

**City of Three Rivers, MI
Sewer Relocation Project
Contract 13**

2016

*Advertisement, Instruction for Bidders,
Bid, Agreement, Bonds, General and
Supplementary Conditions, and Specifications*

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PART A

BIDDING REQUIREMENTS AND CONTRACT FORM

FOREWORD

This PART includes Advertisement for Bids, Instructions to Bidders, Bid Form, Bid Bond Form, Agreement Form, Contract Bond Forms, Affidavits, and Notice to Proceed.

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ADVERTISEMENT FOR BIDS

CITY OF THREE RIVERS

METAL TECHNOLOGIES SEWER RELOCATION

Sealed Bids for Metal Technologies Sewer Relocation will be received by the City of Three Rivers, at the City Clerk's office, 333 W Michigan Ave Three Rivers, MI, until 2:00 pm, local time, on Tuesday October 11, 2016, at which time they will be publicly opened and read.

In general, the work consists of installation of approximately 250 feet of 12-inch sanitary sewer and three manholes. It also includes proper abandonment of the existing main. Project includes deep installation and dewatering.

Copies of the Bidding Documents may be examined at the Department of Public Services office located at 1015 S Lincoln Ave Three Rivers, MI 49093. A digital copy of the plans and specs are available at no charge, but you must provide your contact information to aroeth@threeriversmi.org to make sure you receive addendums.

Technical questions regarding the project should be emailed to Amy Roth at the City of Three Rivers Department of Public Services aroeth@threeriversmi.org.

The Owner has no responsibility for the accuracy, completeness or sufficiency of any bid documents obtained from any source other than the source indicated in these documents. Obtaining these documents from any other source(s) may result in obtaining incomplete and inaccurate information. Obtaining these documents from any source other than directly from the source listed herein may also result in failure to receive any addenda, corrections, or other revisions to these documents that may be issued.

Bids must be submitted on the forms bound herein, must contain the names of every person or company interested therein, and shall be accompanied by a Bid Bond in the amount of 5% of the amount bid with satisfactory corporate surety, subject to conditions provided in the Instructions to Bidders. The successful bidder will be required to furnish satisfactory Performance Bond and Maintenance and guarantee Bond in the amount of 100% of the Bid, and Labor and Material Bond in the amount of 50% of the Bid.

Any Bid may be withdrawn prior to the scheduled closing time for receipt of Bids, but no bidder shall withdraw his Bid within 60 days after the actual opening thereof.

The Owner reserves the right to reject any or all Bids, waive irregularities in any Bid, and to accept any Bid which is deemed most favorable to the Owner.

Amy Roth

DPS Director

Title

Dated: September 23, 2016

INSTRUCTIONS TO BIDDERS

1. Defined Terms

Terms used in these Instructions to Bidders, which are defined in the General Conditions, have the meanings assigned to them in the General Conditions. Certain additional terms used in these Instructions to Bidders have the meanings indicated below, which are applicable to both the singular and plural thereof.

- 1.1 Bidder - One who submits a Bid directly to Owner as distinct from a sub-bidder, who submits a bid to a Bidder.
- 1.2 Issuing Office - The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.
- 1.3 Successful Bidder - The Bidder to whom Owner (on the basis of Owner's evaluation as hereinafter provided) makes an award.

2. Copies of Bidding Documents

- 2.1 Complete sets of the Bidding Documents may be obtained as stated in the Advertisement.
- 2.2 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 2.3 Owner and Engineer in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

3. Qualifications of Bidders

To demonstrate qualifications to perform the Work, each Bidder must be prepared to submit within five days of Owner's request, written evidence, such as financial data, previous experience, present commitments, equipment manufacturers to be used, and subcontractors. Each Bid must contain evidence of Bidder's qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the Contract.

