elements and from damage.
 - H. Assemble, install, connect, and adjust the Products as stipulated in the Specifications.
 - I. Repair or replace items damaged by the CONTRACTOR.

PERMITS

- 6.15 CONTRACTOR shall obtain all temporary permits required to complete the Work. Application and inspection fees associated with temporary permits shall be paid by the CONTRACTOR.

USE OF PREMISES

- 6.16 CONTRACTOR shall confine Work operations to the Site and other designated areas. All disturbed areas shall be restored to equal to or better than original condition.

- 6.17 Material and equipment storage areas on Site shall be established and maintained in a manner that will not disrupt or impair the use of the Site.

PATENT FEES AND ROYALTIES

- 6.18 CONTRACTOR shall pay license fees, royalties and costs incident to the use of any invention, design, process or device which is the subject of patent rights or copyrights in connection with the Work. OWNER will pay for processes involved in the operation of the completed facilities.

SAFETY AND PROTECTION

- 6.19 CONTRACTOR shall be responsible for initiating, maintaining and supervising safety programs in connection with the Work. CONTRACTOR shall take precautions and provide protection to prevent damage, injury or loss to:
- A. Employees on the Work and other persons who may be affected thereby;
 - B. The Work and Products to be incorporated therein, whether in storage on or off the site; and
 - C. Other property at the Site or adjacent thereto, both above and below ground, not designated for removal, relocation or replacement. CONTRACTOR shall erect and maintain necessary safeguards for safety and protection of property and shall notify owners of adjacent utilities when prosecution of the Work may affect them. CONTRACTOR shall be responsible for costs associated with all damage, injury or loss.
- 6.20 CONTRACTOR shall designate a superintendent at the site as safety officer, whose duty shall be the prevention of accidents.
- 6.21 Damage, injury or loss to property referred to in this Article caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor and anyone directly or indirectly employed by any of them and anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR at CONTRACTOR'S cost. CONTRACTOR's duties and responsibilities for the safety and protection of the Work shall continue until the Work is completed and ENGINEER has issued the Certificate of Completion.

LAWS AND REGULATIONS

- 6.22 CONTRACTOR shall comply with all laws, ordinances, rules, regulations and orders of public bodies applicable to the Work.
- 6.23 When the CONTRACTOR becomes aware that the Contract Documents, or any requirements thereof, are at variance to laws and regulations, CONTRACTOR shall promptly serve written Notice to the ENGINEER. Any alterations required to bring the Work in compliance will be made by Modification.
- 6.24 When the CONTRACTOR is aware that the Contract Documents, or any requirements thereof, are at variance to laws and regulations and performs any of the Work contrary to laws and regulations without Notice to the ENGINEER, all costs incurred in correcting the Work shall be borne by the CONTRACTOR.

HAZARDOUS MATERIALS

- 6.25 In the event CONTRACTOR discovers on the Site unexpected regulated hazardous materials, including without limitation, inorganics, organics and asbestos, CONTRACTOR shall immediately give Notice to ENGINEER and request a determination of how to proceed. In the event CONTRACTOR releases, under any circumstances, regulated hazardous materials on the Site, CONTRACTOR shall immediately give Notice to ENGINEER, take emergency action as appropriate and, following approval by ENGINEER of CONTRACTOR'S proposed plan of remediation, CONTRACTOR shall remediate said release at CONTRACTOR'S expense, all in compliance with all applicable laws and regulations.

EMERGENCIES

- 6.26 In emergencies affecting the safety of persons, the Work or adjacent property, CONTRACTOR, without authorization from ENGINEER or OWNER, is obligated to act, at CONTRACTOR's discretion, to prevent

threatened damage, injury or loss. CONTRACTOR shall give ENGINEER prompt Notice of the emergency action taken, and any significant changes in the Work or deviations from the Contract Documents caused thereby.

INDEMNIFICATION

- 6.27 CONTRACTOR shall indemnify, defend and hold harmless OWNER and ENGINEER, their consultants, agents and employees, from and against claims, damages, losses, attorney's fees, and expenses arising out of, or resulting from, the performance of the Work, provided that any such claim, damage, loss or expense:
- A. is attributable to bodily injury, sickness, disease or death, or to injury to, or destruction of, tangible property other than the Work itself, including the loss of use resulting therefrom; and
 - B. is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.
- 6.28 In all claims against OWNER or ENGINEER or their agents or employees, by any employee of CONTRACTOR or Subcontractors or anyone for whose acts they may be liable, the indemnification obligation shall not be limited by the amount or type of damages, compensation or benefits under workmen's compensation acts, disability benefit acts, or other employee benefit acts.
- 6.29 The indemnification obligation of CONTRACTOR shall not extend to the liability of ENGINEER, agents or employees arising out of the preparation or approval of maps, Drawings, reports, surveys, Change Orders, designs or Specifications.

ARTICLE 7-WORK BY OTHERS

- 7.1 OWNER may perform or may contract with others to do additional work related to the Project. CONTRACTOR shall afford others a reasonable opportunity to perform work as well as to store materials and equipment on Site and shall properly integrate and coordinate CONTRACTOR's work with others. CONTRACTOR shall coordinate and cooperate with contractors working in the area for other owners or jurisdictions.
- 7.2 If any part of CONTRACTOR's work depends for proper execution or results upon the work of other contractors, other owners, or OWNER, CONTRACTOR shall inspect and promptly report to ENGINEER any defects or deficiencies in such work. CONTRACTOR's failure to so report shall constitute an acceptance of the other work as fit and proper for integration with CONTRACTOR's work.
- 7.3 Additional Work resulting from other contracts, or work by OWNER not noted in the Contract Documents will be added by Change Order.

ARTICLE 8-OWNER'S RESPONSIBILITIES

GENERAL

- 8.1 OWNER will issue all communications to the CONTRACTOR through the ENGINEER.
- 8.2 In case of termination of the employment of ENGINEER, OWNER will appoint an engineer against whom CONTRACTOR makes no substantial objections, whose status under the Contract Documents will be that of the former ENGINEER.
- 8.3 OWNER will furnish the data required under the Contract Documents promptly and will make payments to CONTRACTOR promptly.

OWNER FURNISHED PRODUCTS

- 8.4 When the Contract Documents stipulate that the OWNER will furnish Products to be incorporated in the Work, the OWNER'S responsibilities will be:
- A. Arrange for and deliver the necessary Shop Drawings, Product Data, and samples to the CONTRACTOR.
 - B. Arrange and pay for delivery of the Products to the Site in accordance with the Construction Schedule.
 - C. Deliver supplier's bill of materials to the CONTRACTOR.
 - D. Inspect deliveries jointly with the CONTRACTOR.
 - E. Submit claims for transportation damage.

ARTICLE 9-ENGINEER'S STATUS

OWNER'S REPRESENTATIVE

- 9.1 ENGINEER will be OWNER'S representative during the bidding and construction period. Communications between the OWNER and the CONTRACTOR, or claimant, will be directed through the ENGINEER. The duties, responsibilities and limitations of authority of ENGINEER as OWNER's representative during the bidding and construction are set forth in these Contract Documents and shall be modified only with consent of OWNER and ENGINEER.
- 9.2 ENGINEER will not be responsible for the construction means, methods, techniques, sequences or procedures, or the safety precautions and programs incident thereto, and ENGINEER will not be responsible for the CONTRACTOR's failure to perform the Work in accordance with the Contract Documents.
- 9.3. ENGINEER will not be responsible for the acts or omissions of the CONTRACTOR, or any Subcontractors, or any of their agents or employees, or any other persons performing any of the Work.

VISITS TO SITE

- 9.4 ENGINEER will make visits to the site at intervals appropriate to the various stages of construction to observe the progress and quality of the executed Work and to determine, in general, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. ENGINEER'S efforts will be directed toward providing for OWNER a greater degree of confidence that the completed Work will conform to the Contract Documents. On the basis of such visits and on-site observations as an experienced and qualified professional, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defects and deficiencies in the Work.

CLARIFICATIONS AND INTERPRETATIONS

- 9.5 ENGINEER may issue clarifications or interpretations consistent with, or inferable from, the intent of the Contract Documents.

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- 9.6 ENGINEER shall review Shop Drawings, Product Data and samples of Products submitted by the CONTRACTOR.

REJECTING DEFECTIVE WORK

- 9.7 ENGINEER will have authority to disapprove or reject Defective Work. ENGINEER will also have authority to require special inspection or testing of Work whether or not the Work is fabricated, installed or completed.

SITE REPRESENTATIVE

- 9.8 ENGINEER will furnish a Resident Project Representative, who may have one or more assistants, to aid OWNER and ENGINEER in carrying out their responsibilities at the Site. The duties, responsibilities and authority of the Resident Project Representative are set forth in Article 18 of these General Conditions.

DECISIONS ON DISAGREEMENT

- 9.9 ENGINEER will be initial interpreter of the requirements of Contract Documents and judge of acceptability of the Work. Claims, disputes, and other matters pertaining to bidding, execution and progress of the Work shall be referred initially to ENGINEER with a request for an informal meeting and a formal decision. Notice of each such claim, dispute and other matter shall be delivered by claimant to ENGINEER and other party within 15 days of occurrence of the event giving rise thereto. Additional supporting data shall be supplied within 30 days of occurrence. ENGINEER's written decision will be rendered within 40 days after the occurrence. In ENGINEER's capacity as interpreter and judge, ENGINEER will be impartial to OWNER, CONTRACTOR or claimant and will not be liable for any decision rendered in good faith.
- 9.10 The rendering of a decision by ENGINEER with respect to any such claim, dispute or other matter, will be a condition precedent to arbitration under these General Conditions. The ENGINEER's decision shall become final and binding on the parties 30 days after the decision is rendered unless deferred by an arbitration request, litigation or administrative appeal (if applicable) is filed by either party within the 30-day period. Lawsuits shall be brought in Kent County.
- 9.11 No decision made by ENGINEER in good faith, either to exercise or not to exercise authority under this Article shall give rise to any duty, liability or responsibility of ENGINEER to claimant, CONTRACTOR, any Subcontractor, any of their agents or employees, or any other person performing any of the Work.

ARTICLE 10-CHANGES IN THE WORK

- 10.1 Without invalidating the Contract, OWNER may, at any time, order additions, deletions or revisions in the Work by Change Orders. Upon receipt of an executed Change Order, CONTRACTOR shall proceed with the Work involved.
- 10.2 ENGINEER may authorize minor changes or alterations in the Work not involving extra cost and not inconsistent with the overall intent of the Contract Documents. These changes will be authorized by a Bulletin and will be binding upon OWNER and CONTRACTOR.
- 10.3 Additional work performed by CONTRACTOR without authorization of a Change Order will not entitle CONTRACTOR to an increase in the Contract Price or an extension of the Contract Time, except as set forth in these General Conditions.
- 10.4 OWNER shall execute appropriate Change Orders recommended by ENGINEER as set forth in these General Conditions.
- 10.5 It shall be CONTRACTOR's responsibility to notify Surety of any changes affecting the general scope of the Work or change in the Contract Price or Time. The amount of the applicable Bonds shall be adjusted accordingly.

ARTICLE 11-CHANGE OF CONTRACT PRICE

GENERAL

- 11.1 The Contract Price constitutes the total compensation payable for performing all duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR, and includes all taxes payable by CONTRACTOR as a result of the Work.
- 11.2 The Contract Price shall only be changed by a Change Order. Claims for a change in the Contract Price shall be submitted, with supporting data, to ENGINEER within 15 days of the occurrence of the event giving rise to the claim.

- 11.3 Claims for extra compensation shall not be made by CONTRACTOR for reasonable delays:
- A. caused by the work of other Project contractors or subcontractors.
 - B. due to the failure of OWNER to perform any obligations required of OWNER under these Contract Documents.
- 11.4 Value of the Work covered by a Change Order shall be determined by one of the following methods:
- A. where the Work is covered by Contract unit prices by application of unit prices to the items involved.
 - B. by mutual acceptance of a lump sum.
 - C. on the basis of the cost of the Work, plus overhead and profit, but only in the event OWNER and CONTRACTOR cannot agree on one of the above methods.

COST-PLUS WORK

- 11.5 Cost-plus work means cost of the Work plus a fee. Cost of the Work means the sum of all costs incurred and paid by CONTRACTOR in the performance of cost-plus work. Such costs shall be in amounts no higher than those prevailing in the locality of the Work. Cost of the Work shall only include:
- A. payroll costs for employees including superintendents and foremen at the Site in the direct employ of CONTRACTOR under schedules of job classifications. Payroll costs shall include, but not be limited to, salaries and wages, social security contributions, unemployment, excise and payroll taxes, workers' or workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay.
 - B. cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation, storage and manufacturers' field services.
 - C. rentals of all construction equipment, machinery and accessories, and costs of transportation, loading, unloading, installation, dismantling and removal. Rental rates shall not exceed rates listed in the "Rental Rate Blue Book for Construction Equipment" published by Equipment Guide Book Company. Rates allowed will be based on the most economical time unit. The rental determined by multiplying the rate (e.g., hourly, daily, weekly, etc.) by the period of use shall not exceed the rental determined by applying the next highest rate (e.g., for this purpose the daily rate would be "higher" than the hourly rate, etc.) to the corresponding period of use.
 - D. fees of special consultants.
 - E. cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, hand tools, office and temporary facilities at the Site.
 - F. transportation, travel and subsistence expenses.
 - G. sales, use or similar taxes imposed by any governmental authority.
 - H. unavoidable deposit losses, royalty payments, and fees for permits and licenses, and losses and damages to the Work not compensated by insurance.
 - I. the cost of utilities, fuel, telegrams, long distance telephone calls, and expressage.
- 11.6 Cost of the Work shall not include:
- A. compensation for CONTRACTOR's officers, executives, principals, managers, professionals, clerks and other personnel, whether at the Site or office.

- B. any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.
 - C. cost due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of Defective Work or damage to the property, disposal of materials or equipment wrongly supplied.
 - D. other overhead or general expense costs.
- 11.7 The fee allowed to the CONTRACTOR for overhead and profit shall be 10 percent of the cost of the Work; except for payments to Subcontractors in which case the fee shall be 5 percent.
- 11.8 Payments to Subcontractors will be determined in the same manner as CONTRACTOR's cost of the Work. The fee allowed to the Subcontractors for overhead and profit shall be 10 percent.
- 11.9 The amount of credit to OWNER for any change which results in a net decrease in cost will be the amount of the actual net decrease, exclusive of any fee for overhead and profit. When both additions and credits are involved in any one change, the overhead and profit shall be based on the net increase in the Work.
- 11.10 CONTRACTOR shall submit daily cost reports of cost-plus work to the ENGINEER.

ARTICLE 12-CHANGE OF THE CONTRACT TIME

- 12.1 The Contract Time may only be altered by a Change Order. Claim for a change of Contract Time shall be delivered to OWNER and ENGINEER within 15 days of the event giving rise to the claim. Adjustment in the Contract Time will be determined by ENGINEER.
- 12.2 The Contract Time will be extended in an amount equal to time lost due to unreasonable time delays beyond control of CONTRACTOR. Reasons for such delays shall be restricted to fires, labor disputes, epidemics, abnormal weather conditions, and Acts of God. In addition Contract Time may be extended for unreasonable time delays:
- A. caused solely by work of other Project contractors or subcontractors
 - B. due to failure of OWNER to perform any obligations required of OWNER under these Contract Documents.

ARTICLE 13-WARRANTY, TESTS AND DEFECTIVE WORK

WARRANTY AND GUARANTEE

- 13.1 CONTRACTOR warrants and guarantees to OWNER and ENGINEER that materials and equipment shall be new and that Work shall be of good quality and free from faults or defects and in accordance with requirements of the Contract Documents. Prompt Notice of any defects will be given to CONTRACTOR.
- 13.2 CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by monthly estimates, passes automatically to OWNER at the time of payment, free and clear of all liens.

TESTS AND INSPECTIONS

- 13.3 If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any portion of the Work to be inspected, tested, or approved by someone other than CONTRACTOR, CONTRACTOR shall give ENGINEER timely notice of readiness therefore. Such tests shall be in accordance with the methods prescribed by the applicable organization or the Contract Documents. All certification fees, testing laboratory fees, and inspection fees of said public authorities will be paid by CONTRACTOR. Inspection coordination is the responsibility of the CONTRACTOR, unless otherwise indicated in the Contract Documents.

- 13.4 Neither observations by ENGINEER nor inspections, tests or approvals by persons other than CONTRACTOR shall relieve CONTRACTOR from obligations to perform the Work required by the Contract Documents, laws, ordinances, rules, regulations or orders of public authority having jurisdiction.
- 13.5 When inspection readiness is declared by the CONTRACTOR and the inspection proves unsuccessful, all costs for the inspection shall be borne by the CONTRACTOR.

ACCESS TO THE WORK

- 13.6 ENGINEER, his representatives, and representatives of OWNER shall at all times have access to the Work. CONTRACTOR shall provide proper facilities for access, observation of the Work, and for any inspection or testing by manufacturers, suppliers, material men, and other parties as authorized by OWNER.

UNCOVERING WORK

- 13.7 If Work requiring inspection, testing or approval is covered either without ENGINEER's written approval where required, or contrary to ENGINEER's specific request, the Work shall, if requested by ENGINEER, be uncovered for observation and replaced at CONTRACTOR's expense.
- 13.8 If ENGINEER considers it necessary or advisable that covered Work be inspected or tested, other than as outlined under the previous paragraph, CONTRACTOR, at ENGINEER's request, shall uncover and expose that portion of the Work. If the Work is defective, CONTRACTOR shall bear all the expenses of satisfactory repair and reconstruction, including compensation for additional engineering services resulting therefrom. If such Work is not found to be defective, CONTRACTOR shall be allowed an increase in Contract Price, an extension of Contract Time, or both, directly attributable to such uncovering and reconstruction.

CUTTING AND PATCHING

- 13.9 CONTRACTOR shall be responsible for all cutting, fitting and patching required to complete the Work, to make its several parts fit together properly, or to uncover portions of the Work to provide for installation of ill-timed Work. CONTRACTOR shall not cut or alter any part of the Work or the work of another Contractor or Subcontractor without written approval of the ENGINEER. In no case shall the CONTRACTOR endanger any portion of the Work by cutting or altering any part of it.

CORRECTION OR REMOVAL OF DEFECTIVE WORK

- 13.10 CONTRACTOR shall promptly, as specified by ENGINEER, either correct any Defective Work or remove it from the Site and replace it with acceptable Work. If CONTRACTOR does not correct or remove and replace such Defective Work within a reasonable time, OWNER may have the deficiency corrected or the Defective Work removed and replaced by others. All direct and indirect costs of such correction or removal, and replacement, including compensation for additional engineering services, shall be paid by CONTRACTOR in an amount as verified by ENGINEER. CONTRACTOR shall also repair all Work of others destroyed or damaged by replacement of CONTRACTOR's Defective Work.

ONE YEAR CORRECTION PERIOD

- 13.11 Prior to the expiration of one year after the date of Certificate of Completion or such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents, CONTRACTOR shall promptly correct identified Defective Work or remove it from the Site and replace it with acceptable Work. If CONTRACTOR does not promptly comply, OWNER's rights to correction will be the same as for Defective Work in this Article. Repairs and replacements made under this paragraph shall bear an additional 12-month correction period dated from the acceptance of repair and replacement.

ACCEPTANCE OF DEFECTIVE WORK

- 13.12 If OWNER prefers to accept Defective Work, an appropriate reduction in the Contract Price will be made. If the acceptance occurs after final payment, an appropriate amount, as determined by ENGINEER, shall be paid by CONTRACTOR to OWNER.

OWNER'S RIGHT TO DO WORK:

- 13.13 If CONTRACTOR should neglect to prosecute the Work properly and diligently, or fail to perform any provision of this Contract, including requirements of the Construction Schedule, OWNER, after three (3) days Notice to CONTRACTOR and his Surety may, without prejudice to any other remedy that OWNER may have, correct and remedy any such deficiency. Direct and indirect costs of OWNER, including compensation for additional engineering services, shall be verified by ENGINEER and an appropriate reduction in the Contract Price will be made. If the payments due CONTRACTOR are not sufficient to cover such amount, CONTRACTOR shall pay the difference to OWNER.

ARTICLE 14-PAYMENTS AND COMPLETION

PROGRESS PAYMENTS AND RETAINAGES

- 14.1 As a condition precedent to the first progress payment, CONTRACTOR shall submit a Construction Schedule and Schedule of Values.
- 14.2 Monthly, CONTRACTOR will prepare a payment request covering Work completed to date supported by such data as ENGINEER may reasonably request from CONTRACTOR.
- 14.3 The monthly payment requests shall not include Products not incorporated in the Work unless specifically requested by CONTRACTOR and approved by OWNER subject to the following mandatory conditions:
- A. the Products have been specifically manufactured for the Work;
 - B. the Products have been delivered and suitably stored at the Site or at another location agreed to; and
 - C. CONTRACTOR has furnished supporting data, satisfactory to OWNER, that establishes OWNER's title to the Products, free of any Liens or other encumbrances, and protects OWNER's interest therein, including applicable insurance.
- 14.4 Monthly progress payments and retainage shall conform to the following, provided CONTRACTOR'S progress is in accordance with the approved Construction Schedule and the conditions for payment as set forth in this Article.
- A. Progress payments covering the first 50 percent of the Work shall be 90 percent of the progress period Work completed and 75 percent of the Products furnished and not incorporated in the Work, but specifically authorized by the OWNER.
 - B. Progress payments covering the final 50 percent of the Work, at the discretion of the OWNER, may be increased to 100 percent of the progress period Work completed and 75 percent of Products furnished and not incorporated in the Work, but specifically authorized by the OWNER.
 - C. All payments to the CONTRACTOR by the OWNER, including retainage, shall be in accordance with all laws and regulations applicable to these activities in the state in which the Work is performed.

APPROVAL OF PAYMENT

- 14.5 CONTRACTOR will prepare monthly payment requests and present them to ENGINEER for recommendation to the OWNER. ENGINEER shall complete review of such requests, make adjustments as deemed appropriate, and forward to the OWNER within ten (10) days of receipt from the CONTRACTOR.
- 14.6 ENGINEER'S submittal and recommendation of any payment request shall constitute a representation by ENGINEER to OWNER, based on ENGINEER's on-site observations of Work in progress as an experienced qualified professional, that the Work has progressed to the point indicated; that, to the best of ENGINEER's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents; and that CONTRACTOR is entitled to payment. However, by recommending payment, ENGINEER shall not thereby be deemed to have represented that ENGINEER made exhaustive or continuous on-site inspections

to check the quality or the quantity of the Work, or that ENGINEER has reviewed the means, methods, techniques, sequences, and procedures of construction or that ENGINEER has made any examination to ascertain how or for what purpose CONTRACTOR has used the moneys paid or to be paid to CONTRACTOR or that title to any Work, materials, or equipment has passed to OWNER free and clear of any liens.

- 14.7 OWNER will make payment to CONTRACTOR on monthly requests within 30 days of ENGINEER'S presentation to OWNER.