4. Examination of Contract Documents and Site

- 4.1 It is the responsibility of each Bidder before submitting a Bid:
 - 4.1.1 To examine thoroughly the Contract Documents and other related data identified in the Bidding Documents (including "technical data" referred to below);
 - 4.1.2 To visit the site to become familiar with and satisfy Bidder as to the general, local and site conditions that may affect cost, progress, performance or furnishing of the Work;
 - 4.1.3 To consider federal, state and local Laws and Regulations that may affect cost, progress, performance or furnishing of the Work;
 - 4.1.4 To study and carefully correlate Bidder's knowledge and observations with the Contract Documents and such other related data; and
 - 4.1.5 To promptly notify Owner of all conflicts, errors, ambiguities or discrepancies, which Bidder has discovered in or between the Contract Documents and such other related documents.
- 4.2 Reference is made to the Supplementary Conditions for identification of:
 - 4.2.1 Those reports of explorations and tests of subsurface conditions at or contiguous to the site, which have been utilized by Engineer in preparation of the Contract

Documents. Bidder may rely upon the general accuracy of the technical data contained in such reports but not upon other data, interpretations, opinions, or information contained in such reports or otherwise relating to the subsurface conditions at the site, nor upon the completeness thereof for the purposes of bidding or construction.

- 4.2.2 Those drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Facilities) which are at or contiguous to the site that have been utilized by Engineer in preparation of the Contract Documents. Bidder may rely upon the accuracy of the technical data contained in such drawings but not upon the completeness thereof for the purposes of bidding or construction.
- 4.2.3 Copies of such reports and drawings may be examined by any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.2 of the General Conditions has been identified and established in Paragraph SC-4.2 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion drawn from any "technical data" or any such data, interpretations, opinions or information.
- 4.3 Information and data shown or indicated in the Contract Documents with respect to Underground Facilities at or contiguous to the site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities or others, and Owner and Engineer do not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary Conditions.
- 4.4 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Contract Documents due to differing or anticipated conditions appear in Paragraphs 4.2 and 4.3 of the General Conditions.
- 4.5 Before submitting a Bid, each Bidder will be responsible to obtain such additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface, and Under-ground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences or procedures of construction to be employed by Bidder and safety precautions and programs incident thereto or which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price and other terms and conditions of the Contract Documents.
- 4.6 On request in advance, Owner will provide each Bidder access to the site to conduct such explorations, tests and studies as each Bidder deems necessary for submission of a Bid. Bidder must fill all holes and clean up and restore the site to its former condition upon completion of such explorations, investigations, tests and studies.
- 4.7 Reference is made to the Supplementary Conditions for the identification of the general nature of work that is to be performed at the site by Owner or others (such as utilities and other prime contractors) that relates to the work for which a Bid is to be submitted. On request, Owner will provide to each Bidder for examination access to or copies of Contract Documents (other than portions thereof related to price) for such work.
- 4.8 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Contract Documents and applying the specific means, methods, techniques, sequences or procedures of construction (if any) that may be shown or indicated or expressly required by the Contract Documents, that Bidder has given Engineer written notice of all conflicts,

errors, ambiguities and discrepancies that Bidder has discovered in the Contract Documents and the written resolutions thereof by Engineer is acceptable to Bidder, and that the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

- 4.9 The provisions of 4.1 through 4.8, inclusive, do not apply to Asbestos, Polychlorinated biphenyls (PCBs), Petroleum, Hazardous Waste or Radioactive Material covered by Paragraph 4.5 of the General Conditions.

5. Availability of Lands for Works, etc.

The lands upon which the Work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be provided by Contractor. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by Owner unless otherwise provided in the Contract Documents.

6. Interpretations and Addenda

- 6.1 All questions about the meaning or intent of the Bidding Documents are to be directed to Engineer. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda, mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- 6.2 Addenda may also be issued to modify the Bidding Documents as deemed advisable by Owner or Engineer.

7. Bid Security

- 7.1 Each Bid must be accompanied by Bid security made payable to Owner in an amount stated in the Advertisement and in the form of a Bid Bond (on form attached) issued by a Surety meeting the requirements of Paragraph 5.1 of the General Conditions.
- 7.2 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Agreement, furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the successful Bidder fails to execute and deliver the Agreement and furnish the required contract security within fifteen days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidder whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of the seventh day after the Effective Date of the Agreement or the time specified in the Advertisement for Bids, whereupon Bid security furnished by such Bidders will be returned. Bid security with Bids which are not competitive will be returned within seven days after the Bid opening.

8. Contract Time

The number of days within which, or the dates by which, the Work is to be substantially completed and also completed and ready for final payment (the term "Contract Times" is defined in Paragraph 1.12 of the General Conditions) are set forth in the Agreement (or incorporated therein by reference to the attached Bid Form).

9. Liquidated Damages

Provisions for liquidated damages, if any, are set forth in the Agreement.

10. Substitute and "Or-Equal" Items

The Contract, if awarded, will be on the basis of material and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute or "or-equal" items. Whenever it is indicated in the Drawings or specified in the Specifications that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement. The procedure for submittal of any such application by Contractor and consideration by Engineer is set forth in paragraphs 6.7.1., 6.7.2., and 6.7.3. of the General Conditions and may be supplemented in the General Requirements.

11. Subcontractors, Suppliers, and Others

11.1 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, and other persons and organizations (including those who are to furnish the principal items of material and equipment) to be submitted to Owner in advance of the specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after the Bid opening submit to Owner a list of all such Subcontractors, Suppliers, and other persons and organizations proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, person, or organization if requested by Owner. If Owner or Engineer who after due investigation has reasonable objection to any proposed Subcontractor, Supplier, other person, or organization, may before the Notice of Award is given request apparent Successful Bidder to submit an acceptable substitute without an increase in Bid price. If the apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, and other persons and organizations. The declining to make requested substitution will not constitute grounds for sacrificing the Bid security of any Bidder. Any Subcontractor, Supplier, other person, or organization listed and to whom Owner or Engineer does not make written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of Agreement as provided in Paragraph 6.8.2 of the General Conditions.

11.2 No Contractor shall be required to employ any Subcontractor, Supplier, other person, or organization against whom Contractor has reasonable objection.

12. Bid Form

12.1 The Bid Form is included with the Bidding Documents. Additional copies may be obtained from Engineer (or Issuing Office).

12.2 All blanks on the Bid Form must be completed by printing in ink or by typewriter. The Bid price of each item on the form must be stated in words and numerals. In case of a conflict, words will take precedence.

12.3 Bids by corporations must be executed in the corporate name by the president or a vice president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown below the signature.

12.4 Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature, and official address of the partnership must be shown below the signature.

12.5 All names must be typed or printed in blue ink below the signature.

12.6 The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which must be filled in on the Bid Form).

- 12.7 The address and telephone number for communications regarding the Bid must be shown.
- 12.8 Evidence of authority to conduct business as an out-of-state corporation in the state where the Work is to be performed shall be provided in accordance with Paragraph 3 above. State contractor license number, if any, must also be shown.
- 12.9 In all unit price items, the Bidder shall fill in the unit price bid for each item and in addition thereto make an extension based on the estimated quantities.

13. Submission of Bids

Bids shall be submitted at the time and place indicated in the Advertisement or Invitation to Bid and shall be enclosed in an opaque sealed envelope, marked with the notation "Bid Enclosed", the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted) and name and address of Bidder and accompanied by the Bid Security and other required documents. If the Bid is sent through the mail or other delivery system, the sealed opaque envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face of it.

14. Modification and Withdrawal of Bids

Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

15. Opening of Bids

Bids will be opened and (unless obviously non-responsive) read aloud publicly at the place where Bids are to be submitted. An abstract of the amounts of the base Bids and major alternates (if any) will be made available to Bidders after the opening of Bids.

16. Bids to Remain Subject to Acceptance

All bids shall remain subject to acceptance for the time stated in the Advertisement, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to that date.

17. Award of Contract

- 17.1 Owner reserves the right to reject any and all Bids, including without limitation the rights to reject any and all nonconforming, non-responsive, unbalanced or conditional Bids and to reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by the Owner. The Owner reserves the right to waive any and all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder. Discrepancies in the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of words.
- 17.2 In evaluating Bids, Owners will consider the qualifications of the Bidder, whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data as may be requested in the Bid Form or prior to the Notice of Award.
- 17.3 Owner may consider the qualifications and experience of Subcontractors, Suppliers, and other persons and organizations proposed for those portions of the Work as to which the identity of Subcontractors and other persons and organizations must be submitted as provided in the Supplementary Conditions. Owner also may consider the operating costs, maintenance requirements, performance data, and guarantees of major items of materials and equipment proposed for incorporation in the Work when such data is required to be submitted prior to Notice of Award.