PAYMENT WITHHELD

- 14.8 ENGINEER may not recommend any payment or may nullify any payment previously recommended, to such extent as may be necessary to protect OWNER from loss because:
- A. Work is defective or completed Work has been damaged requiring correction or replacement.
 - B. written claims have been made against OWNER or liens have been filed in connection with the Work.
 - C. Contract Price has been reduced by Modifications.
 - D. CONTRACTOR has failed to file receipts for payment of equipment and materials not incorporated in the Work.
 - E. OWNER has been required to correct Defective Work or complete neglected Work.
 - F. unsatisfactory prosecution of the Work, including failure to clean-up or failure to perform testing as required by the Contract Documents.

PARTIAL UTILIZATION

- 14.9 OWNER shall have the right to take possession of, and use any completed or partially completed portions of the Work prior to completion. The OWNER's possession and use shall not be deemed an acceptance of any Work not completed in accordance with the Contract Documents. Unless otherwise called for in the Contract Documents, CONTRACTOR will be reimbursed for any extra costs or provide an extension of Contract Time for any delays or both which result from Partial Utilization of Work. Special insurance coverage, if required, shall be provided by the OWNER. Upon receipt of a request from OWNER to utilize a portion of the Work, ENGINEER shall:
- A. make an inspection and shall prepare a list of items of incompleted and Defective Work remaining for the portion of the Work to be utilized.
 - B. determine if any extra compensation or time extension is due the CONTRACTOR due to the OWNER'S Partial Utilization of the Work.

SUBSTANTIAL COMPLETION

- 14.10 When ENGINEER considers that the Work has been substantially but not entirely completed, and full completion thereof is materially delayed through no fault of CONTRACTOR, ENGINEER will issue a Certification of Substantial Completion. Liquidated damages for that portion of Work will not be assessed beyond the date of Substantial Completion.

PAYMENT FOR SUBSTANTIAL COMPLETION

- 14.11 OWNER will, upon Certificate of Substantial Completion by ENGINEER and without terminating the Contract, make payment of the balance due for Work fully completed and accepted. Consent of the Surety shall be submitted by CONTRACTOR to ENGINEER prior to certification of such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

NOTIFICATION OF COMPLETION

- 14.12 When CONTRACTOR considers the Work required in the performance of this Contract to be complete and ready for final inspection, CONTRACTOR shall provide Notice to the ENGINEER.

FINAL INSPECTION

- 14.13 CONTRACTOR shall serve Notice of completion on ENGINEER who will, within 7 days, schedule the final inspection with OWNER and CONTRACTOR, and will notify CONTRACTOR of incomplete and Defective Work. CONTRACTOR shall remedy such defects immediately and again submit a Notice of completion. Questions regarding quantities for payment will be measured jointly by the CONTRACTOR and ENGINEER.

FINAL PAYMENT

- 14.14 After CONTRACTOR has remedied all incomplete and Defective Work and delivered documents required by the Contract Documents, CONTRACTOR will prepare a request for final payment. CONTRACTOR shall furnish an executed Affidavit of Completion, in the form set forth in Article 19 of these General Conditions, including consent of the Surety to final payment. In lieu thereof, CONTRACTOR may furnish a Bond satisfactory to OWNER to indemnify OWNER against any lien.

APPROVAL OF FINAL PAYMENT

- 14.15 If ENGINEER is satisfied that the Work has been completed, and has received CONTRACTOR's Affidavit of Completion, ENGINEER will, within 10 days, issue the Certificate of Completion and present a recommendation for final payment to the OWNER for approval and payment. If said documentation is satisfactory in form and substance, OWNER shall pay CONTRACTOR within 30 days of receipt thereof.

CONTRACTOR'S CONTINUING OBLIGATION

- 14.16 The CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents shall be absolute. Recommendation of any progress or final payment by ENGINEER, issuance of a Certificate of Substantial Completion, any payment by OWNER to CONTRACTOR, any use or occupancy of the Work or any part thereof by OWNER, any act of acceptance by OWNER or any failure to do so, or any correction of Defective Work by OWNER shall not constitute an acceptance of Work contrary to the Contract Documents.
- 14.17 The duties and obligations imposed on CONTRACTOR by these General Conditions, and the rights and remedies available hereunder, and the rights and remedies available to OWNER and ENGINEER hereunder, shall be in addition to, and not a limitation of, any otherwise imposed or available by law, by special guarantee, or other provisions of the Contract Documents.

WAIVER OF CLAIMS

- 14.18 The making and acceptance of final payment shall constitute:
- A. a waiver of all claims by OWNER against CONTRACTOR, except claims arising from unsettled Liens, from Defective Work appearing after final inspection pursuant to this Article or from failure to comply with the Contract Documents. However, it shall not constitute a waiver by OWNER of any rights with respect to CONTRACTOR's continuing obligations under the Contract Documents; and
 - B. A waiver of all claims by CONTRACTOR against OWNER, except those claims under negotiation, arbitration, or litigation.
- 14.19 CONTRACTOR'S refusal to accept the final payment as tendered by OWNER shall constitute a waiver of any right to interest thereon.

LIQUIDATED DAMAGES

- 14.20 OWNER will deduct the amount of any liquidated damages and expenses, calculated in accordance with the Agreement, from moneys due or to become due to CONTRACTOR. If such amount exceeds such unpaid balance, the CONTRACTOR shall pay the difference to the OWNER.

ARTICLE 15-SUSPENSION AND TERMINATION

WORK SUSPENSION

- 15.1 OWNER may order CONTRACTOR to suspend the Work, or any portion thereof, until the reason for such suspension has been eliminated; however, this right shall not give rise to any duty by OWNER to exercise this right for the benefit of CONTRACTOR or any other party.
- 15.2 OWNER may suspend the Work for the following reasons:
- A. Defective Work.
 - B. CONTRACTOR fails to supply sufficient skilled workmen or suitable Products.
 - C. CONTRACTOR fails to make prompt payments to Subcontractors or for labor or Products.
 - D. CONTRACTOR fails to maintain proper insurance, bonds, licenses, or federal, state, or local permits.

OWNER TERMINATION OF WORK

- 15.3 Upon the occurrence of any one or more of the following events OWNER may, after giving CONTRACTOR and Surety 10 days written Notice of Termination, terminate the services of the CONTRACTOR.
- A. CONTRACTOR fails to initiate and diligently proceed with the Work.
 - B. CONTRACTOR is adjudged bankrupt or insolvent.
 - C. CONTRACTOR makes a general assignment for the benefit of creditors.
 - D. a trustee or receiver is appointed for CONTRACTOR or for any of CONTRACTOR's property.
 - E. CONTRACTOR files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or similar laws.
 - F. CONTRACTOR repeatedly fails to supply sufficient skilled workmen or suitable Products.
 - G. CONTRACTOR repeatedly fails to make prompt payments to Subcontractors or for labor or Products.
 - H. CONTRACTOR disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction.
 - I. CONTRACTOR disregards the authority of the ENGINEER.
 - J. CONTRACTOR otherwise violates any provisions of the Contract Documents.

OWNER COMPLETION OF WORK ON TERMINATION:

- 15.4 If the Surety does not resume performance of the Work within 10 days after Notice of Termination is received from OWNER, OWNER shall have the absolute right to complete the Work in the most expeditious manner and shall have the right to exclude CONTRACTOR from the Site and take possession of the Work and of all CONTRACTOR's tools, appliances, equipment and machinery at the Site and use the same without liability to CONTRACTOR for trespass or conversion. OWNER may incorporate in the Work all Products for which OWNER has paid CONTRACTOR but which are stored elsewhere. In such case CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the balance due to CONTRACTOR at the time of termination exceeds the direct and indirect costs of completing the Work, including compensation for additional engineering services, attorney's fees, technical services and administrative costs, such excess shall be paid to CONTRACTOR. If such costs exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such costs incurred by OWNER shall be

verified by ENGINEER and incorporated in a Change Order, but in finishing the Work OWNER shall not be required to obtain the lowest cost for the remaining portion of the Work performed.

OWNER'S ADDITIONAL TERMINATION RIGHTS

- 15.5 Where CONTRACTOR's services have been terminated by OWNER, said termination shall not affect any rights of OWNER against CONTRACTOR then existing or which may thereafter accrue. Any retention due or payment of money by OWNER to CONTRACTOR shall not release CONTRACTOR from liability.

OWNER'S TERMINATION FOR CONVENIENCE

- 15.6 Upon 10 days' written Notice to CONTRACTOR, Surety and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the Work and terminate the Contract. In such case, CONTRACTOR will be paid for Work executed and expense sustained plus a reasonable profit.

CONTRACTOR'S CONTINUING WORK DURING DISPUTES

- 15.7 CONTRACTOR shall carry on the Work and maintain the Construction Schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as CONTRACTOR and OWNER may otherwise agree.

CONTRACTOR MAY STOP WORK OR TERMINATE

- 15.8 If, through no act or fault of CONTRACTOR, the Work is suspended for a period of more than 90 days by the OWNER or by an order of court or other public authority, or OWNER fails to pay CONTRACTOR any sum recommended by ENGINEER within 90 days of its presentation, then CONTRACTOR may, upon 10 days' written Notice to OWNER, terminate this Contract and recover from OWNER payment for all Work executed and any expense sustained plus a reasonable profit. In lieu of terminating the Contract, CONTRACTOR may, upon 10 days' notice to OWNER, stop the Work until CONTRACTOR has been paid amounts then due.

ARTICLE 16-ARBITRATION

- 16.1 In the event that a claim, dispute or other question arises relating to the Contract Documents, except claims which have been waived by the making or acceptance of final payment or claims not subject to arbitration under applicable law, OWNER and CONTRACTOR may, by mutual agreement, submit the claim, dispute or matter to arbitration. In the event the parties agree to arbitration, the right to proceed to arbitration shall be subject to the terms and conditions in this Article.
- 16.2 The parties must agree on the specific claims, disputes or matters to be arbitrated. The written arbitration submission shall state the nature and circumstances surrounding the claim or dispute, state the amount claimed or relief sought, and the specific supporting provisions relied upon in the Contract Documents. The scope of the arbitration shall be strictly limited to matters defined in the arbitration submission.
- 16.3 Once the arbitration submission has been signed by both parties, it shall be submitted to the American Arbitration Association which shall proceed to process the case in accordance with the Construction Industry Arbitration Rules, except to the extent that the same have been modified by this Article and the arbitration submission.
- 16.4 The arbitration panel shall consist of one Professional Engineer or Architect, one Contractor, and one Attorney selected in accordance with the applicable rules of the American Arbitration Association. In lieu of the appointment of an Arbitration Panel to settle an existing claim or dispute, OWNER and CONTRACTOR may agree upon a permanent arbitrator or Arbitration Panel to decide all claims, disputes, and other matters relating to the Contract Documents.
- 16.5 The arbitrator or Arbitration Panel shall apply the terms and conditions of the Contract Documents to the claim, dispute or matter submitted to it and shall base its decision on said Contract Documents.
- 16.6 The arbitrator's or Arbitration Panel's decision shall be set forth in writing, shall state the decision on each claim, dispute or matter submitted, and the reason for each decision.

- 16.7 Once a written arbitration submission has been executed, the agreement to arbitrate shall be specifically enforceable under the prevailing arbitration law. The arbitration award rendered by the arbitrator(s) shall be final and judgment may be entered upon it in any court having jurisdiction thereof.
- 16.8 During the pendency of the arbitration proceedings, CONTRACTOR covenants and agrees that CONTRACTOR shall continue to proceed with the Work required pursuant to the Contract Documents. In the event that CONTRACTOR is terminated by OWNER at any time prior to the issuance of the arbitrator's or Arbitration Panel's written decision, or if CONTRACTOR fails to proceed with the Work during the pendency of the arbitration proceedings, OWNER shall be entitled to obtain a court order enjoining the continuance of said arbitration proceedings by reason of such action.

ARTICLE 17-MISCELLANEOUS

- 17.1 Whenever any provision of the Contract Documents requires the giving of Notice, it shall be deemed to have been validly given, if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if sent by certified mail or commercial carrier, with provision for receipt acknowledgement, to the last business address known to party who gives the Notice. Notice may also be made by facsimile transmission. In such case, Notice will be deemed received when the transmission is made. The party making such facsimile transmissions shall also forward a copy of such Notice by regular mail.
- 17.2 If any section, paragraph, clause or provision of the Contract Documents shall be held invalid, the invalidity of such section, paragraph, clause or provision shall not affect any of the other provisions of the Contract Documents. The Article and paragraph headings in the Contract Documents are furnished for convenience of reference only and shall not be considered to be a part of the Contract Documents.

ARTICLE 18-RESIDENT PROJECT REPRESENTATIVE

GENERAL

- 18.1 Resident Project Representative is ENGINEER's Agent under the supervision of ENGINEER in matters pertaining to the on-site Work. Dealings with Subcontractors shall be through, or with knowledge of, CONTRACTOR.

DUTIES AND RESPONSIBILITIES

- 18.2 Resident Project Representative will:
- A. Review the Construction Schedule, schedule of Shop Drawing submissions, and Schedule of Values prepared by CONTRACTOR, and consult with ENGINEER concerning their acceptability.
 - B. Attend preconstruction conferences, progress meetings, and other job conferences; chair meetings and maintain and circulate copies of minutes and notices thereof.
 - C. Serve as ENGINEER's liaison with CONTRACTOR, principally through with CONTRACTOR's Superintendent. Assist ENGINEER as OWNER's liaison when CONTRACTOR's operations affect OWNER's on-site operations.
 - D. Assist ENGINEER in obtaining from OWNER additional details or information when required for proper execution of the Work.
 - E. Receive Shop Drawings, Product Data and samples, submittals, and receive samples delivered at the site for ENGINEER's examination.
 - F. Advise ENGINEER and CONTRACTOR immediately of the commencement of any Work requiring a Shop Drawing of sample submission if the submission has not been approved by ENGINEER.

- G. Conduct on-site observations of the Work to assist ENGINEER in determining compliance with the Contract Documents.
- H. Report to ENGINEER whenever it appears that any portion of the Work does not conform to the Contract Documents or has been damaged prior to final payment; and advise ENGINEER when it appears any portion of the Work should be uncovered for observation or requires special testing, inspection or approval.
- I. Verify that required tests, equipment and systems startups, and operating and maintenance instructions are conducted in the presence of required personnel, and that CONTRACTOR maintains adequate records thereof; observe, record and report to ENGINEER details of test procedures, startups, inspections, and operating and maintenance instructions.
- J. Accompany inspectors representing public or other agencies having jurisdiction on the Project; record and report to ENGINEER on the outcome of these inspections.
- K. Transmit to CONTRACTOR, ENGINEER's clarifications and interpretations of the Contract Documents.
- L. Consider and evaluate CONTRACTOR's suggestions for modifications in Drawings or Specifications and report them with recommendations to ENGINEER.
- M. Maintain at the Site orderly files for correspondence, reports of job conferences, Shop Drawings, Product Data and samples submissions, reproductions of original Contract Documents, including all Addenda, Change Orders, additional Drawings, ENGINEER's clarifications and interpretations of the Contract Documents, progress reports, and other Project related documents.
- N. Maintain a log book, recording hours on the Site, weather conditions, data relative to extras or deductions, list of visiting officials and representatives of manufacturers, fabricators, suppliers and distributors, daily activities, decisions, and general and specific observations of test procedures.
- O. Furnish ENGINEER periodic reports of progress of the Work and its relationship with the approved Construction Schedule and schedule of Shop Drawing submissions.
- P. Consult with ENGINEER relative to scheduled major tests, inspections or start of critical phases of the Work.
- Q. Report accidents immediately to ENGINEER.
- R. Review applications for payment with CONTRACTOR and forward them with recommendations to ENGINEER, noting relation to the Schedule of Values, Work completed, and payment for materials and equipment not incorporated in the Work.
- S. During the course of the Work, verify that certificates, maintenance and operation manuals, and other data required to be assembled and furnished by CONTRACTOR are applicable to the items actually installed; and that this material is delivered to ENGINEER for review and forwarding to OWNER prior to final acceptance of the Work.
- T. Prior to, and as a condition of, recommending to ENGINEER issuance of a Certificate of Substantial Completion, Resident Project Representative will:
 - 1. Prepare a list of incomplete or Defective Work.
 - 2. Verify that all items required for Substantial Completion have been corrected or completed.
 - 3. Secure agreement between OWNER and CONTRACTOR relative to responsibilities for utilities, heat, janitorial services, insurance, Project security, access by the parties, safety and any other matters.
 - 4. Secure CONTRACTOR's specific Construction Schedule to fully complete the Work.
- U. Conduct final inspection with ENGINEER, OWNER and CONTRACTOR and prepare a final list of items to be completed or corrected.

- V. Verify that all items on final list have been completed or corrected and make recommendations to ENGINEER concerning acceptance.

LIMITATIONS OF AUTHORITY

- 18.3 Resident Project Representative shall not guarantee or warrant CONTRACTOR's Work. Except upon written instructions of ENGINEER, Resident Project Representative shall not:
 - A. Authorize any deviation from the Contract Documents or approve any substitute Products.
 - B. Exceed limitations on ENGINEER's authority as set forth in the Contract Documents.
 - C. Undertake any of the responsibilities of CONTRACTOR, Subcontractors or CONTRACTOR's Superintendent, or expedite the Work.
 - D. Advise on, or issue directions relative to, any aspect of the means, methods, techniques, sequences or procedures of construction unless such is specifically called for in the Contract Documents.
 - E. Advise on, or issue directions as to, safety precautions and programs in connection with the Work.
 - F. Authorize OWNER to occupy the Project in whole or in part.
 - G. Participate in specialized field or laboratory tests.
 - H. Order the Work stopped.

ARTICLE 19-AFFIDAVIT OF COMPLETION

STATE OF MICHIGAN _____)
COUNTY OF _____) ss

The undersigned _____, as CONTRACTOR, being duly sworn, deposes and says that he entered into a contract with the _____, as OWNER, on the ____ day of _____, 2021 for the construction of _____. Deponent further says that the Work under the terms of the said Contract has been completed and all indebtedness incurred by him to subcontractors, material-men, and laborers in his employ has been paid in full or satisfactorily secured.

Deponent further says this affidavit is furnished before final payment or before the retainage, withheld in accordance with the provisions stated in said Contract, may be reduced.

Deponent further says he hereby waives and releases any and all claims or rights which he may have, in connection with said Contract, against OWNER or the premises upon which said Contract Work was performed, and agrees to indemnify OWNER against any and all such claims or rights which may be asserted by subcontractors, material-men, and laborers with whom CONTRACTOR has contracted for performance under said Contract.

Further, deponent saith not.

WITNESSES:

SIGNED:

By: _____

Title: _____

Subscribed and sworn to before me this ____ day of _____, 2020.

Notary Public, _____ County, _____

My commission expires: _____

We, _____, as Surety on the above described Contract, hereby give our consent to the payment to the CONTRACTOR as indicated above.

DATE: _____

SIGNED: _____
(Attorney-in-fact)

PART 1 - GENERAL

1.01 SUMMARY OF WORK:

- A. The Village of Middleville desires to reconstruct High Street, including water main, water services and lead/galvanized water service replacement to the house water meter, hydrants, signs, sanitary and storm sewer improvements, sand subbase, aggregate base, HMA pavement, concrete curb & gutter, concrete sidewalk, and reconstruction of drives to match the road cross-section. The work includes the restoration of all disturbed areas, all necessary traffic control and all related work.
- C. The OWNER has title to the property on which the construction is to take place.

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Measurement and payment criteria applicable to the Work.

1.02 AUTHORITY:

- A. Measurement methods delineated in the individual specification sections are intended to complement the criteria of this section.
- B. The ENGINEER will take all measurements and compute quantities accordingly.
- C. Assist by providing necessary equipment, workers, and survey personnel as required.

1.03 UNIT QUANTITIES SPECIFIED:

- A. Quantities and measurements indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements supplied or placed in the Work and verified by the ENGINEER shall determine payment.
- B. If the actual Work requires more or fewer quantities than those quantities indicated, provide the required quantities at the unit prices contracted.

1.04 MEASUREMENT OF QUANTITIES:

- A. Measurement Devices:
 - 1. Weigh Scales: Inspected, tested and certified.
 - 2. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle.
 - 3. Metering Devices: Inspected, tested and certified.
- B. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook weights.
- C. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.
- D. Measurement by Area: Measured by square dimension using mean length and width or radius.
- E. Linear Measurement: Measured by linear dimension, at the item centerline.

1.05 PAYMENT:

- A. Payment Includes: Full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.
- B. Final payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities accepted by the ENGINEER multiplied by the unit price for Work which is incorporated in or made necessary by the Work.

1.06 MEASUREMENT AND PAYMENT SCHEDULE:

- A. The following schedule outlines the method of measurement and basis of payment to be used on this project. Requirements for materials and methods described under each unit price are included in the specification sections.

1. **General Conditions, Bonds, Insurance, Max 5%:** Paid as a lump sum. Payment will be made once 5% of the contract work has been completed.

2. **Mobilization, Max 10%:** Paid as a lump sum. Payment will be based on the following payment schedule: 50% of bid amount for 5% of original contract amount completed; 75% of bid amount for 10% of original contract amount completed; 100% of bid amount for 25% of original contract amount completed.
3. **Curb and Gutter, Rem:** Will be measured by the linear foot along the base of the curb face or along the flowline of the gutter where marked by the Engineer, regardless of vertical size. Includes saw cutting.
4. **Sidewalk, Rem:** Measured and paid for by the square yard, regardless of depth. Payment includes all driveways and sidewalks. All removals shall be to a saw cut edge at an existing sidewalk joint.
5. **Pavt, Rem, Modified:** Measured and paid for by the square yard, regardless of depth. Payment includes all improved street surfaces, driveways and sidewalks, regardless of material, where improved surfaces are called for removal. Gravel surfaces are excluded. All removals shall be to a saw cut edge.
6. **Sewer, Rem, Less than 24 inch:** Includes all necessary excavation, cutting of existing sewer, and removal. Payment will be at the contract unit price per linear foot and will include all labor, tools, equipment, material, excavation, and backfill required to remove the existing sanitary sewer or plugs and flowable fill for the main being taken out of service if main can remain in place as approved by the Engineer. Payment will include the placement of masonry plug at the removal limits as directed by the Engineer. Removals necessary for the construction of the sanitary sewer systems and not specifically called out on the plans will be considered incidental to construction.
7. **Plug, 12 inch Storm Penetration:** Paid for by each brick and mortar plug installed on existing storm manholes. Includes all labor, materials, and equipment.
8. **Machine Grading, Road:** Measured along street centerline and paid for by the 100 foot station. This item shall include rough grading, shaping, fine grading, removal of culverts, earth excavation, embankment, and all earthwork necessary to construct the proposed street section from right-of-way line to right-of-way line. Includes any necessary clearing and grubbing including removal and disposal of all brush and vegetation less than 6" in diameter regardless of species.
9. **Machine Grading, Sidewalk:** Measured along sidewalk centerline and paid for by the 100 foot station. This item shall include rough grading, shaping, fine grading, removal of culverts, earth excavation, embankment, and all earthwork necessary to construct the proposed sidewalk section from right-of-way line to right-of-way line. Includes any necessary clearing and grubbing including removal and disposal of all brush and vegetation less than 6" in diameter regardless of species.
10. **Erosion Control, Inlet Protection, Fabric Drop:** Paid for by each fabric drop used. All existing catch basin inlets within the construction influence area shall receive inlet protection.
11. **Erosion Control, Silt Fence:** Will be measured by the linear foot along the line of silt fence placed. Place silt fence where specified on plans.
12. **Subbase, CIP:** Calculated from the proposed street section and paid for by the cubic yard compacted in place where used and authorized by the ENGINEER. Where existing soils area adequate for subbase (determined by Engineer), payment for subbase will not be made.
13. **Aggregate Base, 8 inch:** Measured and paid for by the square yard for the thickness and MDOT specified material, compacted in place, tested and accepted.
14. **Dr Structure Cover, Adj, Case 1:** Paid for each structure adjusted to match proposed grade.
15. **Dr Structure Cover, Type B:** Paid for by each casting placed. Replace castings as noted on plans. Castings placed with new drainage structures will not be paid for separately.
16. **Dr Structure Cover, Type K:** Replace castings as noted on plans. Castings placed with new drainage structures will not be paid for separately.
17. **Dr Structure, 48 inch Dia:** Counted and paid for by the unit as shown in the Bid Form and includes furnishing and installing the structure, grade rings, casting, covers and all other accessories as specified and detailed. Furnishing, adjusting and finishing of castings on new storm manholes, is considered included in the cost of the storm manhole, and shall not be paid for separately.
18. **Storm Sewer, C76 CI III, 12 inch:** Measured horizontally on the surface along the pipe centerline from center to center of manholes and paid for the linear foot by the pipe size including: excavation, bedding, backfill, compaction, and all related work.
19. **HMA, 3EL:** Paid for by the ton for the mix specified, compacted and accepted. Measured by tallying load tickets. Submit all load tickets to ENGINEER at time of delivery. Estimated quantities based on 110#/syd/inch.
20. **HMA, 5EL:** Paid for by the ton for the mix specified, compacted and accepted. Measured by tallying load tickets. Submit all load tickets to ENGINEER at time of delivery. Estimated quantities based on 110#/yd2/inch.
21. **Driveway, Nonreinf Conc, 6 inch:** Measured and paid for by the square foot for the depth specified for concrete drives poured in place according to the specifications, plan details and notes. Includes all form work, materials, labor, and equipment to perform the work.

22. **Curb and Gutter, Conc, Det F4:** Will be measured in place by length in linear feet, along the joint of the curbing with the pavement, with not deduct in length for catch basins, inlet castings, or dub-down drive approaches.
23. **Valley Gutter, Conc:** Will be measured in place by length in linear feet, along the gutter line of the curbing with the pavement.
24. **Detectable Warning Surface:** Measured and apid for by the linear foot. All materials shall be on the MDOT approved manufactures list.
25. **Sidewalk, Conc, 4 inch:** Measured in place by the area placed and paid for by the square foot including: shaping and compacting base; placing form work; placing and finishing concrete; placing expansion joints; providing and placing curing compound.
26. **Curb Ramp, Conc, 6 inch:** Measured in place by the area placed and paid for by the square foot including: shaping and compacting base; placing form work; placing and finishing concrete; placing expansion joints; providing and placing curing compound.
27. **Mailbox, Relocate:** Measured and paid for by each mailbox relocated as specified on plans.
28. **Minor Traf Devices:** Will be measured and paid as a lump sum and includeds all necessary signing, flagging, traffic regulators, drums, and barricades to safely maintain traffic and protect the work site during the duration of the project per the requirements provided in the plans and specifications.
29. **Traf Regulator Control:** Paid as a lump sum. Payment will be based on the following payment schedule: 50% of bid amount for 5% of original contract amount completed; 75% of bid amount for 50% of original contract amount completed; 90% of bid amount for 90% of original contract amount completed; 100% of bid amount for 100% of original contract amount completed.
30. **Slope Restoration, Non-Freeway, Type B:** Measured by the area placed and paid for the square yard including: labor, equipment, and materials to place topsoil surface; fertilizer, chemical nutrient, Class A; seeding mixture; and mulch Blanket which will not be paid for separately but is included in the unit price.
31. **Hydrant, Rem:** Paid for by each hydrant assembly removed as shown on plans.
32. **Valve and Box, Rem:** Paid for by each valve and box removed as shown on plans.
33. **Gate Box, Adj, Temp, Case 1:** Paid for each structure adjusted to match proposed grade.
34. **Water Main, 8 inch:** Measured and paid for by the linear foot of watermain placed from center of fitting to center of fitting. Includes laying pipe of the specified material and class at the grade shown on the plans, backfilling, compaction, and restoration to existing grade as shown on the plans.
35. **Water Service, Copper, 1 inch (Main to Curb Box):** Measured along the pipe centerline at the surface and paid for by the linear foot installed or replaced of the size and material specified, from the corporation to the ROW. Includes pipe, fittings, connections to the corporation stop, curb stop and existing water service, excavation, backfilling, compaction, and restoration to existing grade. Includes abandonment/removal of existing service to ROW line from abandoned watermain.
36. **Water Service, Copper, 1 inch (Curb Box to Meter), Allowance:** Measured along the pipe centerline at the surface and paid for by the linear foot installed or replaced of the size and material specified, from the corporation to the ROW. Includes pipe, fittings, connections to the corporation stop, curb stop and existing water service, excavation, backfilling, compaction, and restoration to existing grade. Includes abandonment/removal of existing service to ROW line from abandoned watermain.
37. **Plumbing Allowance for Lead Service Replacement:** There are suspected lead/galvanized water services on this block. This was an allowance established to pay for all materials, labor, and equipment, including the services of a licensed plumber, required to:

Replace the water service inside and within 3 feet of a building and connected the service to the new water service line placed from the new Water Meter Chamber. Restoration of al slope and landscaping disturbances, and coordination with the resident to complete the work.

Assist property owner and building maintenance staff during water service interruptions. This may be caused during the installation of a new water main and may result in the accumulation of sediment in screens of faucets and private plumbing lines. This work may include shutting off service within a building to prevent draining of the internal water distribution system, cleaning of internal plumbing systems and screens, meeting attendance and other work as approved by the Engineer.

38. **Water Main, 6 inch:** Measured and paid for by the linear foot of watermain placed from center of fitting to center of fitting. Includes laying pipe of the specified material and class at the grade shown on the plans, backfilling, compaction, and restoration to existing grade as shown on the plans.
39. **Curb Stop and Box on Water Service, 1 inch:** Measured and paid for by the unit for each valve and valve box of the size specified installed, backfilled, tested, and accepted.
40. **Valve and Box, 8 inch:** Paid for each provided and installed, including restrained fittings, gaskets, bolts and nuts, and any adjustment needed.

41. **Reconnect Existing 1 inch Water Service:** Shall be measured in units as shown on the Bid Form and includes furnishing all labor and materials necessary to connect an existing copper water service at the right-of-way line.
42. **Connect to Ex. 8 Water Main, Main St.:** Counted and paid for each connection made to an existing watermain. Includes all fittings, materials, equipment, and labor needed to complete the work. Excludes valves and boxes, which are paid separately.
43. **Connect to Ex. 6 Water Main, Alley:** Counted and paid for each connection made to an existing watermain. Includes all fittings, materials, equipment, and labor needed to complete the work. Excludes valves and boxes, which are paid separately.
44. **Connect to Ex. 4 Water Main, Dibble & Dayton:** Counted and paid for each connection made to an existing watermain. Includes all fittings, materials, equipment, and labor needed to complete the work. Excludes valves and boxes, which are paid separately.
45. **Connect to Ex. 6 Water Main, Railroad:** Counted and paid for each connection made to an existing watermain. Includes all fittings, materials, equipment, and labor needed to complete the work. Excludes valves and boxes, which are paid separately.
46. **Connect to Ex. 6 Water Main, Fremont:** Counted and paid for each connection made to an existing watermain. Includes all fittings, materials, equipment, and labor needed to complete the work. Excludes valves and boxes, which are paid separately.
47. **Tee, 8 inch x 8 inch x 8 inch:** Paid for each provided and installed, including restrained fittings, gaskets, bolts and nuts.
48. **Tee, 8 inch x 8 inch x 6 inch:** Paid for each provided and installed, including restrained fittings, gaskets, bolts and nuts.
49. **Valve and Box, 6 inch:** Paid for each provided and installed, including restrained fittings, gaskets, bolts and nuts, and any adjustment needed.
50. **Bend, 45 Degree, 8 inch:** Paid for each provided and installed, including restrained fittings, gaskets, bolts and nuts, and any adjustment needed.
51. **Bend, 11 Degree, 8 inch:** Paid for each provided and installed, including restrained fittings, gaskets, bolts and nuts, and any adjustment needed.
52. **Bend, 22 Degree, 8 inch:** Paid for each provided and installed, including restrained fittings, gaskets, bolts and nuts, and any adjustment needed.
53. **Reducer, 8 inch x 6 inch:** Paid for each provided and installed, including restrained fittings, gaskets, bolts and nuts, and any adjustment needed.
54. **Reducer, 8 inch x 4 inch:** Paid for each provided and installed, including restrained fittings, gaskets, bolts and nuts, and any adjustment needed.
55. **Hydrant Assembly:** Includes the cost of providing and installing the hydrant, hydrant valve, valve box, and all pieces between the water main and hydrant, including the tee, coarse gravel and concrete base, fire hydrant marker at the locations shown on the plans in a ready-for-use condition unless noted otherwise.
56. **Bend, 45 Degree, 6 inch:** Paid for each provided and installed, including restrained fittings, gaskets, bolts and nuts, and any adjustment needed.
57. **Sanitary Sewer, Heavy Clean & Televisive, 8 inch:** Measured horizontally on the surface along the pipe centerline from center to center of manholes and paid for the linear foot by the pipe size including: by-pass pumping, cleaning, pre-CIPP inversion television inspection of the sewer to be lined, removal of all roots and mineral deposits, intruding gaskets/sealing rings and other obstructions.
58. **Cured In-Place Pipe Liner, 8 inch:** Measured horizontally on the surface along the pipe centerline from center to center of manholes and paid for the linear foot by the pipe size including: bypass pumping, liner installation final television inspection, and all related work.
59. **Clearing:** Paid for by each acre cleared or fraction thereof. Shall consist of cutting, removing from the ground, and disposing of trees, stumps, brush, shrubs, and other vegetation occurring within the project site which interfere with excavation, embankment or clear vision, or are otherwise noted on the construction drawings to be removed and includes the preservation from injury or defacement of all vegetation and objects designated to remain.
60. **Abandon and Fill Underground Utilities:** Measured and paid for by the length of original utility. Includes the cost of cutting the existing water main, providing and placing the required plug.
61. **Pavt Mrkg, Polyurea, 4 inch, White:** Measured and paid for by the length of the pavement marking, in place, along the centerline.
62. **Pavt Mrkg, Polyurea, 4 inch, Yellow:** Measured and paid for by the length of the pavement marking, in place, along the centerline.
63. **Pavt Mrkg, Polyurea, 6 inch, Crosswalk:** Measured and paid for by the length of the pavement marking, in place, along the centerline.
64. **Pavt Mrkg, Polyurea, 24 inch, Stop Bar:** Measured and paid for by the length of the pavement marking, in place, along the centerline.

- 65. Sign, Type IIIA:** Measured by the square foot placed. This includes the proper insallation, time, and materials.
- 66. Post, Steel, 3 pound:** Measured by the foot. Item includes all labor and equipment required for proper installation.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

PART 1-GENERAL

1.01 REQUIREMENTS INCLUDED:

- A. The ENGINEER will schedule and administer the pre-construction meeting, periodic progress meetings and specially called meetings throughout the progress of the work.
 - 1. Prepare the agenda for the meetings.
 - 2. Distribute written notice of each meeting four (4) days in advance of meeting date.
 - 3. Make physical arrangements for meetings.
 - 4. Preside at meetings.
 - 5. Record the minutes; include significant proceedings and decisions.
 - 6. Reproduce and distribute copies within seven (7) days after each meeting.
 - a. To participants in the meeting.
 - b. To parties affected by decisions made at the meeting.
- B. Representatives of contractors, subcontractors, and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

1.02 PRE-CONSTRUCTION MEETINGS:

- A. Schedule:
 - 1. Meeting shall be prior to the start of work at a time and place designated by the ENGINEER.
- B. Attendance:
 - 1. OWNER.
 - 2. ENGINEER.
 - 3. CONTRACTOR.
 - 4. Major Subcontractors.
 - 5. Utility companies.
 - 6. Governmental agencies.
 - 7. Safety representative.
- C. Agenda:
 - 1. Responsibilities.
 - 2. General contract terms.
 - 3. Supervision.
 - 4. Schedules and seasonal limitations.
 - 5. Approvals and testing.
 - 6. Clearances and notices.
 - 7. Construction procedures.
 - 8. Payments and estimates.
 - 9. Labor requirements.

1.03 PROGRESS MEETINGS:

- A. Schedule:
 - 1. Meetings will be scheduled a minimum of once each month at a time and place designated by the ENGINEER.
- B. Attendance:
 - 1. ENGINEER.
 - 2. CONTRACTOR.
 - 3. Subcontractors as pertinent to agenda.
 - 4. Government agencies as pertinent to agenda.
 - 5. Safety representative.
- C. Agenda:
 - 1. Review and approve minutes of previous meeting.
 - 2. Review of work progress since previous meeting.
 - 3. Field observations, problems, conflicts.

4. Problems which impede constructing schedule.
5. Review of off-site fabrication and delivery schedules.
6. Corrective measures and procedures to regain projected schedule.
7. Revisions to construction schedule.
8. Progress schedule during the succeeding work period.
9. Coordination of schedules.
10. Review of submittal schedules.
11. Review of proposed changes for effect on construction schedule and on completion date.
12. Safety report.
13. Review new business.

PART 1-GENERAL

1.01 CONSTRUCTION SCHEDULES:

- A. General:
 - 1. Coordinate with work by others as explained in the General Conditions
 - 2. CONTRACTOR shall notify the ENGINEER 72 hours prior to start of work or a major increase in the work force if these vary from schedule as submitted.
- B. Form of Schedules:
 - 1. Prepare schedules in the form of a horizontal bar chart.
 - 2. Provide a separate horizontal bar for each trade or operation.
 - 3. Provide a horizontal time scale identifying the first work day of each week.
 - 4. The order shall be the chronological beginning of each work item.
 - 5. The row identification shall be each major specification section or subdivision of work with distinct graphic delineation.
- C. Content of Schedules:
 - 1. The construction project schedule shall include as a minimum:
 - a. Project start date.
 - b. Start dates and durations for each major trade group, work tasks or other subdivisions of the work.
 - c. Shop drawings, product data, and sample submittal dates and dates when reviewed copies will be required.
 - d. Equipment and/or material delivery dates if approved.
 - e. Total project duration and end date.
- D. Updating:
 - 1. Show all occurring changes of previous submission.
 - 2. Show progress completion dates of each activity.
 - 3. Submit a narrative report, if required by ENGINEER defining:
 - a. Problem areas: Impact of current and anticipated delay factors.
 - b. Schedule changes: Effect on other contractors.
 - c. Revision description: Effect of change of scope and duration of activities.
- E. Submittal of Schedules:
 - 1. The CONTRACTOR shall submit the initial detailed construction schedule within seven (7) days after the notice of award. ENGINEER will return copy within ten (10) days of receipt. The resubmittal, if required, shall be within (10) days.
 - 2. An updated schedule shall be submitted on the first work day of each month.
- F. Distribution:
 - 1. The reviewed schedule shall be distributed by ENGINEER to:
 - a. The job site file.
 - b. OWNER.

1.02 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES:

- A. General:
 - 1. Where required by the specifications, the CONTRACTOR shall submit descriptive information which will enable the ENGINEER to advise the OWNER whether the CONTRACTOR's proposed materials, equipment, or methods of work are in general conformance to the design concept and in compliance with the drawings and specifications. The information to be submitted shall consist of drawings, specifications, descriptive data, certificates, samples, test results and such other information, all as specifically required in the specifications.
- B. CONTRACTOR Responsibility:
 - 1. CONTRACTOR shall be responsible for the accuracy and completeness of the information contained in each submittal and shall assure that the material, equipment or method of work shall be as described in the submittal. The CONTRACTOR shall verify that the

material and equipment described in each submittal conform to the requirements of the specifications and drawings. If the information shows deviations from the specifications or drawings, the CONTRACTOR shall insure that there is no conflict with other submittals and notify the ENGINEER in each case where his submittal may affect the work of another CONTRACTOR or the OWNER. The CONTRACTOR shall insure coordination of submittals among the related crafts and subcontractors.

2. The CONTRACTOR shall be responsible to check and verify all field measurements, all dimensions on shop and setting drawings and all schedules required for the work of all the various trades.
3. The CONTRACTOR may authorize in writing a material or equipment supplier to deal directly with the ENGINEER or with the OWNER with regard to a submittal. These dealings shall be limited to contract interpretations.
4. The CONTRACTOR shall stamp each submittal with stamp, initialed and signed, certifying to review of the submittal by the CONTRACTOR, verification of field measurements and compliance with Contract Documents.

C. Transmittal Procedure:

1. General:

- a. Submittals shall be submitted promptly in accordance with dates in proposals, approved schedules and in such sequence that there is no delay in the Work or the work of any other CONTRACTOR.
- b. Submittals regarding material and equipment shall be accompanied by the attached Transmittal Form identifying the equipment and any variations from these specifications. A separate form shall be used for each specific item, class of material, equipment, and items specified in separate, discrete sections, for which the submittal is required. Submittals for various items shall be made with a single form when the items taken together constitute a manufacturer's package or are so functionally related that expediency indicates checking or review of the group or package as a whole
- c. A unique number, sequentially arranged, shall be noted on the transmittal form accompanying each item's submittal. Original submittal numbers shall have the following format "XXX-Y; where "XXX is the originally assigned submittal number, and "Y" is a sequential letter assigned for resubmittals, i.e., A, B, or C being the 1st, 2nd and 3rd resubmittals, respectively. Submittal 25-B, for example, is the second resubmittal of submittal 25.

2. Deviation From Contract:

- a. If the CONTRACTOR proposed to provide material or equipment which does not conform to the specifications and drawings, he shall indicate so under "deviations" on the transmittal form accompanying the submittal copies. He shall prepare his reason for a change, including cost differential, and request a change order to cover the deviations.

3. Submittal Completeness:

- b. Submittals which do not have all the information required to be submitted, including deviations, are not acceptable and will be returned without review.

D. Review Procedure:

1. When the contract documents require a submittal, the CONTRACTOR shall submit five (5), and no more than eight (8), copies of all submittal data of which two (2) copies will be retained by the ENGINEER. For samples this number may vary. For samples, submit the number stated in each specifications section.
2. Unless otherwise specified, within 14 calendar days after receipt of the submittal, the ENGINEER shall review the submittal and return a minimum of three (3) copies which carry the ENGINEER's stamp of approval. The returned submittal shall indicated one of the following actions:
 - a. If the review indicates that the material, equipment or work method is in general conformance with the design concept and complies with the drawings and specifications, submittal copies will be marked "FURNISH AS SUBMITTED". In this event the CONTRACTOR may begin to implement the work method or incorporate the material or equipment covered by the submittal.
 - b. If the review indicates limited corrections are required, submitted copies will be marked "FURNISH AS CORRECTED". The CONTRACTOR may begin

implementing the work method by the submittal in accordance with the noted corrections. Where submittal information will be incorporated in O&M data, a corrected copy shall be provided.

- c. If the review reveals that the submittal is insufficient or contains incorrect data, submitted copies will be marked "REVISE AND RESUBMIT". Except at his own risk, the CONTRACTOR shall not undertake work covered by this submittal until it has been revised, resubmitted and returned marked either "FURNISH AS SUBMITTED" or "FURNISH AS CORRECTED".
 - d. If the review indicates that the material, equipment or work method is not in general conformance with the drawings and specifications, copies of the submittal will be marked "REJECTED". Submittals with deviations which have not been identified clearly may be rejected. Except at his own risk the CONTRACTOR shall not undertake the work covered by such submittals until it has been revised, resubmitted and returned marked either "FURNISH AS SUBMITTED" or "FURNISH AS CORRECTED".
 - e. If the review indicates that the material or equipment is not from an acceptable manufacturer, as indicated in the specifications, copies of the submittal will be marked "SUBMIT SPECIFIED ITEM". Except as his own risk, the CONTRACTOR shall not undertake the work covered by such submittals until it has been revised, resubmitted and returned marked either "FURNISH AS SUBMITTED" or "FURNISH AS CORRECTED".
- E. Effect of Review of CONTRACTOR's Submittal:
- 1. Review of drawings, methods of work, or information regarding materials or equipment the CONTRACTOR proposes to provide, shall not relieve the CONTRACTOR of his responsibility for errors therein and shall not be regarded as an assumption of risks or liabilities by the ENGINEER or the OWNER, or by an officer or employee thereof, and the CONTRACTOR shall have no claim under the contract on account of the failure, or partial failure, of the method of work, material, or equipment so reviewed. A mark of "FURNISH AS SUBMITTED" or "FURNISH AS CORRECTED" shall mean that the OWNER has no objection to the CONTRACTOR, upon his own responsibility, using the plan or method of work proposed, or providing the materials or equipment proposed.

1.03 OPERATION AND MAINTENANCE DATA:

- A. Requirements:
 - 1. Compile product data on related information appropriate for OWNER'S operation and maintenance of products furnished.
 - 2. Prepare data in the form of an instructional manual for use by OWNER'S personnel. Prepare five (5) copies or complete sets compiled, bound, and indexed.
 - 3. Submittal of operation and maintenance manuals shall be thirty (30) prior to final payment request.
- B. Required Submittals:
 - 1. Refer to technical specification sections for required submittals.

1.04 RECORD DOCUMENTS:

- A. Requirements:
 - 1. The CONTRACTOR shall maintain on the construction site a minimum of one (1) complete set of contract documents amended by "RED LINE" or highlight inclusion to reflect the most immediate status methods, materials, and locations and routings of construction. Supplementary sketches shall be included, if necessary, to clearly indicate all work as constructed.
 - 2. At conclusion of work, the CONTRACTOR shall submit to the ENGINEER one (1) complete amended record set of these site documents.
 - 3. Submittal shall be thirty (30) days prior to final payment.
 - 4. Failure of the CONTRACTOR to maintain an up-to-date set of modified drawings on the project site shall be reason to withhold payments.