- 17.4 Owner may conduct such investigations as Owner deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of Bidders, proposed Subcontractors, Suppliers, and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.
- 17.5 If the Contract is to be awarded, it will be awarded to the lowest responsive, responsible Bidder and whose evaluation by Owner indicates to Owner that the award will be in the best interests of the Project.
- 17.6 If the Contract is to be awarded, Owner will give the Successful Bidder a Notice of Award within the time stated in the Advertisement after the day of the Bid opening.

18. Contract Security

Paragraph 5.1 of the General Conditions and the Supplementary Conditions set forth Owner's requirements as to performance and other Bonds. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by performance and other bonds as required.

19. Signing of Agreement

When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by at least three unsigned counterparts of the Agreement with all other written Contract Documents attached. Within fifteen days thereafter Contractor shall sign and deliver at least three counterparts of the Agreement and attached documents to Owner with the required Bonds. Within fifteen days thereafter, Owner shall deliver one fully signed counterpart to Contractor. Each counterpart is to be accompanied by a complete set of the Drawings with appropriate identification.

20. Retainage

Provisions concerning retainage are set forth in the Agreement.

BID

CONTRACT IDENTIFICATION: City of Three Rivers, Michigan, Contract No. 13, Sanitary Sewer Relocation Project, September 20, 2016

THIS BID IS SUBMITTED TO: City of Three Rivers, 333 W. Michigan Ave., Three Rivers MI 49093

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an agreement with OWNER in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Bid Price and within the Bid Time indicated in the Agreement and in accordance with the other terms and conditions of the Contract Documents.
2. BIDDER accepts all of the terms and conditions of the Advertisement or Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the day of Bid opening. BIDDER will sign and submit the Agreement with the Bonds and other documents required by the Bidding Requirements within fifteen days after the date of OWNER's Notice of Award.
3. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:

- a. BIDDER has examined and carefully studied the Bidding Documents and the following Addenda, receipt of all which is hereby acknowledged: (List Addenda by Addendum Number and Date.)

Number	Date	Number	Date
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

- b. BIDDER has visited the site and become familiar with and is satisfied as to the general, local and site conditions that may affect cost, progress, performance and furnishing of the Work.
- c. BIDDER is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress, performance, or furnishing of the Work.
- d. BIDDER has carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.2.1 of the General Conditions. BIDDER accepts the determination set forth in paragraph SC-4.2 of the Supplementary Conditions of the extent of the "technical data" contained in such reports and drawings upon which BIDDER is entitled to rely as provided in paragraph 4.2 of the General Conditions. BIDDER acknowledges that such reports and drawings are not Contract Documents and may not be complete for BIDDER's purposes. BIDDER acknowledges that OWNER and ENGINEER do not assume responsibility for the accuracy of completeness of information and data shown or indicated in the Bidding Documents with respect to Underground Facilities at or contiguous to the site. BIDDER has obtained and carefully studied (or assumes responsibility for having done so) all such additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous

to the site or otherwise which may affect cost, progress, performance or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by BIDDER and safety precautions and program incident thereto. BIDDER does not consider that any additional examinations, investigations, explorations, tests, studies or data are necessary for the determination of this Bid for performance and furnishing of the Work in accordance with times, price and other terms and conditions of the Contract Documents.

- e. BIDDER is aware of the general nature of the Work to be performed by Owner and others at the site that relates to Work for which this Bid is submitted as indicated in the Contract Documents.
 - f. BIDDER has correlated the information known to BIDDER, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies and data with the Contract Documents.
 - g. BIDDER has given ENGINEER written notice of all conflicts, errors, ambiguities or discrepancies that BIDDER has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to BIDDER, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this Bid is submitted.
 - h. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm, or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation; BIDDER has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; BIDDER has not solicited or induced any person, firm, or corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.
4. BIDDER will complete the Work for the unit prices shown on the following pages:

BID

The items listed herein will constitute a complete Contract. A Bid must be made on each Item with no qualifying statement. Bidder acknowledges that quantities are not guaranteed and final payment will be based on actual quantities determined as provided in the Contract Documents. All specific cash allowances are included in the prices set forth below and have been computed in accordance with paragraph 1.1.8 of the General Conditions.