SECTION 01 33 00

01 33 00.4
SUBMITTAL PROCEDURES

1.05 SCHEDULES:

- A. Shop Drawing Transmittal Form

williams&works

engineers | surveyors | planners

SHOP DRAWING TRANSMITTAL FORM

To: David Mickevich, E.I.T.
Williams & Works
549 Ottawa Ave., N.W.
Grand Rapids, MI 49503

Date: _____
Job Name: 2024 High Street Reconstruction
Job No.: 222158
Job Location: Village of Middleville
Contractor: _____

We are sending you:

☐ Plans ☐ Specifications ☐ Change Order No. _____
☒ Shop Drawings ☐ Contract Documents ☐ Other _____

Quantity	Drawing No.	Description

These are transmitted as checked below:

☐ Furnish as Submitted ☐ Rejected ☐ For Your Information
☐ Furnish as Corrected ☐ For Approval ☐ For Grade Inspection
☐ Revise and Resubmit ☐ For Field Use ☐ For Your Use
☐ Submit Specified Item ☐ For File ☐ As Requested
☐ _____ ☐ _____ ☐ _____

Remarks: _____

Copy to: _____

Authorized by: _____

PART 1 - GENERAL

1.01 REFERENCE SPECIFICATIONS:

- A. All specifications referred to in the Contract Documents shall be current at the time of advertisement and hereby incorporated.
- B. Copies may be inspected at the office of the ENGINEER and addresses for purchase will also be supplied.
- C. The references shall be limited to section and subsection specified.
- D. References will be abbreviated as the following example:
"MDOT 0.0.00."

1.02 ABBREVIATIONS:

A. Standards:

AASHTO:	American Association of State Highway Transportation Officials
ACI:	American Concrete Institute
ACPA:	American Concrete Pipe Association
AI:	Asphalt Institute
AIA:	American Institute of Architects
AISI:	American Iron and Steel Institute
AGA:	American Gas Association
ANSI:	American National Standards Institute
API:	American Petroleum Institute
ASA:	American Standards Association
ASTM:	American Society for Testing and Materials
ASCE:	American Society of Civil Engineers
AWS:	American Welding Society
AWWA:	American Water Works Association
CE:	Corps of Engineers
CFR:	Code of Federal Regulations
CRSI:	Concrete Reinforcing Steel Institute
CSI:	Construction Specifications Institute
DOT:	Department of Transportation
EPA:	Environmental Protection Agency
EGLE:	Michigan Department of Environment Great Lakes and Energy
FM:	Factory Mutual
IEEE:	Institute of Electrical and Electronic Engineers
ISA:	Instrument Society of America
MBMA:	Metal Building Manufacturers Association
MDPH:	Michigan Department of Public Health
MDOT:	Michigan Department of Transportation
MDNR:	Michigan Department of Natural Resources
MDEQ:	Michigan Department of Environmental Quality
MIOSHA:	State of Michigan OSHA
NAPA:	National Asphalt Pavement Association
NEC:	National Electrical Code.(by NFPA)
NEMA:	National Electrical Manufacturers Association
NFPA:	National Fire Protection Association
NPCA:	National Precast Concrete Association
OSHA:	Occupational Safety and Health Administration
PCI:	Portland Cement Institute
PTI:	Post-Tensioning Institute
SDI:	Steel Deck Institute
SJI:	Steel Joist Institute
SSPC:	The Society for Protective Coatings
TPI:	Truss Plate Institute

SECTION 01 42 00

01 42 00.2
REFERENCES

UL: Underwriters Laboratories

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Work Included:
 - 1. This section summarizes the work required for quality control. Also reference the specific technical Section for the work being performed.
- B. Payment and Coordination:
 - 1. Testing will be provided and paid for by OWNER, and coordinated through the ENGINEER.

1.02 QUALITY ASSURANCE:

- A. General:
 - 1. The test specimen selection will be by the ENGINEER.
 - 2. The testing procedure will be in accordance with the current standard specified.
 - 3. For field quality control, refer to the SECTION requirements.

1.03 SUBMITTALS:

- A. Test Specimens:
 - 1. Delivery shall be to the place of inspection and testing.
- B. Certification of Quality by Producer:
 - 1. Delivery shall be to the ENGINEER.
- C. Certification of Welders:
 - 1. Delivery shall be to the ENGINEER.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Inspection and Testing Agencies:
 - 1. In accordance with the requirements of ASTM E329.
 - 2. Reporting shall be to the ENGINEER.

PART 3 - EXECUTION

3.01 PERFORMANCE:

- A. Acceptance Tests and Inspection:
 - 1. Aggregates: Certification of quality by producer.
 - 2. Soil density:
 - a. Moisture-density relationships: ASTM D1557-78, AASHTO T-180 (Modified Proctor).
 - b. Field density determination according to ASTM standards.
 - c. CONTRACTOR to provide access to test location and depth.
 - 3. Asphalt cement: Certification of quality by producer.
 - 4. Asphalt mix composition:
 - a. Sample: ASTM D979.
 - b. Extraction test: AASHTO T30, AASHTO T168 and ASTM D2172.
 - c. Frequency: One test within each 500-ton placed.
 - 5. Asphalt pavement density:
 - a. Sample: ASTM D979.
 - b. Comparative density tests of in-place material against laboratory specimens of the same material: ASTM D1559 and ASTM D2726.
 - c. Frequency: One test within each 2,500 square yards placed.

6. Brick and Block:
 - a. Buildings:
 - (1) Under 30M: Visual inspection on site.
 - (2) Over 30M: ASTM C216 and ASTM C90.
 - b. Manholes, catch basins, etc.:
 - (1) Visual inspection on site.
7. Cement: Certification of quality by producer.
8. Concrete:
 - a. Sample: ASTM C172.
 - b. Frequency: Once for each 50 cubic yards of each class of concrete placed.
 - c. Perform following from sample:
 - (1) Mold three 6-inch cylinder compressive strength specimens: ASTM C31.
 - (2) Slump test: ASTM C143.
 - (3) Air test: ASTM C231.
 - (4) Yield test: ASTM C138.
 - (5) Strength test: ASTM C139.
9. Field quality control of SECTIONS: Required.
10. Manholes:
 - a. Precast: Certification of quality by producer.
11. Painting:
 - a. Workmanship: Visual inspection on site.
 - b. Film thickness test: Gauge or yield.
 - c. Frequency: One test within each 100 square feet applied.
12. Pipe:
 - a. Gravity: Laboratory test 1/2 percent of total item with minimum three pieces each size, material and class. Certification of quality by producer acceptable for corrugated metal.
 - b. Pressure: Certification of quality by producer.
13. Steel (reinforcing, structural and miscellaneous): Certification of quality by producer.
14. Welding:
 - a. Certification of welders as follows:
 - (1) Buildings: AWS D1.0 Appendix A.
 - (2) Water Tanks: AWS D1.0 Appendix A.
 - b. Visual on-site inspection and nondestructive testing as follows:
 - (1) Buildings: AWS D1.0 Appendix B.
 - (2) Water Tanks: AWWA D100.
15. Well soil samples: Sieve analysis ASTM C136.

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. This work shall consist of reconstruction of a multi-block local road in the Village of Middleville in Barry County, Michigan. Road shall be closed to thru traffic for the entirety of the work.
- B. Local Traffic shall be maintained according to Sections 104.11, 812 and 922 of the Michigan Department of Transportation 2020 Standard Specifications for Construction, including any Supplemental Specifications, and as specified herein.
 - 1. The Contractor shall notify the Engineer a minimum of 5 business days prior to the implementation of any lane closures or traffic shifts.
 - 2. The Contractor shall coordinate his operations with Contractors performing work on other projects within or adjacent to the Construction Influence Area (CIA).
 - 3. The Owner's maintenance crews and/or Contract Maintenance Agencies may perform maintenance work within or adjacent to the Construction Influence Area (CIA). Maintenance and/or Contract Maintenance Agency will coordinate their operations with the Resident 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. Construction Influence Area (CIA). The CIA shall include the right-of-way of the following roadways, within the approximate limits described below:
 - 1. Main Street to Washington Street. Including all intersecting roads to the limits shown on plans.
- D. Traffic Restrictions.
 - 1. No work shall be performed or lane closures allowed during the Memorial Day, July 4th, or Labor Day holiday periods, as defined by the Engineer.
 - 2. The Contractor shall notify the Engineer at least 24 hours in advance of erection or removal of overlay on existing signs.
 - 3. Parking of the Contractor's employees' vehicles shall not be allowed within the construction zone where traffic is maintained, except in areas determined by the Engineer.
 - 4. The work shall be completed as defined in the progress schedule.
 - 5. Traffic shall be detoured around the CIA.

PART 2 - PRODUCTS

2.01 TRAFFIC CONTROL DEVICES:

- A. General:
 - 1. All traffic control devices and their usage shall conform to Michigan MUTCD, current edition, and MDOT typicals 100-GEN-KEY, 101-GEN-SPACING-CHARTS, 102-GEN-NOTES, 103-GEN-SIGN.
- B. Temporary Signs for stage construction shall be as shown in the plans and stated herein. Temporary signs accompanying Barricade, Type III, High Intensity, Lighted shall be free standing and mounted separately from the barricade.
 - 1. Reflective sheeting shall be applied to both sides of the rail on the item Barricade, Type III, High Intensity, Lighted, and shall bear the appropriate directional pattern as shown in Traffic and Safety Standard Plan WZD-125 series.
 - 2. Sandbags to anchor signs shall contain sand, in the event of a break, shall be replaced.

2.02 PLASTIC DRUMS:

- A. Plastic drums with high intensity sheeting are included and may be used at the discretion of the Engineer.

PART 3 – EXECUTION

3.01 Construction Sequencing.

- A. The contractor shall submit a plan to the Engineer prior to the preconstruction conference to review regarding the maintenance of traffic plan.
- B. The contractor shall submit and internal traffic control plan for all construction traffic.
- C. Road shall be closed to thru traffic at all times.
- D. Contractor shall maintain at least one travel lane at all times for local traffic.
- E. POB, POE, and all intersecting roads shall have Type III barricades in accordance with SECTION 2.01.

3.02 MDOT Typical.

- A. The following MDOT typicals are included in this contract.
 - 1. None

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Work Included:
 - 1. Provide permanent and/or temporary erosion and sediment control.
- B. Intent and Purpose of Control:
 - 1. Keep disturbed areas small.
 - 2. Stabilize and protect disturbed areas as soon as possible.
 - 3. Keep storm water runoff velocities low.
 - 4. Protect disturbed areas from runoff.
 - 5. Retain sediment within the corridor or site area.

1.02 PERMIT:

- A. Required:
 - 1. CONTRACTOR shall apply for and obtain from local Soil Erosion/Sedimentation Control Enforcing Agent.
 - 2. Permit fees to be paid by OWNER.

1.03 JOB CONDITIONS:

- A. Scheduling:
 - 1. Control measures shall be constructed prior to the time construction starts uphill or upstream from the control measure location.
 - 2. Removal and cleanup of temporary control structures: Within one week after control measure is no longer needed.
- B. Street Sweeping:
 - 1. Street sweeping shall be performed regularly when wheeled traffic tracks soil, sediment or mud onto adjacent paved surfaces. All streets affected shall be swept regardless of their relationship to the project limits.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Sodding:
 - 1. MDOT, Sec. 816
- B. Seeding:
 - 1. MDOT, Sec. 816.
 - 2. Temporary Measures: MDOT Table 816-2.
 - 3. Permanent Measures: Hydroseed MDOT Table 816-1.
- C. Topsoil:
 - 1. Temporary Measures: Not required unless readily available.
 - 2. Permanent Measures: MDOT, Sec. 816.
- D. Mulching:
 - 1. Temporary and Permanent Measures: MDOT, Sec. 816. Required as specified on plans and/or in Project Specifications.
- E. Riprap:
 - 1. As specified.

PART 3 - EXECUTION

3.01 PERFORMANCE:

A. General:

1. Abide with all applicable rules and regulations as established by the State of Michigan and the local governmental unit pursuant to Act 347 P.A. of 1972 as amended. (Soil Erosion and Sedimentation Control Act).
2. Copies of state guidelines "Better Environment thru Soil Erosion and Sedimentation Control" and applicable OWNER'S Specifications may be obtained at no charge from the OWNER.
3. The Unified Keying System for erosion control measures is included with the construction plans. Specific erosion control measures, if required, are indicated on the plans.
4. Even though a specific erosion control measure is not called out on the plans, this does not relieve the contractor from his obligation under the above Act to properly control and/or prevent all erosion caused by the Contractor's construction operation.

B. Sediment Removal:

1. Take such steps as are necessary to assure the retention and removal of any sediment which enters an existing storm sewer or open ditch along the construction route before said sewer or ditch discharges into a stream or pond.
2. If eroded material is allowed to enter a storm sewer system it shall be the CONTRACTOR's responsibility to see that all catch basins and manholes are cleaned following construction prior to receipt of final payment. Unless the CONTRACTOR can document positively to what extent an existing storm sewer system along the construction area is silted in prior to construction, no credit will be allowed for cleaning the system stem.
3. The CONTRACTOR shall be responsible for maintaining the roadways in a passable condition until the paving is completed. This includes any maintenance necessary for dust control.

C. Soil Erosion and Sedimentation Control Measures:

1. Provide and maintain at least the following temporary soil erosion and sedimentation control measures:
 - a. Excavated or borrow material stock-pile.
 - (1) Place bales of hay or straw around stockpile in a manner to prevent soil erosion from entering the drainage system or leaving the site.
 - b. Trench backfill in place.
 - (1) Place bales of hay or straw across trenches, ditches to prevent soil erosion from leaving the site or entering the drainage system until:
 - (a) Seed and mulch have been placed in non-paved areas.
 - (b) Aggregate has been placed in bituminous and gravel areas.
 - c. Dewatering discharge.
 - (1) Place bales of hay, straw and/or siltation fencing at point of discharge, adequately anchored.
 - d. Maintain controls during non-working hours and during working hours if weather so requires.
 - e. Silt sacks shall be placed and maintained in any catch basin receiving storm water from an area where permanent measures are disrupted.
 - f. Silt Fence shall be placed and maintained as directed where sheet drainage is present and existing vegetation is disrupted.
 - e. Remove all silt and solids retention controls following construction.

END OF SECTION

PART 1 - GENERAL

1.01 MATERIALS AND EQUIPMENT:

- A. Materials and equipment incorporated into the Work:
 - 1. Conform to applicable specifications and standards.
 - 2. Comply with size, make, type and quality specified or as specifically approved by the ENGINEER.
 - 3. Manufactured and fabricated products.
 - a. Design, fabricate and assemble in accord with the best engineering and shop practices.
 - b. Manufacture like parts of duplicate units to standard sizes and gages to be interchangeable.
 - c. Two or more items of the same kind shall be identical, by the same manufacturer.
 - d. Products shall be suitable for service conditions.
 - e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.
 - 4. Do not use material or equipment for any purpose other than that for which it is designed or specified.

1.02 MANUFACTURERS'S INSTRUCTIONS:

- A. When Contract Documents, require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including two sets to the ENGINEER.
 - 1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with ENGINEER for further instructions.
- B. Handle, install, connect, clean, and condition and adjust products in strict accord with such instructions and in conformity with specified requirements.
- C. Perform work in accord with manufacturer's instructions. Do not omit any preparatory step or installation procedures unless specifically modified or exempted by Contract Documents.

1.03 TRANSPORTATION AND HANDLING:

- A. Arrange deliveries of products in accord with construction schedules; coordinate to avoid conflict with work and conditions at the site.
 - 1. Deliver products in undamaged condition, in manufacturer's original containers or packaging with identifying labels intact and legible.
 - 2. Immediately upon delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals and that products are properly protected and undamaged.
- B. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

1.04 STORAGE AND PROTECTION:

- A. Store products in accord with manufacturer's instructions, with seals and labels intact and legible.
 - 1. Store products subject to damage by the elements in weather tight enclosures.
 - 2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.
- B. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections to assure that products are maintained under specified conditions and free from damage or deterioration.

1.05 SUBSTITUTIONS:

- A. Where materials and equipment items are identified in the specifications by manufacturer's name or catalog number, Bids shall be based on the products of one of the manufacturers so named or added thereto by addendum during the bidding period.
- B. During the bidding period, all requests for substitutions shall be given full consideration by the ENGINEER; and if approved, an addendum will be issued to incorporate the approved material or equipment into the Contract Documents.
- C. Requests for substitutions must be received by the ENGINEER in ample time, not later than 10 days before bid due date, so that any necessary addendum will be received by all prospective bidders before submission of the Bids.
- D. After award of the Contract; requests for substitutions will be considered only for one of the following reasons:
 - 1. Increased value to the OWNER.
 - 2. Decreased cost to the OWNER.
 - 3. Specified items not procurable.
- E. Requests for substitutions after award of the contract shall be accompanied by manufacturer's data or other detailed description of the proposed material or equipment.
- F. A request for a substitution constitutes a representation that the CONTRACTOR has investigated and determined the proposed product is equal to, or superior in all respects to that specified.
- G. The CONTRACTOR shall coordinate the installation of an accepted substitution into the Work and make the Work complete in all respects.
- H. The ENGINEER shall be the judge of the acceptability of the proposed substitutions.
- I. Requests for substitutions shall be submitted on the accompanying form.

APPLICATION FOR APPROVAL OF SUBSTITUTE
MATERIAL/EQUIPMENT

<u>Material/Equipment</u>	<u>Manufacturer</u>	<u>Model No. Certificate No. or Other Description</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

Proposed Substitute Material/Equipment:

<u>Material/Equipment</u>	<u>Manufacturer</u>	<u>Model No Certificate No</u>
_____	_____	_____

Reason for Request for Substitution:

Increased value to OWNER

Decreased cost to OWNER Amount of Credit \$ _____

Specified item not procurable

Approval of Substitution

Contractor_____
Date

Not Approved

Engineer_____
Date

PART 1 - GENERAL

1.01 STAKING:

- A. Construction staking will be furnished by the OWNER through the ENGINEER on the following basis:
 - 1. Gravity pipeline: One staking: Line and grade points at each structure or appurtenance, 50 feet upstream from structure, and at 100 foot station intervals.
 - 2. Pressure pipeline: One staking: Line and grade points at each structure or appurtenance and at 100 foot station intervals.
 - 3. Paving:
 - a. Curb and gutter: One staking: Line and grade points at 50 foot intervals.
 - b. Gravel, bituminous or concrete roadways or runways: One staking: Line and grade points at 50 foot intervals on both sides of roadway or runway.
 - c. Parking lots or aprons: One staking: Line and grade at 50 foot grid point intervals and at grade change points.
 - d. Sidewalk: One staking: Line and grade at approximately 50-foot intervals.
 - 4. Buildings and structures: One staking: Base line and temporary bench mark on site.
- B. CONTRACTOR shall order the staking five (5) working days in advance of the need for said staking.

1.02 RESTAKING:

- A. If restaking or additional staking is required, it shall be performed by the ENGINEER at the CONTRACTOR'S expense.

1.03 SCHEDULES:

- A. Construction Staking Request Form.

REQUEST FOR CONSTRUCTION STAKES

Project Name High Street Reconstruction WW Project No. 222158 Code N/A

Location Middleville, MI

Contract No. N/A Section N/A

Name of Contractor _____

Contractor Authorized Signature _____ Date _____

Contractor to Start Work on [Date] _____

Plan Sheet No. _____ Street Name _____

From Sta. No. _____ To Sta. No. _____

From M.H. No. _____ To M.H. No. _____

Sanitary Sewer _____ Street Grading _____

Storm Sewer _____ Water Main _____

Curb & Gutter _____ Force Main _____

Sidewalk _____ Other (Specify) _____

Stakes _____ or Hubs _____ Needed for: (Check One)

Line & Grade _____ Line Only _____ Cut Sheet _____

Offset Distance _____ Offset Direction N ___ S ___ E ___ W ___

Remarks: _____

CONSTRUCTION DEPARTMENT

Request Received by _____ Date _____

Construction Dept. Approval _____ Date _____

SURVEY DEPARTMENT

Started Work on _____ (Date) Estimated Field Time _____ (Days) _____ (Hours)

Survey Chief Assigned _____ Date Completed _____

Number of Men _____ Number of Man Hours _____

CONSTRUCTION & CONTRACTOR

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Cleaning:
 - 1. General:
 - a. Manufactured products: Manufacturer's instructions.
 - b. Clean-up during construction: Maintain premises and public properties free from accumulations of waste, debris and rubbish caused by operations.
 - c. Final clean-up: Remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all surfaces; leave the work clean and ready for occupancy.
 - 2. Delinquency:
 - a. Remedies: Failure to clean-up promptly is considered to be defective Work:
 - (1) Payment: Per ARTICLE 14 of SECTION 00 70 00, GENERAL CONDITIONS.
 - (2) OWNER may correct per ARTICLE 13 of SECTION 00 70 00, GENERAL CONDITIONS.
- B. Work Record Documents:
 - 1. Maintenance of Documents:
 - a. Maintain 1 copy at jobsite in good order of:
 - (1) Contract Drawings.
 - (2) Specifications.
 - (3) Addenda.
 - (4) Reviewed shop drawings.
 - (5) Change Orders.
 - (6) Other contract Modifications.
 - b. Filing: Work specification format.
 - c. Accessibility: To OWNER and ENGINEER.
 - 2. Recording:
 - a. Keep record documents current.
 - b. Contract Drawings: Legibly mark to record actual construction:
 - (1) Field changes of dimension and detail.
 - (2) Changes made by Change Orders and Bulletins.
 - (3) Details not on original contract Drawings.
 - c. Specifications and Addenda: Legibly mark up each SECTION to record:
 - (1) Manufacturer, trade name, catalog number and supplier of products actually installed.
 - (2) Changes made by Change Orders and Bulletins.
 - (3) Other matters not originally specified.
 - 3. Submittal:
 - a. Delivery: See SECTION 01 33 00.
 - b. Transmittal letter: Contain:
 - (1) Date.
 - (2) Project title and number.
 - (3) CONTRACTOR'S name and address.
 - (4) Title and number of each record documents.
 - (5) Certification that each document as submitted is complete and accurate.

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. The work for this section includes the use of non-shrink grout for plugging abandoned utility lines, patching concrete, installing base plates, bearing plates, railing posts, or where called for on the plans.
- B. All grout shall be cementitious grout unless noted. Epoxy grout shall be used only where specifically called for on the plans.

1.02 SUBMITTALS:

- A. Submit product data describing the grout, including manufacturer's recommended mixing and placing instructions.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Cementitious Grout
 - 1. Flowable mix shall develop a minimum compressive stress of 6000 psi in 28 days.
 - 2. Acceptable products include:
 - a. "Hi-Flow Grout" by The Euclid Chemical Company
 - b. "Five Star Grout" by Five Star Products, Inc.
 - c. "Crystex" by L&M Construction Chemicals, Inc.
- B. Epoxy Grout
 - 1. Flowable mix shall develop a minimum compressive stress of 10,000 psi in 28 days.
 - 2. Acceptable products include:
 - a. "E3-HP" by The Euclid Chemical Company
 - b. "Five Star DP Epoxy Grout" by Five Star Products, Inc.
 - c. "EpogROUT 758" by L&M Construction Chemicals, Inc.

PART 3 - EXECUTION

3.01 PLACEMENT:

- A. Grout shall be mixed and placed per manufacturer's recommendations.
- B. All voids within area to be grouted must be filled.
- C. Strike-off grout cleanly and neatly. Rectify all defects.