Item No.	Description	Estimated Amount	Unit	Unit Cost in Numbers	Unit Price in Words	Total Estimated Cost of Item
1	MOBILIZATION	1	LSUM			
2	TRAFFIC CONTROL	1	LSUM			
3	AUDIO VIDEO RECORDING	1	LSUM			
4	SURFACE REPLACEMENT	800	SYD			
13A	SANITARY SEWER REMOVAL	250	LFT			
13B	12" SANITARY SEWER – ALTERNATE A	250	LFT			
13C	18" SANITARY SEWER – ALTERNATE B	250	LFT			
14	TYPE 1 SANITARY SEWER MANHOLE	3	EACH			
16	POLLUTION CONTROL	1	LSUM			
18	CONSTRUCTION STAKING	1	LSUM			
Total Estimated Construction Cost: ALTERNATE A WITH 12" SEWER, All Items Excepting Item 13C						
Total Estimated Construction Cost: ALTERNATE B WITH 18" SEWER, All Items Excepting Item 13B						

4A. LISTED "OR-EQUAL" OR SUBSTITUTIONS

- a. The name or make of any piece of equipment or material of construction specified in Part C of the Contract Documents and identified on the Bid Substitution List shall be used in determining the base bid price. Where two or more Equipment or Product Manufacturers are named, bidders may use any of the named. Bidder may offer "Or-Equal" or substitutions for specified Equipment or Product Manufacturer, provided they name on the Bid Substitution List the "Or-Equal" or substitute offered together with the total amount to be added to, or deducted from the amount of their base bid for the corresponding project item.
- b. All provisions for review and acceptance of an offered substitute shall comply with the Contract Documents. Owner reserves the right to accept or reject any offered substitute.
- c. If the bidder names no substitute on his "Bid Substitution List" the specified Equipment or Product Manufacturers shall be used. No additional substitutes may be offered for items on the "Bid Substitution List" subsequent to the award of the Contract.
- d. Contract award shall be determined by base bid.

5. BIDDER agrees that the Work will be substantially complete and completed and ready for final payment in accordance with paragraph 14.13. of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

BIDDER accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the times specified in the Agreement.

6. The following documents are attached to and made a condition of this Bid:

- a. Required Bid Security in the form of Surety Bond.
- b. A tabulation of Subcontractors, Suppliers, and other persons and organizations required to be identified in this Bid.
- c. Required BIDDER's Qualification Statement with supporting data

7. Communications concerning this Bid shall be addressed to the address of BIDDER indicated below Bidder's signature or to the following address:

8. The terms used in this Bid which are defined in the General Conditions or Instructions will have the meanings indicated in the General Conditions or Instructions.

Submitted on _____, 20_____.

If BIDDER is:

An Individual

By _____
(Individual's Signature)

Doing business as _____

Business Address: _____

Phone No.: _____ Fax No.: _____

A Partnership

By _____
(Firm Name)

(General Partner's Signature)

(Title)

Business Address: _____

Phone No.: _____ Fax No.: _____

A Corporation

By _____
(Corporation Name)

(State of Incorporation)

(Signature of Person Authorized to Sign)

(Title)

(Corporate Seal)

Attest _____
(Secretary)

Corporate Address: _____

Phone No.: _____ Fax No.: _____

Date of Qualification to do Business is: _____

A Joint Venture

By _____
(Signature)

(Address)

By _____
(Signature)

(Address)

Phone Number and Address for Receipt of Official Communications

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above).

AGREEMENT

THIS AGREEMENT is dated as of the _____ day of _____ in the year 20____ by and between City of Three Rivers (hereinafter called OWNER) and _____(hereinafter called CONTRACTOR).

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

Article 1. WORK.

CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Installation of approximately 250 feet of 12-inch sanitary sewer main and three manholes. It also includes proper abandonment of the existing main. Project includes deep installation and dewatering.

Article 2. ENGINEER.

The Project has been designed by Jones & Henry Engineers, Ltd., who is hereinafter called ENGINEER and who is to act as OWNER's representative, assume all duties and responsibilities, and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

Article 3. CONTRACT TIMES.