END OF SECTION

SECTION 31 01 30CLEANING AND VIDEO INSPECTION OF UNDERGROUND PIPINGPART 1 - GENERAL

1.01 DESCRIPTION:

- A. This section includes the work required for heavy cleaning and video inspection of underground piping.

1.02 SUBMITTALS:

- A. Submit the following after completion of the heavy underground piping cleaning and video inspection:
 - 1. Electronic report of the video inspection including the following information:
 - a. Specific details as to the internal condition of the sewer and manholes televised noting location and condition of any broken or crushed pipe, obstructions, defective joints, misalignment in the line and grade, infiltration, service laterals, manhole flow channels, etc.
 - b. Length of sewer section, size, pipe material, manhole identification numbers and/or plan stationing, street name, etc.
 - 2. Original and two (2) copies of the inspection video in CD/DVD format in protective case and labeled.

1.03 JOB CONTITIONS:

- A. Maintain existing underground piping system operational.
- B. Maintain or detour vehicular traffic in accordance with an approved plan.

PART 2 - PRODUCTS

2.01 EQUIPMENT:

- A. Underground Piping Cleaning Equipment:
 - 1. Hydraulically Propelled Equipment: The equipment used shall be of a movable dam type and be constructed in such a way that a portion of the dam may be collapsed at any time during the cleaning operation to protect against flooding of the sewer. The movable dam shall be equal in diameter to the pipe being cleaned and shall provide a flexible scraper around the outer periphery to ensure removal of grease. If sewer cleaning balls or other equipment which cannot be collapsed is used, special precautions to prevent flooding of the sewers and public or private property shall be taken.
 - 2. High-Velocity Jet (Hydrocleaning) Equipment: All high-velocity sewer cleaning equipment shall be constructed for ease and safety of operation. The equipment shall have a selection of two or more high-velocity nozzles. The nozzles shall be capable of producing a scouring action from 15 to 45 degrees in all size lines designated to be cleaned. Equipment shall also include a high-velocity gun for washing and scouring manhole walls and floor. The gun shall be capable of producing flows from a fine spray to a solid stream. The equipment shall carry its own water tank, auxiliary engines, pumps and hydraulically driven hose reel. The NASSCO Jetter Code of Practice shall be consulted as a guide for the selection of different type nozzles and recommended pressure applications for various cleaning requirements.
 - 3. Mechanically Powered Equipment: Bucket machines shall be in pairs with sufficient power to perform the work in an efficient manner. Machines shall be belt operated or have an overload device. Machines with direct drive that could cause damage to the pipe will not be allowed. A power rodding machine shall be either a sectional or continuous rod type capable of holding a minimum of 750 feet of rod. The rod shall be specifically heat treated steel. To ensure safe operation, the machine shall be fully enclosed and have an automatic safety clutch or relief valve.

SECTION 31 01 30CLEANING AND VIDEO INSPECTION OF UNDERGROUND PIPING

- B. Video Camera:
 1. Shall be specifically designed and constructed for the required video inspection and shall be capable of operating under 100% humidity conditions.
 2. Shall have pan, tilt and rotate capabilities for viewing into lateral connections, at joints, and manholes.
 3. Shall be capable of producing quality picture and sound.

PART 3 - EXECUTION

3.01 PREPARATORY CLEANING:

- A. All underground utilities shall be cleaned by rodding, high velocity water jet, or other approved means to provide an unobstructed view of the pipe interior. The maximum pressure used when cleaning a sewer shall be 1500 psi. Preparatory cleaning shall include the entrapment and removal of all debris (gravel, sand, etc.) resulting from the cleaning operation. Disposal of the debris and other waste material shall be to an appropriate sanitary landfill, by a hauler licensed to perform this activity. The CONTRACTOR shall immediately notify the ENGINEER if the cleaning operations cause a failure of a pipe or if there is evidence of pipe deterioration.
- B. During sewer cleaning operations, satisfactory precautions shall be taken in the use of cleaning equipment. When hydraulically propelled cleaning tools (which depend upon water pressure to provide their cleaning force) or tools which retard the flow in the sewer line are used, precautions shall be taken to ensure that the water pressure created does not damage or cause flooding of public or private property being served by the sewer. When possible, the flow of sewage in the sewer shall be utilized to provide necessary pressure for hydraulic cleaning devices. When additional water is necessary to avoid delay in normal work procedures, the water shall be conserved and not used unnecessarily.
- C. The designated sewer manhole sections shall be cleaned using hydraulically propelled, high-velocity jet or mechanically powered equipment. Selection of the equipment used shall be based on the conditions of lines at the time the work commences. The equipment shall be capable of removing dirt, grease, rocks, sand and other materials and obstructions from the sewer lines and manholes. If cleaning of an entire section cannot be successfully performed from one manhole, the equipment shall be set up on the other manhole and cleaning shall be attempted again. If, again, successful cleaning cannot be performed or the equipment fails to traverse the entire manhole section, it will be assumed that a major blockage exists and the cleaning effort shall be abandoned.

3.02 INTERNAL VIDEO INSPECTION PROCEDURES:

- A. After cleaning, the manhole sections shall be visually inspected by means of closed-circuit television. The inspection will be done one manhole section at a time and the flow in the section being inspected will be suitably controlled as specified. All CCTV inspections shall be performed in accordance with PACP standards, including the specific date and time of inspection.
- B. The television camera used for the inspection shall be one specifically designed and constructed for such inspection. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. The camera, television monitor and other components of the video system shall be capable of producing picture quality to the satisfaction of the OWNER's Representative; and if unsatisfactory, equipment shall be removed and no payment will be made for an unsatisfactory inspection.
- C. The camera shall be moved through the line in either direction at a moderate rate, stopping when necessary to permit proper documentation of the sewer's condition. In no case will the television camera be pulled at a speed greater than 30 feet per minute. Manual winches, power winches, TV cable and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line. If, during the inspection operation, the television camera will not pass through the entire manhole section, the CONTRACTOR shall set up his equipment so that the inspection can be performed from the opposite manhole. If, again, the camera fails to pass through the entire

manhole section, the inspection shall be considered complete noted as Survey Abandoned and no additional inspection will be required.

- D. The depth of flow at the time of internal inspection shall not exceed the depths stated below. The video inspection device shall be elevated above the water line.

Pipe size	Maximum depth of Flow
8"	1.25" or 15% of pipe diameter
10"	1.5" or 15% of pipe diameter
12"	2.4" or 20% of pipe diameter

- E. Vertical deviations (pipe sags and bellies). In these situations where there are vertical deviations in the grade of the utility being inspected and when such deviations result in a depth of flow precluding the effective televising, the contractor shall lower the depth of flow to the extent possible an internally inspect as much of the pipe as possible.
- F. When manually operated winches are used to pull the television camera through the line, telephones or other suitable means of communication shall be set up between the two manholes of the section being inspected to ensure good communications between members of the crew.
- G. The importance of accurate distance measurements is emphasized. Measurement for location of defects shall be above ground by means of a meter device. Marking on the cable, or the like, which would require interpolation for depth of a manhole, will not be allowed. Accuracy of the distance meter shall be checked by use of a walking meter, roll-a-tape or other suitable device, and the accuracy shall be satisfactory to the OWNER's Representative.
- H. Documentation of the television results shall be as follows:
1. Television Inspection Logs: Electronic media location records shall be kept by the Contractor and will clearly show the location, by distance in 1/10 of a foot or nearest mm from the manhole wall, in relation to an adjacent manhole of each infiltration point observed during inspection. In addition, other points of significance such as locations of building sewers, unusual conditions, roots, storm sewer connections, cracks, fractures, broken pipe, presence of scale and corrosion and other discernible features, as defined in the PACP defect codes, will be recorded on electronic media and a copy of such records will be supplied to the OWNER.
 2. Digital photographs of the pipe condition and all defects shall be taken by the Contractor. Photographs shall be located by distance in 1/10 of a foot or nearest mm, from the manhole wall, in relation to an adjacent manhole.
 3. Records: The contractor shall furnish to the ENGINEER six (6) copies of the inspection journal. Journal entries shall in clued:
 - a. Date, time and weather conditions.
 - b. Employees names and duties performed.
 - c. Utility segment locations cross-referenced to map and street intersections and manhole numbers.
 - d. Utility type: Sanitary Sewer, Storm Sewer, Combined Sewer, Underdrain, etc.
 - e. Pipe length, material and diameter.
 - f. Distance from entry point.
 - g. Direction of camera travel.
 - h. Description and location of defect(s) observed.
 - i. Service leads size and location relative to entry point.
 - j. Termination point.
 4. DVD Record: A video recording of each segment televised shall be furnished to the ENGINEER. Said documentation shall be the property of the OWNER. Each video shall be complete with audio recording of the operator's comments as camera progresses. A digital display noting the distance from the entry point shall be present on a real time display. Video media shall be in DVD format. Labels shall be affixed to video media indexing material contained.
 5. All CCTV Inspection shall be performed by CCTV personnel who are trained and certified in the use of NASSCO's Pipeline Assessment and Certification Program (PACP)®.

3.03 FLOW CONTROL DURING INSPECTION:

- A. When a sewer is being inspected, and the flow depth exceeds the limits specified, the contractor shall make provisions to work within the acceptable ranges. This could include by-pass pumping, temporary back-ups, or performing the work during low-flow periods. Regardless of the method used, the CONTRACTOR shall be responsible for the safe, lawful conveyance of the utility.
- B. A sewer line plug shall be inserted into the line at a manhole upstream of the segment to be investigated. The plug may be designed to permit flow depths within the specified range if by-pass pumping is not provided. Provisions shall be made for immediate removal should excessive flow rates necessitate more pipe capacity. Following completion of the investigation, plugs shall be removed.
- C. When pumping is required to control the depth of flow, the contractor shall supply all labor and equipment including but not limited to: pumps, pipes, driveway-crossing pipes, headers, etc., to divert the flow around the section in such work is to be performed.
 - 1. Pump capacity: shall be of sufficient size to pump the peak daily flow. Normally, by-pass pumping will not be permitted during rain events or periods immediately following an intense rainfall.
 - 2. Conduits: Shall be in good condition with no leakage occurring at joints.
 - 3. Continuous Pumping: If continuous (24 hour) pumping is required, the following condition shall be met:
 - a. Supervision: The contractor shall be responsible for supervision, coordination, fueling and control of the operation.
 - b. Noise: Pumps and equipment to provide power to them shall be in good operating condition so that noise levels within their design parameters are reasonable. Excessively loud equipment, as determined by ENGINEER shall be promptly replaced.
- D. During inspection, the contractor shall be responsible for any and all protective measures, to ensure the flow operations do not cause flooding or damage to public or private property. The contractor shall be responsible for any damages which result from flow control operations.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes the following:
 - 1. Protecting all existing trees, shrubs, groundcovers, plants and/or grass not shown to be removed on the plans
 - 2. Removing existing trees, shrubs, groundcovers, plants and grass shown to be removed on the plans.
 - 3. Clearing and grubbing.
 - 4. Stripping and stockpiling topsoil.
 - 5. Removing above- and below-grade site improvements.
 - 6. Disconnecting, capping or sealing, and abandoning site utilities in place.
 - 7. Erosion and sedimentation control measures.
- B. Related Sections include the following: that are affected by site operations.
 - 1. Division 01 Section "Execution" for verifying utility locations and for recording field measurements.
 - 2. Division 31 Section "Earth Moving" for soil materials, excavating, backfilling, and site grading.
 - 3. Division 23 Section "Turf and Grasses & Plants" for finish grading including preparing and placing planting soil mixes and testing of topsoil material.

1.02 PERMITS

- A. Permit for transport and disposal of debris, by CONTRACTOR.
 - 1. Submit demolition procedures and operational sequence for review and approval by ENGINEER
- B. Soil Erosion:
 - 1. Apply for and obtain Soil Erosion Control Permit from local Soil Erosion/Sedimentation Control Enforcing Agent.
 - 2. Apply for and obtain National Pollution Discharge Elimination System (NPDES) permit if applicable. All projects with one acre or more of disturbed area require a NPDES Notice of Coverage.
 - 3. All applicable permit fees to be paid by Owner

1.03 JOB CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
- B. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
- C. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- D. Salvable Improvements: Carefully remove items indicated to be salvaged or relocated and store on Owner's premises where indicated.
- E. Utilities:
 - 1. Notify utility locator service for area where Project is located before site clearing.
 - 2. Protect and maintain utility services to remain

F. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

G. Scheduling:

1. Erosion control measures shall be constructed prior to the time construction commences upstream from the control measure location.
2. Removal and cleanup of temporary control items shall be completed within one week following stabilization of the disturbed areas, or as approved by regulatory agency.
3. Refer to the Soil Erosion Control Plan for recommended construction sequence.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Except as noted the CONTRACTOR maintains possession of all materials being demolished.
- B. Carefully remove, store and protect for reinstallation all equipment so designated.
- C. Carefully remove, clean and deliver salvaged materials to the OWNER's storage area.
- D. Growth preventative material shall be Veteran CST, Pathfinder or approved equal and applied by a certified applicator.
- E. Seeding: SEE SECTION 02920

F. Topsoil: SEE SECTION 02900

G. Mulch:

1. Blankets:
 - a) Slopes 3:1 or less: North American Green DS75 rapidly degradable single net straw blanket or approved equal.
 - b) Slopes between 3:1 and 2:1: North American Green DS150 rapidly degradable double net straw blanket or approved equal.
 - c) Slopes between 2:1 and 1:1 and ditches with intermittent flow and velocities less than 3 feet per second: North American Green SC150 double net straw-coconut blanket or approved equal.
 - d) Slopes between 2:1 and 1:1 and ditches with sustained flow and velocities more than 3 feet per second: North American Green C125 double net coconut blanket or approved equal.
2. Hydraulic:
 - a) Slopes 2:1 or less: Geopro mulch or approved equal
 - b) Slopes 3: 1 or less: MDOT 816 with mulch anchoring tackifier
 - c) Not permitted in areas of concentrated flow, ditches, swales etc.

H. Energy Dissipation:

1. Rip Rap, Plain, MDOT 916
2. Check Dams, MDOT 916, Enviroberm, or Triangular Silt Dike
3. Filter Rolls, Sediment Stop by North American Green

I. Inlet Protection:

1. Silt Saver Yard basin and pipe protection inlet by Silt Saver or approved equal
2. Silt Sack by ADF Environmental or MDOT 916.04
3. Catchall, or FloGard by Marathon Materials Inc.
4. Silt fence surround when plan detail is provided

J. Geotextile Fabric:

1. Non-woven MDOT Table 910-1 "Stabilization Geotextile"

2. Woven MDOT Table 910-1 "Geotextile Separator"

- K. Silt Fence:
- | | | |
|----|----------------------|-------------------------------------|
| 1. | Amoco 1380 Silt Stop | Amoco Fabrics and Fibers Co. , Inc. |
| | CEF 2122 | Amoco Fabrics and Fibers Co. , Inc. |
| | CEF 2130 | Amoco Fabrics and Fibers Co. , Inc. |
| | Beltech 751 | Belton Industries |
| | GTF-2009 | LINQ Industrial Fabrics |
| | Mirafi 100GX | Mirafi, Inc |
| | Mirafi 100SX | (Nicolon Corp.) |
| | TerraTex SC | Webtec, Inc. |
| | Ecolofence | MDOT 916.04 |
- L. Polymers:
1. Floc Log by Applied Polymer Systems
 2. Silt stop PolyacrylImide soil stabilizer by Applied Polymer Systems
- M. Plastic Sheeting, 8 Mill minimum

PART 3 - EXECUTION

3.01 Clearing:

- A. Shall consist of cutting, removing from the ground, and disposing of trees, stumps, brush, shrubs, and other vegetation occurring within the project site which interfere with excavation, embankment or clear vision, or are otherwise noted on the construction drawings to be removed and includes the preservation from injury or defacement of all vegetation and objects designated to remain.
- B. Where removal of a stump may result in damage to existing utilities, the stump shall be removed by chipping to a depth of at least one foot below the finished ground surface. Other stumps may be removed by chipping when approved by the Engineer.
- C. Any trees or shrubs that are designated to be saved but are damaged by the Contractor's operations shall be repaired or replaced by the Contractor, as directed by the Engineer, at no additional cost to the Owner
- D. Individual trees scheduled for removal shall be paid for as indicated in SECTION 01270.

3.02 Demolition:

- A. Completely demolish above grade structures and appurtenances to extent indicated on drawings and in specifications. Remove all scrap materials from site. Demolish in an orderly and careful manner. Install plugs or blind flanges on pipes as indicated or implied.
- B. Remove existing below grade walls, columns, slabs, foundations, and piers which are in the same location as proposed structures to a depth of at least two (2) feet below the bottom of the new structures. Remove other walls, columns, slabs, foundations, and piers in their entirety.
- C. Properly disconnect, seal and plug all utility services, such as gas, electric, water and sewer, to buildings and structures to be demolished. Restrain joints of existing utilities to remain in service per technical specifications for new construction.
- D. Do not remove underground piping which is to be abandoned, except where it interferes with new construction or is specifically noted for removal. Plug cut ends of abandoned underground piping with non-shrink grout.
- E. REPAIR: Repair damage to adjacent structures, piping, and conduits.

F.SALVAGE COORDINATION:

1. Present to the ENGINEER an inventory of equipment to be delivered to the OWNER 48 hours prior to delivery.
2. Salvaged equipment is not to be dismantled or repaired, but the CONTRACTOR shall remove conduits, pipes, tubing and clean off and flush out as required for proper temporary storage.
3. Store all salvaged material on suitable blocking to maintain parts clear of the ground. Cover to insure drainage of rain water.

3.03 SOIL EROSION CONTROL:

A. General:

1. Abide with all applicable rules and regulations as established by the State of Michigan and the local governmental unit pursuant to Part 91 of 1994 P.A. 451, as amended, (Formerly Act 347 P.A. of 1972, Soil Erosion and Sedimentation Control Act).
2. Copies of state guidelines "Soil Erosion and Sediment Control Guidebook" may be obtained from the Department of Management and Budget by contacting the Office of Design and Construction, P.O. Box 30026, Lansing, MI, 48909. Applicable OWNER'S Specifications may be obtained at no charge from the OWNER.
3. The Michigan Department of Management and Budget S-E-S-C Keying System for erosion control measures is included with the construction plans. Specific erosion control measures, as required, are indicated on the plans.
4. Though a specific erosion control measure may not be specified on the plans, this does not relieve the CONTRACTOR from his obligation under the above Act to properly control and/or prevent all erosion caused by the CONTRACTOR construction operation.
5. Protect sensitive areas and areas where vehicular, and pedestrian traffic is prohibited.

B. Sediment Removal:

1. Take such steps as are necessary to assure the retention and removal of any sediment which enters an existing storm sewer or open ditch along the construction route before said sewer or ditch discharges into a stream or pond.
2. If eroded material is allowed to enter a storm sewer system it shall be the CONTRACTOR's responsibility to see that all catch basins and manholes are cleaned following construction prior to receipt of final payment. Unless the CONTRACTOR can document positively to what extent an existing storm sewer system along the construction area is silted in prior to construction, no credit will be allowed for cleaning the system.
3. The CONTRACTOR shall be responsible for maintaining the roadways in a passable condition until construction is completed, including any maintenance necessary for dust control or to eliminate tracking of sediments off site by vehicles and equipment.

C. Control Measures:

1. Provide and maintain temporary soil erosion and sedimentation control measures:
 - a. Provide control measures at storm sewer inlets and outlets, dewatering discharges, excavated or borrow material stockpiles, unvegetated slopes as shown on plans, and anywhere erosion or sedimentation is likely to occur in disturbed area.
 - b. Install soil erosion and sedimentation control measures according to manufacturer instructions, or as shown on plans.
 - c. Maintain controls during working and non-working hours if weather so requires.
 - d. Remove silt or solids retained in control structures and devices during and following construction as necessary to maintain sufficient sediment storage volume and drainage system operation.

D. Storm Water Operators:

1. The Storm Water Operator is the OWNERS Representative, responsible to assure soil erosion is kept in check.
2. Contractor shall review site inspection logs and make corrective measures as necessary.

E. Seeding: SEE SECTION 02920

F.Topsoil: SEE SECTION 02900

G. Mulch:

1. Blankets
2. Hydraulic

H. Energy Dissipation:

1. Rip Rap, MDOT 916:
 - a. Begin the riprap in a trench below the toe of the slope and progress upward. Place the stones individually, tamping in place to assure sound placement. Riprap shall be placed by hand on an approved geotextile fabric. Stone placement shall be random and tight jointed. Individual stones shall have a minimum 6 inch nominal diameter, and be 8 inches in place perpendicular to the slope.
 - b. Where the plans indicate "grouted riprap", stones shall be placed as stated above and the joints filled with grout meeting ASTM.
2. Check Dams:
 - a. Stone MDOT 916
 - b. Enviroberm, or Triangular Silt Dike Manufacturers specifications
3. Filter Rolls, Sediment Stop by North American Green, Manufacturers specifications

I. Inlet Protection:

1. Manufacturer's specification
2. Silt fence surround when plan detail is provided, MDOT 916.05

J. Geotextile Fabric:

1. Non-woven MDOT Table 910-1 "Stabilization Geotextile"
2. Woven MDOT Table 910-1 "Geotextile Separator"

K. Silt Fence. MDOT 916.02

L. Polymers:

1. Flocculant by Applied Polymer Systems, Manufacturers specification
2. Silt stop Polyacrylamide soil stabilizer by Applied Polymer Systems Manufacturers specification.

M. Plastic Sheet piling:

1. Cover entire area to be protected
2. Overlap successive layers with a shingle lap
3. Bury or weight free edge to anchor

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. This section includes the work required for trenching, excavating and backfilling, clearing, boring and jacking, special pipe foundations, and special work below grade.

1.02 DEFINITIONS:

- A. Maximum density: Maximum dry weight in pounds per cubic foot of a specific material.
- B. Optimum moisture: Percentage of water at maximum density.
- C. Rock excavation: Includes all boulders or rock weighing 400 pounds (approx. one cubic yard) or more and all solid or ledge rock, slate, shale, sandstone, and other hard materials that require continuous use of pneumatic tools, heavy rippers, or continuous drilling and blasting for removal. Pavements are not included.
- D. Suitable Excavated Material: Mineral (inorganic) soil free of cinders, refuse, sod, boulders, rocks, pavement, soft or plastic clays, vegetable or other organic material and capable of being compacted as specified. Moisture content has no bearing on the suitability of materials to be used.
- E. Granular Material: Coarse grained material having no cohesion, which derives its resistance to displacement from internal stability.
- F. Cohesive Material: Fine grained material which derives its resistance to displacement by mutual attraction between particles of the mass, involving forces of molecular origin (i.e. Clays are considered cohesive).
- G. Grade Terminology: SEE PLAN DETAIL.

1.03 REFERENCES:

- A. MDOT - Michigan Department of Transportation, "Standard Specifications for Construction," 2020 ed.
- B. MDOT – Density Control Handbook, latest edition.
- C. American Society of Testing Materials, latest edition.
- D. Handbook of Specifications for the Protection of Natural Resources.

1.04 SUBMITTALS:

- A. Testing and Inspection Reports: Written reports shall be submitted to ENGINEER, with copy to the CONTRACTOR, documenting testing and/or inspection results. Tests shall include:
 - 1. Test results on borrow material.
 - 2. Gradation analysis for granular backfill and sub-base materials.
 - 3. Field reports for in-place soil density tests.

1.05 JOB CONDITIONS:

- A. Obtain and comply with construction permits from agencies having jurisdiction over the work.
- B. Scheduling: Clean up promptly following utility installation backfilling.
- C. Dust Control: Broom or apply dust palliatives as needed.
- D. Driveway Closing: 24 hour maximum. Maintain emergency access to all properties during construction.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Utility Pipe Bedding:
 - 1. Granular Material; MDOT Class II Sand, or equal.
- B. Trench Backfill:
 - 1. Backfill utility trenches with suitable excavated material or granular material.
 - 2. Granular material: MDOT 205, and 902 Class III limited to 1 inch maximum size.
 - 3. Select Granular Material: MDOT 205, and 902, Class III limited to 1 inch maximum size.
 - 4. Concrete: MDOT P2, S3, or DIVISION 3 - CAST-IN-PLACE CONCRETE, if included.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Clearing and Grubbing:
 - 1. Remove trees, clear and grub as indicated on the drawings along pipeline route, or as approved by Engineer.
 - a. Wood (4 inches in diameter and larger) from trees removed shall belong to the adjacent property owner unless instructed by the property owner to dispose. Cut the wood in 4 foot lengths and stockpile in location suitable to property owner.
 - b. Promptly dispose of brush, wood less than 4 inches in diameter and wood not wanted by property owner.
 - 2. Save and protect all trees and vegetation not identified to be removed.
 - 3. Repair or replace trees, shrubs and other vegetation damaged by CONTRACTOR'S operation at no additional cost to OWNER.
- B. Conflicting Utilities:
 - 1. Before starting excavation, establish location and extent of existing utilities in work area.
 - 2. Establish potential conflict areas prior to construction.
 - 3. Excavate and expose existing utilities presenting potential conflict to determine their exact location and elevation.
 - 4. Provide adequate means of support and protection during operations.
 - 5. Advise ENGINEER of conflicts and obtain instructions on how to proceed.
 - 6. Make adjustments in proposed utility location at no additional cost to OWNER.
 - 7. Make arrangements with owner of existing utility for relocation, if necessary.
 - 8. Schedule work accordingly.
- C. Signs, mailboxes and other movable surface features:
 - 1. Witness location prior to removal. Relocate to accessible location and maintain during construction.
 - 2. Upon completion of construction, replace to original position and condition.
 - 3. Replace regulatory traffic control signs immediately after utilities are placed and backfilled.
- D. Property Irons
 - 1. Protect existing property irons at edge of right-of-way. If property iron must be removed for construction, the CONTRACTOR shall have a registered professional surveyor witness the property iron(s) prior to disturbance and replace the existing property iron(s) at the CONTRACTOR'S expense.

3.02 EXCAVATION:

- A. General:
 - 1. Dispose of surplus and unsuitable excavated material.
 - 2. Remove, salvage and stockpile topsoil on-site in area designated by ENGINEER.
 - 3. Unsuitable material, highly compressible or organic soils encountered in subgrade or below payment line may need to be removed: Notify ENGINEER and obtain instruction on how to proceed.

- B. Trenches:
 - 1. Depth: Provide a uniform and continuous bearing and support for proposed utility on solid and undisturbed or compact granular material.
 - 2. Minimum Width: Allow space for jointing and bedding. Four inches minimum clearance around pipe in rock, boulders, or large stones.
 - 3. Maximum Width: Limitations apply at utility crown.
 - a. 6 inch through 10 inch diameter: 30 inches.
 - b. 12 inch to 30 inch diameter: Outside diameter plus 24 inches.
 - c. 30 inch and over diameter: Outside diameter plus 36 inches.
 - d. Elliptical: Outside pipe width plus 36 inches.
- C. Blasting:
 - 1. Obtain and comply with required permits.
 - 2. Perform only during hours approved by ENGINEER.
- D. Length of Open Trench: Maximum 200 feet.
- E. Damage to Existing Underground Utilities:
 - 1. Report all damage to ENGINEER and Utility OWNER.
 - 2. Repair to utility OWNER's standard.

3.03 BACKFILLING:

- A. Pipe bedding area: Compact granular material to 95% of maximum density.
- B. Trench Backfill Area:
 - 1. Under permanent pavement, shoulder areas, and areas within a one-on-one slope from the shoulder edge:
 - a. Compact native suitable excavated material in top 4 feet and balance native suitable excavated material or granular material in 9" layers to 95% maximum density.
 - 2. Under nonpermanent pavement: Same as permanent pavement.
 - 3. Under unimproved right-of-way areas: Compact suitable excavated material to 85% of maximum density.
 - 4. Under landscaped areas: Compact suitable excavated material to 80% of maximum density.
 - 5. Under unimproved areas:
 - a. Suitable excavated material: Compact to 80 percent of maximum density and round neatly over trench.
 - b. Unsuitable excavated material: Replace and round neatly over trench with permission of ENGINEER.
 - 6. Under undercut existing structures: Place concrete.
- C. Structures:
 - 1. Density requirements: Same as Trenches.
 - 2. Concrete structure: Place backfill only after 75 percent of concrete design strength has been reached.

3.04 SPECIAL PIPE FOUNDATIONS:

- A. Excavation: ENGINEER's instructions.
- B. Backfill: To payment line with granular material.

3.05 COMPACTION, TESTING AND INSPECTION:

- A. Surplus excavated and unsuitable excavated material becomes the property of the Contractor.
- B. Dispose of surplus excavated or unsuitable excavated materials off-site or on-site in areas designated by ENGINEER.

- C. Performance and test equipment: By ENGINEER or OWNER approved independent laboratory.
 - D. Moisture - Density relationships:
 - 1. AASHTO T99 Method C
 - E. Field Density: Either of following:
 - 1. ASTM D-2167 (Rubber Balloon)
 - 2. ASTM D-2922 (Nuclear)
 - 3. AASHTO T191
 - 4. One Point Michigan Cone
 - F. Furnish equipment and personnel to provide access to test location and depth. Density tests will be performed at various levels, as determined by ENGINEER, during or after backfilling operation.
 - G. Correct any deficiencies resulting from insufficient or improper compaction. Retest if required.
- 3.06 SOIL EROSION AND SEDIMENTATION CONTROL: See SECTION 01 57 00
- 3.07 SURPLUS MATERIALS:
- A. Surplus excavated and unsuitable excavated material becomes the property of the Contractor.
 - B. Dispose of surplus excavated or unsuitable excavated materials off-site or on-site in areas designated by Engineer.
- 3.08 DEWATERING:
- A. Provide dry excavations until utility has been placed and backfill is completed.
 - B. Provide and maintain slopes, crowns, ditches and ponds to insure satisfactory surface drainage at all times.
 - C. Provide in accordance with SECTION 31 23 19.

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Work includes construction of new and reconstruction of existing HMA pavements and gravel roads, including associated earthwork, paving and surfacing for all roads, driveways, parking lots, curb and gutter, sidewalks, and shoulders.
- B. Definitions:
1. Pavement structure: Any combination of subbase, base course, and surface course, including shoulders, placed on a subgrade.
 2. Permanent pavement: All improved pavement surfaces above the quality of treated or untreated gravel.
 3. Subgrade: That portion of the earth grade upon which the pavement structure is to be placed.
 4. Subbase: The layer of specified material of designed thickness placed on the subgrade as a part of the pavement structure.
 5. Base course: The layer or layers of specified or selected material of designed thickness placed on a subbase or a subgrade to support leveling and surface courses.
 6. Leveling course: Layer of specified material placed on the base course in preparation for the surface course.
 7. Surface course: The top layer of a pavement structure.
 8. Maximum density (soils): Maximum unit weight of soil material according to Modified Proctor Method ASTM D1557.
 9. Maximum density (HMA): Maximum unit weight of a representative sample of the hot mix asphalt according to the Marshall Method ASTM D2726.

1.02 REFERENCES:

- A. Michigan Department of Transportation (MDOT), "Standard Specifications for Construction," 2020 ed.
- B. American Society of Testing Materials (ASTM), latest edition.

1.03 SUBMITTALS:

- A. Submit the following in accordance with SECTION 01 33 00 – SUBMITTAL PROCEDURES:
1. Asphalt Mix Design: Provide job-mix formula prepared by independent lab or approved by MDOT for HMA leveling and surface courses to ENGINEER two weeks prior to paving.
 2. Certification of quality by producer for the following:
 - a. Cement
 - b. Aggregates
 - c. Asphalt cement
 - d. Pavement marking material
 - e. Prime coat
 - f. Bond coat
 3. Submit the proposed mix design for each class of concrete along with one of the following:
 - a. Field test records of the proposed mix design
 - b. Laboratory test results of the proposed mix design from an independent testing agency approved by the ENGINEER
 - c. MDOT certification of the proposed mix design from an MDOT Certified Batch Plant
 4. Submit shop drawings showing all fabrication dimensions and locations for placing the reinforcing steel and accessories.
 - a. Use Class B lap splices at all splice locations unless specified otherwise by the ENGINEER.
 - b. All splices not shown on the drawings must be approved by the ENGINEER.
 5. Submit certifications for the following:
 - a. Cement
 - b. Aggregates
 - c. Admixtures

d. Reinforcement

1.04 JOB CONDITIONS:

- A. Seasonal Limitations:
 - 1. Removal of permanent pavement: Unless otherwise specified, execute during the period from March 15 to October 15.
 - 2. Restoration of permanent pavement: Unless otherwise specified, execute during the period from May 5 to November 15 (Region South of M-46).
- B. Clean up promptly following pavement installation.
- C. Maintenance of Temporary Surfaces: Maintain temporary surfaces until permanent pavement installation is completed.
- D. Driveway Closing: 24 hour maximum, unless otherwise approved by Engineer.
- E. Allow access to the HMA plant for verification of mix proportions, aggregate gradations, and temperatures.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Subbase: Granular material MDOT Class II or IIA, MDOT 902.08.
- B. Aggregate Base Course: MDOT 21AA aggregate conforming to Table 902-1 and Table 902-2.
- C. Aggregate Surface Course: Use HMA Millings at the gradations shown below.
 - 1. Use Aggregate 22A when the Aggregate surface course is to receive a HMA surface at a later date. MDOT 302 and 902.06.
 - 2. Use Aggregate 23A when the Aggregate Surface Course is to be constructed without a HMA surface. MDOT 306 and 902.06.
- D. Aggregate Shoulders and Approaches:
 - 1. Use Aggregate 22A for construction of Class AA shoulders and approaches. MDOT 307 and 902.06.
 - 2. Use Aggregate 23A for construction of Class A shoulders and approaches. MDOT 307 and 902.06.
 - 3. Use roadway excavation or borrow material for construction of Class B shoulders and approaches. MDOT 307 and 902.06.
- E. HMA Base Course: Shall be an MDOT mixture as indicated on Plans.
- F. HMA Leveling and Surface Courses: Shall be an MDOT mixture as indicated on Plans.
- G. HMA Bond Coat: HMA material. MDOT 904-5. (SS 1h Asphalt emulsion)
- H. Pavement Marking: Conform to MDOT 920.
- I. Concrete Curb & Gutter: Unless otherwise specified, use concrete Grade 3500 or 3500HP for concrete curb, gutter, combination curb and gutter, gutter pan and spillways. MDOT 601, 701, 6 sacks per cubic yard minimum.
- J. Concrete Sidewalk: Unless otherwise specified, use concrete Grade 3500 or 3500HP for concrete sidewalk ramps and steps. MDOT 601, 701, 6 sacks per cubic yard minimum.
- K. Concrete Joint Filler: Conform to ASTM D 1751.

- L. Reinforcing Bars: Bar reinforcement shall be deformed steel bars meeting ASTM requirements as specified under MDOT 905.
- M. Welded Steel Wire Fabric Reinforcement: Conform to MDOT 905.

PART 3 - EXECUTION**3.01 PREPARATION:**

- A. Removal: Remove all existing pavement structure required, as shown on the plans or in the proposal.
 - 1. Pavement remnant limit: Remove pavement to edge or joint, where dimension is less than 3 feet. All removals shall be to a saw cut edge if a joint is more than three feet away.
 - 2. Butt joint: Provide where new pavement meets existing pavement.
- B. Dispose of all material removed during the construction.
- C. Subgrade:
 - 1. Obtain approval prior to placing the subbase or base course.
 - 2. Construct to the required line, grade and cross section. MDOT 205.03.N.
 - a. Tolerance if subbase is required: Trim within \pm 1 inch of design grade.
 - b. Tolerance if subbase is not required: Trim within \pm 3/4 inch of design grade.
 - 3. Compaction:
 - a. Compact to not less than 95 percent of the maximum density using Modified Proctor.
- D. Excavation: Conform to MDOT 205.03.G.
- E. Embankment: Conform to MDOT 205.03.H.

3.02 PERFORMANCE:

- A. Subbase:
 - 1. Thickness: Conform to design cross section.
 - 2. Construction method:
 - a. Place in layers not exceeding 12 inches loose measure.
 - b. Spread evenly and compact to not less than 95 percent maximum density according to Modified Proctor.
 - c. Conform construction to MDOT 301.01 thru 301.03.
- B. Aggregate Base Course:
 - 1. Thickness: Compacted depth of any layer of aggregate placed, maximum 6 inches, minimum 3 inches.
 - 2. Construction Method: Conform the placing of aggregate base course with MDOT 302.01 thru 302.03.
 - 3. Tolerances:
 - a. Curbed streets: Shape the aggregate base course to the established grade and cross section, within a tolerance of 1/4 inch.
 - b. Other: Unless otherwise specified, shape within 1/2 inch of the established grade and cross section.
 - c. Check and correct grades prior to pavement placement.
- C. Aggregate Surface Course:
 - 1. Thickness: Maximum 6 inches thickness of any one layer when compacted, unless otherwise specified.
 - 2. Construction Method: Conform construction of an aggregate surface course to MDOT 306.01 thru 306.03.
- D. Shoulder Area (aggregate): Provide 4 inches thickness of compacted aggregate shoulder on an aggregate base, unless otherwise specified.

- E. Shoulder Area (other than aggregate): Stabilize shoulder to a 4 inch depth with compacted soil or topsoil.
- F. HMA Base Course:
 - 1. Thickness: Maximum lift thickness - according to Mix Design, unless otherwise approved. MDOT 502.03.F.
 - 2. Construction Methods: Conform placement of the HMA base course mixture in accordance with MDOT 502.03.F.
 - 3. Tolerances:
 - a. Curbed streets: Shape the HMA base course to the established grade and cross section, within a tolerance of 1/4 inch. Windrowing (placing a lift of varying thickness to create a crown) HMA shall not be allowed to correct grading deficiencies.
 - b. Other: Unless otherwise specified, shape within 1/2 inch of the established grade and cross section.
 - 4. Aggregate Wear Index of all base materials shall be 260.
- G. HMA Bond Coat:
 - 1. Construction method: Apply between successive paving courses where any soils are tracked onto the finished mat between successive lifts.
 - 2. Application rate: Provide 0.10 gallon per square yard.
 - 3. Not required when permitted by ENGINEER.
- H. HMA Leveling and Surface Courses:
 - 1. Cutting: Saw vertically and in straight lines at any angle with pavement centerline.
 - 2. Thickness: Do not place HMA top course mixture in lifts exceeding 2 inches unless otherwise approved by Engineer.
 - 3. Construction Methods:
 - a. Paving: Conform method of paving to MDOT 502.03.F.
 - b. Prior to placement of HMA surface, crowns and grades of roadway will be verified by CONTRACTOR for positive drainage. Any deficiencies in grade or crown shall be corrected prior to placement of surface course.
 - c. Contractor to ensure surface is free of debris prior to placement of successive courses of HMA
 - 4. Tolerances: HMA surface on streets with new curbs shall have a finish elevation of 1/4 inch above curb. Windrowing (placing a lift of varying thickness to create a crown) HMA shall not be allowed to correct grading deficiencies.
 - 5. Pavement density: Minimum density of in-place course material when the course thickness is greater than 3 times the maximum aggregate size of the mix shall be 97 percent of the recorded laboratory specimen density and 95 percent when the course thickness is less.
- I. Concrete Curb & Gutter (MDOT 3500):
 - 1. Removal: Remove to joint.
 - 2. Thickness: Conform thickness to plan detail.
 - 3. Construction Methods: Unless otherwise specified, construct curbing mechanically or with forms and either by casting separately or as an integral part of the pavement MDOT 802.
- J. Concrete Sidewalk (MDOT 3500):
 - 1. Removal: Remove to joints.
 - 2. Thickness: 4 inches nominal and 6 inches at driveways and alleys.
 - 3. Construction Methods: Conform construction of sidewalks, unless otherwise specified to MDOT 803.
- K. Concrete Joint Seal:
 - 1. Cleaning: Unless otherwise specified, clean all joints with a jet of compressed air, immediately prior to sealing.
 - 2. Sealing: Seal joints in accordance with the plans and as specified in MDOT 602.03.S.

3.03 STRUCTURE ADJUSTMENT:

- A. Street Castings.
 - 1. Adjust castings to finish grade or to a maximum of 1/4" below finish grade of all manholes, catch basins, and valve boxes.
 - a. Set grades of castings and valve boxes from street grades with a tilt of castings where necessary to meet proposed street grades and crown.
 - b. All castings, when adjusted to finish grade, shall be placed in a bed of hot HMA mix placed in entire area disturbed for casting adjustment. Alternately, as approved by the ENGINEER, a concrete mix may be used in the void created to raise the casting.
 - 2. Castings shall be adjusted to finish grade after the leveling course is complete.
 - a. Castings shall be kept below grade or flush with the proposed sand subgrade so as not to conflict with grading operations or conflict with placement of leveling course.
 - 3. Refer to SECTION 01 20 00 regarding payment for adjustment of structures.

3.04 TESTING AND INSPECTION:

- A. Inspection: By the ENGINEER or his designated authorized representative.
- B. Acceptance Testing:
 - 1. DIVISION 1 - SECTION 01 45 00 QUALITY CONTROL.
 - 2. If initial testing indicates failed or nonconformance to specifications, perform additional tests. If further testing verifies nonconformance, additional testing shall be paid by CONTRACTOR. Replace nonconforming material at no additional cost to OWNER.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. This section includes the work required for protection and restoration of surface features such as site improvements and all trees, shrubs, lawns and other landscape features.
- B. Definition of Site Improvements: Fences, retaining walls and parking appurtenances, playing fields and equipment, sheds, mail boxes, lawn sprinkling systems and yard accessories.

1.02 SUBMITTALS:

- A. Topsoil Analysis: Certification of suitability by local agricultural agent.
- B. Seed Analysis: Certification of purity and germination by manufacturer.
- C. Trees and Shrubs: Certification by suppliers of source and species.

1.03 JOB REQUIREMENTS:

- A. Lawn Areas Disturbed by Construction Operation:
 - 1. By Hydro-seeding.
- B. Scheduling:
 - 1. Restoration of lawns and other surface features: Promptly following curb and gutter, site improvements and paving.
 - 2. Restoration of site improvements: Promptly following installation of improvements.
 - 3. Clean up: Promptly following restoration.
- C. Seasonal Limitations: MDOT Division 816.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Trees, Shrubs and Plants: MDOT 917.
- B. Topsoil: MDOT 917. 3 inches depth minimum, shall be screened to contain no stone larger than one inch, wood debris or objectional material and raked smooth. May be augmented with compost.
- C. Chemical Fertilizer: Grade 12:12:12. 228 pounds per acre.
- D. Grass Seed,: MDOT 917 except as noted:

<u>Percent By Weight</u>	<u>Class 'A' Seed Type</u>
10%	Cannon Kentucky Bluegrass
10%	Goldrush Kentucky Bluegrass
20%	Ronde Kentucky Bluegrass
20%	SR5100 Chewings Fescue
20%	SR5200 Creeping Red Fescue
10%	SR4400 Perennial Ryegrass
10%	SR4500 Perennial Ryegrass

- E. Hydraulic Seeding: Meet items noted above.
- F. Compost: MDOT 816 and 917 (must be supplied by source indicated on MDOT's Qualified Products List.).
- G. Site Improvements: Provide materials equal to or better than those that existed prior to start of construction whether shown or not shown on the drawings.

- H. Mulch: Select from MDOT Qualified Products List, shall be spray applied with mulch anchoring.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Inspection: Approval required.

3.02 TREES AND SHRUBS:

- A. Protection: All items not indicated for removal.
B. Damaged branches: Trim and seal within 5 days.

3.03 TOPSOIL

- A. Place new topsoil in preparation for seed.
B. Construction Methods: MDOT 816

3.04 SLOPE RESTORATION, TYPE A:

- A. Construction methods: MDOT 816 except with the following rates:
1. Topsoil: 3 inches of new topsoil or Compost
2. Fertilizer: 25 pounds per 1,000 square feet.
3. Sowing: Lawns: 4-6 pounds per 1,000 square feet (minimum 2 seeds per square inch).
4. Mulch and Mulch Anchoring: Cover all seeded areas.
5. Water: 3.5 gallons per square yard as necessary.

3.05 SODDING: Construction methods: MDOT 816 with 4 inch top-soil.

3.06 COMPOST: Place per MDOT 816 with seed integrated in compost.

3.07 SITE IMPROVEMENTS:

- A. Protection: All items not indicated for removal.
B. Restoration: Approval required.

3.08 SURFACE RESTORATION:

- A. Backfill site with approved material, fine grade, rake to remove stones larger than 1-1/2", lumps, wood, debris, and other extraneous materials, provide seeding, mulch and fertilizer. Water as required to restore a vigorous growth of turf.

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. The work includes the reconstruction of sanitary sewer pipelines and laterals by the installation of a resin-impregnated flexible tube that is inverted into the existing pipeline and expanded to fit tightly against said pipeline by the use of water or steam pressure. The resin system shall then be cured by elevating the temperature of the fluid used for the inflation to a sufficient enough level for the initiators in the resin to effect a thermosetting reaction.

1.02 REFERENCES:

- A. This specification references standards from the American Society for Testing and Materials, such as: ASTM F1216 (Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube), ASTM F1743 (Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)), ASTM D5813 (Cured-in-Place Thermosetting Resin Sewer Pipe), ASTM D790 (Test Methods for Flexural Properties of Un-reinforced and Reinforced Plastics and Electrical Insulating Materials), and D2990 (Tensile, Compressive, and Flexural Creep and Creep-Rupture of 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.

1.03 QUALIFICATIONS:

- A. The system proposed (materials, methods, workmanship) must be proven through previous successful installations to an extent and nature satisfactory to the OWNER and the ENGINEER that is commensurate with the size of the project being proposed. Since CIPP is intended to have a 50-year design life, only products deemed to have this performance will be accepted.
- B. Products and Installers seeking approval must meet all of the following criteria to be deemed commercially acceptable:
1. For a Product to be considered Commercially Proven, a minimum of 500,000 linear feet and/or 1000 line sections must have been successfully installed. The Manufacturer (Licensor) shall have completed sufficient enough testing to document that the materials and the method(s) of installation proposed will produce the desired long-term performance.
 2. For an Installer to be considered Commercially Proven, the Installer must satisfy all insurance, financial, and bonding requirements of the OWNER, and must have at least five years active experience in the commercial installation of the product bid. The Installer's key personnel shall have at least 250,000 linear feet and/or 500 line sections of successful experience (included in this experience shall be a sufficient quantity of installations in the sizes proposed for this project).
 3. The CONTRACTOR shall submit the following information:
 - a. Manufacturer's certification that the materials to be used meet the referenced standards and these specifications.
 - b. License or certificate verifying Manufacturer's/Licensor's approval of the installer.
 - c. Proposed equipment and procedures for accomplishing the work.
 - d. Lining Manufacturer's product data and instructions for resin and catalyst system.
 - e. Design Calculations for wall thickness designs. To be completed by an ENGINEER proficient in the design of pipeline systems.

PART 2 - PRODUCTS

2.01 Liner:

- A. The liner shall consist of one or more layers of a flexible needled felt or an equivalent nonwoven material, capable of carrying resin and withstanding the installation pressures and curing temperatures. The tube should be compatible with the resin system to be used on this project. The material should be able to stretch to fit irregular pipe sections and negotiate bends.
1. The liner should be fabricated to a size that, when installed, will tightly fit the internal circumference and the length of the original conduit. Allowances should be made for the longitudinal and circumferential stretching that occurs during placement of the tube.
 2. The liner shall be uniform in thickness and when subjected to the installation pressures will meet or exceed the designed finish wall thickness. The minimum wall thickness for an 8" pipe shall be 6 millimeters.
 3. Any plastic film applied to the liner on what will become the interior wall of the finished CIPP shall be compatible with the resin system used, translucent enough that the resin is clearly visible, and shall be firmly bonded to the felt material.
 4. The liner shall be marked for distance at regular intervals along its entire length, not to exceed 5 feet. Such markings shall also include the lining manufacturer's name or identifying symbol.
 5. The wall color of the interior pipe surface of CIPP after installation shall be a relatively light reflective color so that a clear detailed examination with closed circuit television inspection equipment may be made.
 6. Seams in the Tube shall be stronger than the non-seamed felt material.

2.02 RESIN:

- A. The Resin System. The resin system shall be a corrosion resistant polyester, vinyl ester, or epoxy and catalyst system that when properly cured meets the minimum requirements given herein or those that are to be utilized in the design of the CIPP for this project.

2.03 STRUCTURAL REQUIREMENTS:

- A. The design thickness of the liner shall be arrived at using standard engineering methodology. ASTM F1216, Appendix X1, has such an acceptable methodology that may be used where applicable. The long-term flexural modulus to be used in the design shall be verified through testing. The long-term modulus shall not exceed 50% of the short-term value for the resin system unless the tube contains reinforcements. In the event that a reinforced tube is utilized, the long-term flexural modulus shall be the percentage of the short-term modulus as determined by the above referenced testing.
- B. The layers of the finished 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 such that the knife blade moves freely between the layers. If separation of the layers occurs during testing of the field samples, new samples will be cut from the work. Any reoccurrence may be cause for rejection of the work.
- C. The finished CIPP shall fit tightly in the host pipeline at all observable points and shall meet or exceed the minimum thickness established by the design process. The materials properties of the finished CIPP shall meet or exceed the following structural standards:

MINIMUM PHYSICAL PROPERTIES				
Property	ASTM Test Method	Polyester System	Filled Polyester System	Vinyl Ester System
Flexural Strength	D790	4,500 psi	4,500 psi	5,000 psi
Flexural Modulus (Initial)	D790	250,000 psi	400,000 psi	300,000 psi
Flexural Modulus (50 Yr)	D790	125,000 psi	200,000 psi	150,000 psi
Tensile Strength	D638	3,000 psi	3,000 psi	4,000 psi

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. The CIPP shall be installed in accordance with the practices given in ASTM F1216 for direct inversion installations. The quantity of resin used for the tube's impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances being made for polymerization shrinkage and the anticipated loss of any resin through cracks and irregularities in the original pipe wall. A vacuum impregnation process shall be used in conjunction with a roller system to achieve a uniform distribution of the resin throughout the tube.
- B. Temperature gauges shall be placed at the upstream and downstream ends of the reach being lined to monitor the heated water or steam temperature. In addition to monitoring the temperature inside the tube, temperature gauges shall be placed between the host pipe and the liner at as many points as is practical to record the heating that takes place on the outside of the liner.
- C. Curing of the resin system shall be as per the Manufacturer (Licensor) of the CIPP product. The temperatures achieved and the duration of holding the pressurized fluid at those temperatures shall be per the Manufacturer's (Licensor's) established procedures.

3.02 INSTALLATION RESPONSIBILITIES:

- A. It shall be the responsibility of the OWNER to locate and designate all manhole access points open and accessible for the work, and to provide rights of access to these points. If a street must be closed to traffic because of the orientation of the pipeline, the CONTRACTOR shall institute the actions necessary to do this. The OWNER shall also provide free access to water hydrants for cleaning, installation of the tube, and other work items requiring water.
- B. The CONTRACTOR shall preform cleaning of all pipelines before installation of the CIPP. This will consist of high pressure water jetting in accordance with Section 31 01 30 – Cleaning and Video Inspection of Underground Piping. If the cleaning does not expose 90% of the original cross sectional area of the pipe, further cleaning will be required prior to installation of the CIPP.
- C. The CONTRACTOR, when required, shall remove all internal debris out of the pipeline that will interfere with the installation of the CIPP. The CONTRACTOR shall provide a dumpsite for all debris removed during the cleaning operations. Unless stated otherwise, it is assumed that 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 encountered during this project will be considered as a changed condition.
- D. Experienced personnel trained in locating breaks, obstacles, and service connections by close circuit television shall perform inspection of the pipelines. All inspection shall be performed in accordance with Section 31 01 30 – Cleaning and Video Inspection of Underground Piping. The interior of the pipeline shall be carefully inspected to determine the location of any conditions that may prevent proper installation of the CIPP into the pipelines, and it shall be noted so that these conditions may be corrected.
- E. 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 installation process, 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.
- F. The CONTRACTOR shall make every effort to maintain service usage throughout the duration of the project. In the event that a service will be temporarily out of service, the maximum amount of time of no service shall be 16 hours for any property served by the sewer. The CONTRACTOR shall be required to notify the OWNER and all affected properties whose service laterals will be out of commission and to advise against water usage until the sewer main is back in service. Such

notification shall be provided to the Utility Department at least one week prior to service disconnecting.

- G. 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:
1. Written notice to be delivered to each home or business describing the work, schedule, how it affects them, and a local telephone number of the CONTRACTOR they can call to discuss the project or any problems that could arise.
 2. Personal contact and attempted written notice the day prior to the beginning of work being conducted on the section relative to the residents affected.
 3. Personal contact with any home or business that cannot be reconnected within the time stated in the written notice.
- H. After the installation and curing of the CIPP, all existing laterals will be reopened or reinstated to the sewer main. This will be done by a robotic camera and cutter. The edges of the liner for all laterals reinstated shall be brushed smooth to minimize the likelihood of blockage at the reinstated lateral connection.
- I. All sewer with a CIPP liner installed shall be televised after the construction to ensure proper curing and coverage of the sewer. The television inspection should comply with Section 31 01 30 -- Cleaning and Video Inspection of Underground Piping. All videos will be submitted to the OWNER before payment will be made for the CIPP work.

3.03 QUALITY ASSURANCE PROCEDURES:

- A. The CONTRACTOR shall prepare restrained samples for each installation of CIPP. A log book for the samples shall be maintained by the CONTRACTOR at the job site. The log book shall also contain the liner cure records associated with each CIPP installation and sample. The samples shall be properly labeled and presented to the ENGINEER on a weekly basis for confirmation. ENGINEER shall initial the log book entry to confirm that the sample was taken. The restrained samples shall be delivered to a third party testing laboratory by the CONTRACTOR whereupon they shall be tested for thickness and initial physical properties. Cure records and test reports shall be compiled by the CONTRACTOR and organized in the log book for viewing by OWNER and ENGINEER and five copies of the log book with cure records and test reports shall be delivered to the ENGINEER upon completion of the sewer pipe lining. CONTRACTOR shall be responsible for all costs associated with the sample taking, recording, handling, transportation, testing, reporting and preparation of the log book.
- B. In addition to physically sampling the finished CIPP, the CONTRACTOR shall post-TV the completed work. The television inspection should be used to confirm tightness of the fit of the CIPP to the host pipe and to identify any imperfections. The finished liner shall be continuous over its entire length and be free from visual defects such as foreign inclusions, dry spots, pinholes, and delamination. Record video of finished liner shall conform to the requirements of Section 33 01 30 - Inspection of Underground Piping.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. This section includes the work required for water transmission and distribution mains, valves, structures, and appurtenant work.

1.02 SUBMITTALS:

- A. Submit the following in accordance with SECTION 01 33 00 - SUBMITTALS.
1. Product data on joint restraints, valves, hydrants, and service fittings.
 2. Details for each connection to existing water main.
 3. Proposed equipment and method for flushing, pressure testing, leakage testing, and chlorination.
- B. Report witness measurements on valves, fittings and curb boxes.
1. Provide measurements from three permanent fixtures such as building corners, power poles and trees 8-inch diameter and larger.
- C. Provide certifications on pipe and fittings indicating conformance to specifications prior to installation.

1.03 JOB CONDITIONS:

- A. Interrupting Water Service:
1. Scheduling: Obtain OWNER's approval prior to interruption of service.
 2. Provide notice of 8 hours to affected occupants and 24 hours to Fire Department of time and duration.
 3. Provide stand-by service as required; outage not to exceed 4 hours.
 4. Existing valve operation shall be by OWNER'S employees only.
 5. Prevent contamination of existing water mains.
- B. Install service lines after pressure and bacteriological testing is accepted.
- C. Clean up promptly following pipe installation within maximum of 600 feet behind pipe laying operation.

PART 2 - PRODUCTS

2.01 GENERAL:

- A. Cement Lining: ANSI A 21.4 standard thickness for ductile iron pipe and fittings.
- B. Hydrant Leads: Ductile iron pipe with mechanical joints.

2.02 PIPE:

- A. PVC: Not permitted
- B. Ductile Iron: ANSI A21.50 and ANSI A21.51; ANSI/NSF Standard 61; Pressure Class 350.
- C. Prestressed Concrete Cylinder: Not permitted.
- D. Service Tubing:
1. Copper: ASTM B88, Type K annealed and soft temper.
 2. Plastic: Not permitted.

2.03 JOINTS:

- A. Ductile Iron Pipe and Fittings:
 - 1. Mechanical: AWWA/ANSI C111/A21.11.
 - 2. Push-on: AWWA/ANSI C111/A21.11.
 - 3. Maintain electrical continuity.
- C. Joint Gaskets: Conform to ANSI/AWWA C111/A21.11
 - 1. Material
 - a. Areas of Contamination: Nitrile or Fluoroelastomer (FKM).
 - b. All Other Areas: Styrene Butadiene Rubber (SBR).
- C. Restrained Ductile Iron Pipe and Fittings;
 - 1. Mechanical w/ Mega-Lug restrained joint meeting ANSI/AWWA C110/A21.10, or
 - 2. Push-on restrained gasket joint, American Fast-Grip or U.S. Pipe Field Lok 350
- D. Service Tubing and Fittings:
 - 1. Copper: Flared.

2.04 FITTINGS:

- A. Ductile Iron: AWWA/ANSI C110/A21.10, or AWWA/ANSI C153/A21.53, Class 54, 250 psi working pressure thru 12 inches and 150 psi above. Mechanical joint solid sleeves, Clow Corporation #F1012 or equal.

2.05 VALVES:

- A. Gate: AWWA C509, resilient wedge, non rising stem, fully bronze mounted with o-ring packing and roller and gear operator over 16 inches. End connections shall match pipe.
 - 1. Valves shall open counter clockwise and close clockwise.
- B. Boxes: 3 section cast iron with lid marked WATER:
 - 1. Upper section: Screw on adjoining center section and full diameter throughout.
 - 2. Center section: Minimum 5 inch inside diameter.
 - 3. Base section: Fit over valve bonnet and shaped round for valves thru 10 inch and oval for 12 inch and over.
- C. Pressure Reducing and Pressure Sustaining Valve (PR&PSV):
 - 1. Function:
 - a. Maintain pre-set downstream pressure as long as inlet-upstream pressure is above a predetermined head.
 - b. Open wide to equalize upstream-downstream pressure if upstream pressure drops below a predetermined head.
 - 2. Pressure Settings:
 - a. Minimum downstream pressure: 50 psi.
 - b. Minimum upstream pressure: 60 psi.
 - 3. Bypass Line:
 - a. Provide a piped bypass line around the PR&PSV, with gate valves to allow flow through the bypass line when the PR&PSV is removed for service or is malfunctioning. The bypass line shall be no less than 1 pipe size smaller than the water main.
 - 4. Acceptable Manufacturers and Models:
 - a. Singer Model 106-PR-RE , 8-inch.
 - b. Golden Anderson Combination Pressure Reducing and Pressure Relief Valve, Fig. #4800, 8-inch.
 - c. Engineer approved equal.

2.06 HYDRANTS:

- A. AWWA C502, mechanical joint with drain outlet, East Jordan 5-BR. Plug drain outlet.
- B. Residential: 5 inch size, 2 - 2-1/2 inch hose nozzles and 1 - 4-1/2 inch pumper nozzle.
- C. Commercial: 6 inch size with 8 inch inlet connection, 3 - 2-1/2 inch hose nozzles and 1 - 4-1/2 inch pumper nozzle.
- D. Provide National Standard Fire Hose Thread.

2.07 SERVICE FITTINGS:

- A. All fittings must be in compliance with the "low lead brass" rule that took effect January 4, 2014.
- B. Corporation Stops:
 - 1. Copper tubing: Mueller Co. P-25008N or Ford FB1000-4-NL.
- C. Curb Stops:
 - 1. Copper tubing: Mueller Co. P-15209N or Ford B-44-444-NL.
- D. Curb Boxes: Ford Arch Pattern, Catalog Number EA1-50-40-42R with Type HS Lid – 2 hole style "Erie Pattern" with block support under assembly.

2.08 MISCELLANEOUS:

- A. Service Clamps: Cast iron double strap, brass or bronze with stainless steel parts, AWWA C800 threads.
- B. Tie Rods and Clamps: Clow Corp. or Traverse City Iron Works.
- C. Plastic Seamless Encasement Tubing: use where directed by ENGINEER.
 - 1. Material: ASTM D-1248 Polyethylene, Type I, Class C, 8 mils thick, AWWA C105.
 - 2. Closing Tape: 2 inch wide Poly Ken #900 or Scotchwrap #50.
- D. Tracer wire and appurtenances.
 - 1. If nonconductive material is used for water main, a tracer wire shall be installed with the water main, and attached by an approved means to the water main at regular intervals sufficient to maintain the wire location within one pipe diameter of the main being installed.
 - 2. Tracer wire shall be Copperhead #14 CDS high strength soft drawn 250# or approved equal.
 - 3. Color of insulation shall be blue.
 - 4. Wires shall terminate in a box Valco tracer wire access box, Bingham & Taylor 2 1/2" or approved equal. Located adjacent to a fire hydrant with excess slack to access wire.
 - 5. Wire to wire connections shall be spliced with Copperhead snakebite connections rated for direct bury service.

PART 3 - EXECUTION

3.01 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 plans.
 - a. Verify location and depth of existing utilities in advance of construction and provide adjustments in alignment and grade of watermain at no additional cost to OWNER.
 - 2. Depth of pipe: Minimum cover over pipe:
 - a. 5 feet - 6 inches.
 - 3. High points in pipe line: Locate at services and hydrants.

- B. Bedding:
 - 1. Method: Article 3.05 SCHEDULES.
 - 2. Provide bedding area backfill in accordance with SECTION 31 23 00 EXCAVATING AND BACKFILLING.
 - 3. Provide continuous bearing supporting entire length of pipe barrel evenly.
- C. Cleaning Pipe and Fittings:
 - 1. General: Provide interior free of foreign material and joint surfaces free of lumps and blisters.

3.02 INSTALLATION:

- A. Install in accordance with AWWA/ANSI C600.
- B. Laying Pipe:
 - 1. Prevent entrance of foreign material and plug watertight when left unattended.
 - 2. Provide pipe length and bedding as a unit in a frost free, dry trench.
 - 3. Special supports and saddles: Article 3.05 SCHEDULES.
 - 4. Joint deflection shall be as recommended by pipe manufacturer.
 - 5. Provide minimum vertical and horizontal separation between watermain and sanitary sewer or forcemain of 18 inches and 10 feet, respectively.
- C. Cutting Pipe:
 - 1. Ductile iron: Power saw.
- D. Jointing:
 - 1. Mechanical:
 - a. Lubricate as recommended by manufacturer.
 - b. Tighten bolts evenly to 75 to 90 foot-pounds.
 - 2. Push-on:
 - a. Lubricate as recommended by manufacturer.
 - b. Shape beveling as recommended by manufacturer.
- E. Setting Valves, Fittings and Fire Hydrants:
 - 1. General: Article 3.05 SCHEDULES.
 - 2. Valves: Set plumb.
 - 3. Valve boxes:
 - a. Base section: Center and plumb over operating nut and 2 inches above bonnet joint.
 - b. Upper section: Set cover flush with finished grade.
 - c. Witnesses: Provide 3 measurements to permanent surface features.
 - 4. Pressure Reducing and Pressure Sustaining Valves:
 - a. Install in a precast concrete meter pit as shown on the construction drawings.
 - b. Set valve to pressure settings specified in Part 2 of this specification.
 - 5. Hydrants:
 - a. Connection: With ductile iron pipe and auxiliary valve.
 - b. Positioning: Plumb with pumper nozzle facing curb and nozzle centerline 20 inches above finished grade.
 - c. Install in bed of stone or pea stone sized to allow for the hydrant to completely drain after use.
 - d. Remove drain plug prior to installation in good, well draining soils, as determined by the ENGINEER. Do not remove in poor soils, high groundwater areas, or in areas of known or suspected contamination.
 - 6. Tie valves to tees and crosses and tie hydrants to valves using tie rods and retainer glands or Megalugs. Also provide concrete reaction backing as specified.
- F. Connections:
 - 1. Existing water mains:
 - a. Provide temporary support during cut-in.
 - b. Disinfect by swabbing pipe, valves and fittings with 4 percent chlorine solution.
 - c. Pressure off: Install mechanical joint solid sleeve.

- d. Pressure on: Install tapping sleeve, valve and box.
- 2. Service lines:
 - a. All lead services are to be replaced from the main, all the way to the meter.
 - b. Align at right angles to street or easement line.
 - c. Minimum depth: Same as pipe.
 - d. Curb boxes: Set plumb and provide 3 measurements to surface features.
 - e. Tapping: 45 degrees above center and provide horizontal loop at corporation stop.
 - 1. Plastic Pipe: Tap pipe using a holesaw cutter (new cutter) and double strap saddle per manufacturer's recommendation. No direct tapping allowed.
 - f. Maximum tap sizes shall be as follows:

Pipe Size

Type of Pipe (Tap)	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
Ductile CL 52 (direct)	1/2"	1"	1"	1 1/4"	1 1/2"	2"	2"	2"	2"	2"
All Pipe (w/dbl strap saddle)	1"	1 1/2"	2"	2"	2"	2"	2"	2"	2"	2"

- G. Joint Restraint
 - 1. Joints within the distances specified in the following table shall be restrained unless otherwise directed by Engineer.
 - 2. Joint Restraint Table

Pipe Size (inches)	Tees & Plugs	Hydrants & 90° Bends	45° Bends	22 1/2° Bends	11 1/2° Bends
4	22	10	4	2	1
6	31	14	6	3	1
8	40	19	8	4	2
10	48	23	9	5	2
12	57	27	11	5	3
14	65	31	13	6	3
16	74	35	15	7	3
18	82	39	16	8	4
20	90	43	18	9	4
24	103	51	21	10	5

- 3. Additional Restraint Conditions
 - a. Vertical offsets shall be restrained entirely
 - b. Hydrant lead and valve assemblies shall be restrained entirely.
 - c. Thru runs on tee assemblies may be reduced by 1/2 when preceding and following pipes are at least 10 feet from tee.
 - d. Joint restraint shall be by Mega lug or approved equal.

- G. Polyethylene Encasement: use where directed by ENGINEER.
 - 1. In corrosive soils: Install over ductile iron pipe and tape seams in accordance with AWWA C-105.
- H. Abandon existing watermain: Cut and plug existing watermain to be abandoned. Plug to be cast iron plug, or other ENGINEER approved method. Service lines, end smashed flat and rolled. Remove all valve boxes.

3.03 FIELD QUALITY CONTROL:

- A. Testing and Inspection:
 - 1. General:

- a. Supervision: By ENGINEER.
- b. Completion: Before connecting to existing line.
- c. Notification: Pretest and arrange with ENGINEER for inspection and test.
- d. Equipment and assistance: Provide.
- e. Required water: By OWNER where available from municipal system.
- 2. Pressure:
 - a. Conditions: Air or air-water methods of applying pressure prohibited.
 - b. Range: 140 to 150 psi at lowest elevation.
 - c. Duration: 1 hour and until completion of inspection.
 - d. Procedure: Fill system slowly, expel air through corporation stop at high points and apply pressure.
 - e. Inspection: Examine line and appurtenances for leaks and movement.
 - f. Corrections: Repair defects, visible leaks and repeat test until acceptable.
 - g. Applicable Standard: AWWA C-600.
 - h. Ductile Iron:
 - i. Conditions: Hydrostatically tested in accordance with AWWA C600. Air or air-water methods of applying pressure prohibited.
 - ii. Range: 140 to 150 psi at highest elevation.
 - iii. Duration: 1 hour and until completion of inspection.
 - i. HDPE:
 - i. Conditions: Hydrostatically tested in accordance with AWWA M55 and ASTM F2164. Air or air-water methods of applying pressure prohibited.
 - ii. Pressure: 150% of maximum anticipated sustained working pressure at lowest elevation in test section.
 - iii. Duration: 1 hour and until completion of inspection.
- 3. Leakage:
 - a. Sequence: Following pressure test.
 - b. Average pressure: Within pressure test range.
 - c. Duration: 2 hours.
 - d. Filling: As in pressure test.
 - e. Make-up water: Supply measured by water meter.
 - f. Leakage: Quantity of water supplied to maintain test pressure.
 - g. Allowable: Less than:

$$L = \frac{SD \times \text{square root } (P)}{148,000}$$
 where,
 L = leakage (gallons per hour).
 S = length of pipe (feet).
 D = nominal pipe diameter (inches).
 P = average test pressure (pounds per square inch gauge).
- h. Correction: Repair defects and repeat test until acceptable.
- 4. Testing valves only: Maintain pressure on main and check all valves as follows:
 - a. Vent extreme ends of main and briefly check each valve progressively back towards test point.
 - b. Allowable pressure drop shall be less than 10 psi in 5 minutes with test pump off.
 - c. Correction: Repair defects and repeat test until acceptable.
- 5. Tracing wire continuity: CONTRACTOR to test locating wire for continuity after installation and repair any breaks.

3.04 ADJUST AND CLEAN:

- A. Flushing:
 - 1. Maximum intervals: One quarter mile.
 - 2. Required water: By OWNER where and when available from municipal system. Maintain 20 psi residual pressure in existing water system.
 - 3. Sequence: Following pressure testing and prior to chlorination.
 - 4. Minimum velocity: 3 feet per second at pipe wall.
 - 5. Procedure: Provide method, materials, equipment and time schedule as approved by ENGINEER.

B. Chlorination:

1. Supervision: By ENGINEER.
2. Required water: By OWNER where available from municipal system.
3. Equipment and assistance: Provide.
4. Chlorine gas: Not permitted on jobsite.
5. Sequence: Following pressure tests and flushing and prior to connection to existing water main.
6. Retention time: 24 hours for 25 ppm chlorine.
7. Procedure: Inject chlorine solution at constant rate to produce chlorine concentration of 25 ppm residual free chlorine in pipe, operate valves and clear line of residual chlorine after retention period. Residual chlorine must be 10 ppm or higher after retention period.
8. Sampling: By OWNER, a minimum of 2 samples shall be taken 24 hours apart, every 1,200 feet of pipe.
9. Correction: Rechlorinate sections not meeting MDPH bacteriological requirements.
10. Applicable Standard: AWWA C-651.

3.05 SCHEDULES:

A. Standard Details:

1. Methods of bedding pipe
2. Hydrant Assembly

PART 1 – GENERAL

1.01 DESCRIPTION:

- A. This section includes the work required for sanitary sewer pipe, structures, and appurtenant work.

1.02 DEFINITIONS:

- A. Line and grade control terminology: SEE PLAN DETAIL.

1.03 SUBMITTALS:

- A. Submit the following in accordance with SECTION 01 33 00 – SUBMITTAL PROCEDURES:
1. Shop drawings on radius pipe.
 2. Manufacturer's air or vacuum test results on concrete pipe.
 3. Manufacturer's certificate for materials provided.
- B. Contractor shall report witness measurements and "as-built" elevation on end of service lines.
1. Provide measurements from three permanent fixtures such as building corners, power poles and trees 8-inch diameter and larger.
- C. Report presence of underground utilities and drains.

1.04 JOB CONDITIONS:

- A. Maintain existing sanitary sewer system operational.
- B. Do not bypass wastewater to ground or surface waters.
- C. Install service lines as pipe laying progresses and within maximum of 600 feet of mainline sewer installation.
- D. Cleanup promptly following pipe installation and within maximum of 400 feet behind pipe laying operation.
- E. Connections to existing system shall be made via core connections at manholes with rubber boot.
- F. Existing Manhole castings shall remain the property of the Owner.

PART 2 - PRODUCTS

2.01 PIPE:

- A. Classification Table:

Type and Size	Design Depth (feet)		
	D1 5-10	D2 10-15	D3 over 15
Plastic (PVC) 6" - 18"	ASTM D 3034-SDR35	ASTM D 3034-SDR35	ASTM D 3034-SDR26

- B. Service Pipe (laterals): Provide minimum 6 inch.
1. Plastic (PVC) ASTM D3034 – SDR 35 or 26 (match mainline sewer)
- C. Plastic Pipe: Provide seating marks where couplings are used for jointing.
1. Joints: Provide rubber "o" ring.
- D. Joint Repair or Connecting to Existing Sewer Pipe of Different Material:

1. Provide Fernco adapter coupling and stainless steel bands.
- F. Provide Joint Materials as Indicated for the Following Pipes:
 1. Plastic (PVC): ASTM D3034.
- 2.02 MANHOLES:
 - A. Manholes shall be precast units.
 - B. Precast Units: ASTM C478, modified for "o" ring gaskets.
 1. Pipe Openings: Provide flexible, watertight rubber boot using mechanically compressed flexible joint; Press Seal, Pressure Wedge II, Kor-N-Seal, or equal. Conform to ASTM C923.
 - C. Concrete: 3,500 psi 28 day, 4-inch maximum slump.
 - D. Concrete Brick: ASTM C55, Grade N-1
 - E. Grade Rings: ASTM C478. Note: Ladtech HDPE adjusting rings are a suitable alternate.
 - 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.
 2. Dimensions: 10-inch deep by 10-inch wide, 5-inch tread depth.
 - H. Manhole Castings, in un paved areas: East Jordan 1040, cover A, standard frame or Neenah R-1769-A; with letter S or labeled SEWER
 - I. Manhole Casting in paved areas: EJIW SELFLEVEL Assembly (00303411, 00302417, and 1040A cover).
 - J. Bituminous Waterproofing: ASTM D449.

PART 3 - EXECUTION

- 3.01 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:
 - a. Check grade: at set-up point, 25 feet, 50 feet, 100 feet and 200 foot points thereafter to the next set-up point.
 - b. Projector advancement: Reset at each manhole.
 - B. Bedding:
 1. Method: Bed sanitary sewer pipe in accordance with SECTION 31 23 00 EXCAVATION AND FILL and PLANS.
 2. Provide bedding area backfill in accordance with SECTION 31 23 00 EXCAVATION AND FILL and PLANS.
 3. Provide continuous bearing by supporting entire length of pipe barrel evenly.
 - C. Flow Channel/Bench:
 1. Provide concrete flow channel(s) in all manholes.
 2. Flow channel height must be to the crown of the pipe.
 3. All benches must be sloped toward the flow channel(s) no less than 1/2" per foot.
- 3.02 INSTALLATION:

- A. Laying Pipe:
1. Direction shall be upstream with spigot or tongue end downstream and bell end upstream.
 2. Joints shall be smooth and clean.
 3. Place pipe length and bedding as a unit in a frost free, dry trench.
 4. Special supports and saddles: SEE PLAN DETAILS.
- 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. General: SEE PLAN DETAILS.
 2. Base bedding: Provide 4" stone with full and even bearing on undisturbed frost-free dry subgrade.
 3. Fill joint space completely and trowel between sections of precast units.
 4. Grout annular space between manhole wall and flow channel and pipe.
 5. Provide casting grade setting as follows:
 - a. Existing pavement: Finished grade.
 - b. Gravel or lawn grade: 4 inches below.
 - c. Unpaved areas: Finished grade.
 6. Provide waterproofing on ASTM C478 manholes:
 - a. Bituminous: apply prior to delivery to site, 1 gallon per 100 s.f. to outside free of holidays and open pin holes.
 7. Provide flexible seal on all penetrations install seal material shall be in accordance with the manufacturer's instructions.
 8. Outside drop connection required for drop of 2 feet or more. SEE PLAN DETAILS.
- D. Abandoning and Filling Existing Sanitary Sewer and Manholes:
1. Pipe: Plug ends of pipe and fill with flowable fill.
 2. Manhole: Remove top 3 feet of manhole, plug pipe openings and fill manhole 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 core drilling an opening in the side of the manhole and inserting a flexible manhole connection meeting ASTM C923 to receive sewer pipe.
 - a. Relay and repoint loose blocks and bricks on existing block and brick structures. Re-channel flowlines and benches with concrete.
 - b. System carrying wastewater: by-pass pumping as necessary to complete work.
 3. Future Sanitary Sewer: Provide the following:
 - a. Plug: Pipe 4 inch through 21 inch with standard disc.
 - b. Bulkhead: Pipe 24 inch and larger with brick and mortar and 1/2 inch plaster coat outside.
 - (1) 24 inch - 36 inch: 4 inch thick.
 - (2) 42 inch - 60 inch: 8 inch thick.
- F. Service Lines (laterals):
1. Align at right angles to street or easement line.
 2. Grade: Provide at uniform rate from connection or main riser to the property or easement line, minimum 1/8 inch per foot. (1%)
 3. Provide minimum depth at street right-of-way line, property line, or easement line as follows:
 - a. Standard house with basement: 12 feet below first floor elevation.
 - b. Tri-level house: 4 feet below basement floor elevation.
 - c. House with walkout basement: 5 feet below basement floor elevation.
 - d. Commercial and industrial buildings, schools, churches: As determined in field by ENGINEER.
 - e. The above depths govern, except that the minimum depth at the right-of-way line or property line shall be 10 feet below street or easement centerline grade unless

- otherwise permitted by ENGINEER. Property line riser excluded from this requirement.
4. Connection fitting:
 - a. Locate as directed by ENGINEER in field.
 - b. 45 degrees or 60 degrees Wyes: Provide on all pipe except concrete pipe.
 - c. Tees: Allowed only lateral cleanout.
 - d. Lateral Cleanout: install at each property approximately in the same location as existing.
 5. Mainline riser will be allowed where cover exceeds 13 feet at mainline, and meets R.O.W. requirements.
 6. Plugging: Provide standard plugs or caps securely blocked.
 7. Markers: Provide 1/2" * 12" steel rod, extended from lateral marker at invert to 4 inches below grade.
 8. Witnesses: Report the following to the ENGINEER:
 - a. Wyes and Tee: Measurement to nearest downstream manhole.
 - b. Markers: 3 measurements to permanent surface features.
 9. Property line riser: Provide on all services. SEE PLAN DETAILS.
- G. Bypass Pumping: Provide temporary bypass pumping of wastewater flow as required during construction or replacement of sanitary sewer. See SECTION 01 57 20
- H. Pipe Insulation: Where noted on Drawings, place insulation board 4 feet wide over pipe at top of bedding.

3.03 TESTING AND INSPECTION:

- A. General:
1. Supervision: By ENGINEER.
 2. Testing: Perform upon completion and before connecting to active system.
 3. 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.
- B. Line and grade: Allowable drift between structures from proposed alignment will be as follows.
1. Line:
 - a. Thru 36 inch: 0.20 foot.
 - b. Over 36 inch: 0.40 foot.
 2. Grade:
 - a. Thru 36 inch: 0.02 foot.
 - b. Over 36 inch: 0.05 foot.
- C. Plastic pipe deformation testing is required for all flexible pipe:
1. Pipe deflection will be limited to 5 percent of diameter. Pipe with deflection greater than 5% shall be excavated and corrected or replaced.
 2. Pull GO, NO-GO type gauge through pipe. SEE PLAN DETAILS.
 3. Schedule: Conduct after final backfill has been in place a minimum of thirty (30) days, and after shutdown of dewatering operation.
 4. At the discretion of ENGINEER, no go may be omitted if video indicates no deflection.
- D. Video Televising (See SECTION 33 01 30 Cleaning and Video Inspection of Underground Utilities):
1. CONTRACTOR shall complete video televising of new sewers prior to acceptance.
 2. The sewers and manholes to be televised shall be cleaned completely free of debris prior to televising. Flush sewer with flow of water from upstream end immediately prior to televising.
 3. CONTRACTOR shall provide three (3) copies of televising in CD/DVD format, and written inspection logs/report to ENGINEER.
- E. Leakage Testing is required for all pipe.
1. Acceptable leakage will be as follows:
 - a. Water:

Less than 100 gallons per inch of pipe diameter per mile of pipe per 24 hours. (test permitted only when service laterals are not present, and approved by ENGINEER).

- b. Air: Holding time not less than that listed in table. SEE PLAN DETAILS.
- 2. Correction: Repair defects and repeat test until acceptable.
 - a. Method of repairing defects shall be approved by ENGINEER.

3.04 ADJUST AND CLEAN:

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

3.05 SCHEDULES:

- A. Exfiltration Air Test Table.

EXFILTRATION AIR TEST

TIME REQUIRED FOR LOSS OF PRESSURE FROM 3.5 PSIG TO 2.5 PSIG FOR SIZE AND LENGTH
OF PIPE INDICATED FOR Q = 0.0015 (CU. FT./MIN./SQ. FT. OF INTERNAL SURFACE AREA)

Pipe Diam- eter (in.)	Mini- mum time (min: sec.)	Length for Mini- mum Time (ft.)	Time for Longer length (sec.)	Specification Time for Length (L) Shown (min:sec)							
				100ft	150ft	200ft	250ft	300ft	350ft	400ft	450ft
4	3:46	597	0.380L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	0.854L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

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

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. This section includes work required for storm sewer pipe, structures, culverts, under drains, drain excavation, cleanouts, and related work.

1.02 DEFINITIONS:

- A. Line and grade control terminology: SEE PLAN DETAILS
- B. Standard manhole unit: Depth of 12 feet or less, from top of casting to lowest invert.
- C. Additional manhole depth: Depth in excess of 12 feet.

1.03 SUBMITTALS:

- A. Submit the following in accordance with SECTION 01 33 00 – SUBMITTAL PROCEDURES.
- B. Notify ENGINEER on presence of wastewater:
- C. Line and grade control method other than Laser Beam shall be approved by ENGINEER.
- D. Contractor shall provide witness measurements and "as-built" elevation on end of storm laterals.
1. Provide measurements from three permanent fixtures such as building corners, power poles and trees 8-inch diameter and larger where shown on the drawings.

1.04 JOB CONDITIONS:

- A. Maintain existing storm sewer operational.
- B. Install service lines, catch basins and inlet leads as pipe laying progresses and within maximum of 600 feet of mainline sewer installation.
- C. Clean-up promptly following pipe installation and within maximum of 400 feet behind pipe laying operation.
- D. Connections to existing manholes and catch basins shall be made via core drilling.
- E. Existing castings removed from service shall remain the property of the Owner.

PART 2 – PRODUCTS

2.01 PIPE:

- A. Concrete Pipe Classification Table:

Type and Size	Design Depth (feet)		
	3-10	10-19	Over 19
Reinforced Concrete 12" - 54"	ASTM C-76 Class III	ASTM C-76 Class III	ASTM C-76 Class IV
Reinforced Concrete 60" - 90"	ASTM C-76 Class II	ASTM C-76 Class III	ASTM C-76 Class IV

- B. Reinforcement: Concrete pipe reinforcing shall be circular.

- C. Corrugated Metal Pipe (Culverts): MDOT 909.05.A.
 - D. Footing Drains:
 - 1. PVC: ASTM D 3034-SDR 35 with premium joints.
 - 2. Fittings: Connect to storm sewer with tee or Kor-N-Tee connector (flexible rubber boot) or equal.
 - E. Underdrains:
 - 1. Perforated HDPE with geotextile covering ("sock"): AASHTO M252, 6 inch diameter. Joints shall use couplers. Geotextile covering shall overlap and be secured by an approved means.
 - F. Chlorinated Poly Vinyl Chloride (CPVC): AASHTO 304 tested per MTM 728.
 - G. High Density Polyurethane (HDPE): Smooth lined corrugated meeting AASHTO M 294
 - 1. Manufacturers: ADS N-12 WT IB, or Hancor Hi-Q WT
 - 2. Allowed only where depth of cover is >3 ft. to 16 ft.
 - H. Storm Laterals (6"): PVC pipe, ASTM D3034 SDR 35.
 - I. Driveway culverts: Meet MDOT 401 driveway culvert class F, With metal end sections regardless of selected pipe material.
- 2.02 STANDARD JOINTS: Not used
- 2.03 PREMIUM JOINTS:
- A. Concrete: ASTM C443, modified to include "O"-rings on grooved pipe ends. .
 - B. HDPE: AASHTO M252 or M 294, ASTM D3212.
 - C. Corrugated Metal:
 - 1. Coupling bands. Same as standard joints.
 - 2. Waterproofing materials: 3/8" Neoprene, solid.
 - 3. Neoprene width: 7" for 12" bands and 12" for 24" bands.
- 2.04 PIPE FITTINGS:
- A. Storm lateral connections to concrete pipe: Kor-N-Tee, NPC Products.
 - B. PE reducing tees: Same classification as pipe. Utilize Fernco adapter coupling for corrugated PE to PVC pipe connection.
 - C. 6" Storm Sewer Tap: Shall be a drip tight seal positively connected to both the main line storm sewer and the storm lateral.
 - 1. Inserta-tee
 - 2. Kor-N-Tee
 - 3. Or ENGINEER approved equal
- 2.05 MANHOLES, CATCH BASINS AND INLETS:
- A. Precast Units: ASTM C478 and ASTM C76 Class III.
 - 1. Joints: Cement mortar, preformed bituminous rope or "o"-ring gaskets.
 - 2. Pipe openings: Pipe diameter plus 6 inch, maximum.
 - B. Concrete: 3,500 psi 28 day, 4-inch maximum slump.
 - C. Concrete Radial Units: ASTM C139.
 - D. Grade Rings: ASTM C478.

- E. Manhole Steps:
 - 1. Plastic with 3/8 inch steel rod reinforcement.
 - 2. Dimensions: 10-inch deep by 10-inch wide, 5-inch tread depth.
 - F. Castings: East Jordan or Neenah East Jordan catalogue numbers provided for reference.
 - 1. STM 1: Frame EJIW 1205C SELFLEVEL Assembly type C cover used in paved areas
 - 2. STM 1 Frame EJIW 1120 type C cover in unpaved areas
 - 3. CB K: EJIW 7045 Frame type M2 cover use in F curb section
 - 4. CB C EJIW 7066 Frame type T1 back M2 cover use in Bit Wedge curb section
 - 5. CB E EJIW 6508 No frame "beehive"
 - 6. CB G EJIW 6517 No frame low profile dome
 - 7. CB R EJIW 1205C SELFLEVEL cover M1
- 2.06 RIPRAP:
- A. Riprap: MDOT 916.01.A through 916.01.C.
 - B. Geotextile Fabric: MDOT 910.03.B and Table 910-1.
- 2.07 PIPE INSULATION:
- A. Pipe Insulation: Closed cell extruded polystyrene 2" thick rigid board manufactured by Dow, Owens Corning, or ENGINEER approved equal.

PART 3 - EXECUTION

3.01 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. Expose existing utilities at crossings of proposed storm sewer in advance of laying pipe to verify existing depth. Advise ENGINEER of conflicts in grade and provide adjustments in grade of storm sewer at no additional cost to OWNER.
- B. Laser Beam Control:
 - 1. Check grade at set-up point, 25 feet, 50 feet, 100 feet and 200 foot points thereafter to the next set-up point.
 - 2. Laser advancement: Reset at each manhole.
- C. Bedding:
 - 1. Method: SEE PLAN DETAILS
 - 2. Provide bedding area backfill in accordance with SECTION 31 23 00 EXCAVATION AND FILL.
 - 3. Provide continuous bearing by supporting entire length of pipe barrel evenly.

3.02 INSTALLATION:

- A. Laying Pipe:
 - 1. Direction shall be upstream with spigot or tongue end downstream and bell end upstream.
 - 2. Joints shall be smooth and clean.
 - 3. Place pipe length and bedding as a unit in a frost free, dry trench.
 - 4. Special supports and saddles: SEE PLAN DETAILS

- B. Jointing:
1. Premium:
 - a. Solvents, adhesives and lubricants shall be furnished by Manufacturer.
 - b. Seating: Fully.
 - c. Gasket position: Check.
- C. Manholes, Catch Basins and Inlets:
1. General: SEE PLAN DETAILS
 2. Base bedding: Provide 4 inches of pea stone with full and even bearing in impervious soils or wet conditions. Otherwise provide on undisturbed frost-free dry subgrade.
 3. Precast: Fill joint space completely and trowel.
 4. Adjusting rings: Set in full bed of mortar, joints maximum 1/2 inch at inside face and wipe joints. Plaster coat complete interior of structure with 1/2-inch coat of cement mortar. For HDPE adjusting rings, follow manufacturers installation instructions.
 4. Provide manhole casting grade setting as follows:
 - a. Existing pavement: Finished grade.
 - b. Gravel or lawn grade: 4 inches below.
 - c. Unpaved areas: Finished grade.
 5. Provide catch basin casting grade setting as follows:
 - a. Gutter grade: 1/2 inch below.
 6. Flow Channels:
 - a. Construct with concrete up to spring line of pipe and slope benches toward center of manhole. Trowel smooth.
 - b. Provide clean, smooth, straight flow channel for mainline and laterals.
 - c. Provide smooth curvilinear flow channels for turning flows.
- D. Riprap: MDOT 813.03.E.
- E. Connections:
1. Expose existing storm sewer and structures to which the work is to be connected to confirm condition, location and elevation.
 2. Connect dissimilar pipe materials with appropriate Fernco coupling.
 3. Connect to existing storm manhole by coring for rubber boot connection, or jack hammering opening adequate to insert pipe and secure circumference of pipe with non-shrink cement mortar:
 - a. Structures: Relay and repoint loose blocks and bricks on existing block and brick structures.
 - b. Rechannel flowlines and benches with concrete, trowel smooth.
 2. Future Storm Sewer:
 - a. Bulkhead: Pipe 24 inch and larger with brick and mortar, 1/2 inch plaster outside.
 - (1) up to - 36 inch: 4 inch thick
 - (2) 42 inch - 60 inch: 8 inch thick
 - (3) 60 inch & larger: 12 inch thick
- F. Under drains: MDOT SECTION 404
- G. Pipe Insulation: Where noted on Drawings, place insulation board 4 feet wide over pipe at top of bedding.
- H. Storm Laterals: Reconnect all sump lines, roof drains, and foundation drains encountered during construction to the new storm lateral.

3.03 GENERAL CONSTRUCTION and TOLERANCES:

- A. General:
1. Coordination: By ENGINEER.
 2. Completion: Before connecting to active system.
 3. Notification: Clean and arrange with ENGINEER for inspection.
 4. Keep pipe and structures clean as work progresses.

- B. Line and Grade Tolerances: Allowable drift between structures from proposed alignment will be as follows:
1. Line:
 - a. Thru 36 inch: 0.40 foot.
 - b. Over 36 inch: 0.80 foot.
 2. Grade:
 - a. Thru 36 inch: 0.05 foot.
 - b. Over 36 inch: 0.10 foot.
- C. Plastic pipe deformation measurement (required only if video televising indicates a problem):
1. Pipe deflection will be limited to five percent (5%) of diameter.
 2. Pull Go, No-Go gauge through pipe by hand.
 3. CONTRACTOR shall provide proof ring for Go, No-Go gauge from the manufacturer.
 4. Schedule: Conduct after final backfill has been in place a minimum of thirty (30) days, and after shutdown of dewatering operation.
 5. Correction: Repair defects and retest until acceptable.
- D. Video Televising (See SECTION 33 01 30 Cleaning and Video Inspection of Underground Utilities):
1. CONTRACTOR shall complete video televising of new sewers prior to acceptance.
 2. The sewers and manholes to be televised shall be cleaned completely free of debris prior to televising. Flush sewer with flow of water from upstream end immediately prior to televising.
 3. CONTRACTOR shall provide three (3) copies of televising in CD/DVD format, and written inspection logs/report to ENGINEER.
- 3.04 ADJUST AND CLEAN:
- A. General:
1. Keep pipe and structures clean as work progresses.

END OF SECTION