- 3.1 The Work will be substantially completed within 30 days after the date when the Contract Time commences to run as provided in paragraph 2.3 of the General Conditions (no later than November 30, 2016), and completed and ready for final payment in accordance with paragraph 14.13 of the General Conditions within 60 days after the date when the Contract Time commences to run (no later than December 30, 2016).
- 3.2 Liquidated Damages. OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified in paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense and difficulties involved in proving the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER one-thousand Dollars (\$1,000.00) for each day that expires after the time specified in paragraph 3.1 for Substantial Completion until the Work is substantially complete. After Substantial Completion if CONTRACTOR shall neglect, refuse or fail to complete the remaining Work within the time specified in paragraph 3.1 for completion and readiness for final payment or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER Two-Thousand dollars (\$2,000.00) for each day that expires after the time specified in paragraph 3.1 for completion and readiness for final payment.

Article 4. CONTRACT PRICE.

OWNER shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents in current funds based on the bid prices as set forth in the conformed copy of the CONTRACTOR's Bid hereto attached.

Article 5. PAYMENT PROCEDURES.

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by ENGINEER as provided in the General Conditions.

- 5.1 Progress Payments; Retainage: OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR's Applications for Payment as recommended by ENGINEER, no more often than monthly during construction as provided in paragraphs 5.1.1. and 5.1.2. below. All such payments will be measured by the schedule of values established in paragraph 2.9 of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements.
 - 5.1.1 Prior to Substantial Completion, progress payments will be made for work completed and inventory less 10 percent retainage, less the aggregate of payments previously made and less such amounts as ENGINEER shall determine, or OWNER may withhold, in accordance with paragraph 14.7 of the General Conditions. If Work has been 50 percent completed as determined by ENGINEER, and if the character and progress of the Work have been satisfactory to OWNER and ENGINEER, OWNER on recommendation of ENGINEER, may determine that as long as the character and progress of the Work remain satisfactory to them, there will be no additional retainage on account of Work completed. Inventory includes project pay item materials and equipment not incorporated in the Work (but delivered, suitably stored and accompanied by documentation satisfactory to OWNER as provided in paragraph 14.2 of the General Conditions).
 - 5.1.2 Upon Substantial Completion, in an amount sufficient to increase total payments to CONTRACTOR to 98 percent of the Contract Price (with the balance being retainage), less such amounts as ENGINEER shall determine, or OWNER may withhold, in accordance with paragraph 14.7 of the General Conditions.
- 5.2 Final Payment. Upon final completion and acceptance of the Work in accordance with paragraph 14.13 of the General Conditions, OWNER shall pay the remainder of the Contract Price as recommended by ENGINEER as provided in said paragraph 14.13.

Article 6. INTEREST.

All moneys not paid when due is provided in Article 14 of the General Conditions shall bear interest at the maximum rate allowed by law at the place of the Project.

Article 7. CONTRACTOR'S REPRESENTATIONS.

In order to induce OWNER to enter into this Agreement CONTRACTOR makes the following representations:

- 7.1 CONTRACTOR has examined and carefully studied the Contract Documents (including the Addenda listed in paragraph 8) and the other related data identified in the Bidding Documents including "technical data."
- 7.2 CONTRACTOR has visited the site and become familiar with and is satisfied as to the general, local and site conditions that may affect cost, progress, performance or furnishing of the Work.
- 7.3 CONTRACTOR is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress, performance and furnishing of the Work.
- 7.4 CONTRACTOR has carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.2.1 of the General Conditions. CONTRACTOR accepts the

determination set forth in paragraph SC-4.2 of the Supplementary Conditions of the extent of the "technical data" contained in such reports and drawings upon which CONTRACTOR is entitled to rely as provided in paragraph 4.2 of the General Conditions. CONTRACTOR acknowledges that such reports and drawings are not Contract Documents and may not be complete for CONTRACTOR's purposes. CONTRACTOR acknowledges that OWNER and ENGINEER do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Contract Documents with respect to Underground Facilities at or contiguous to the site. CONTRACTOR has obtained and carefully studied (or assumes responsibility for having done so) all such additional supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto. CONTRACTOR does not consider that any additional examinations, investigations, explorations, tests, studies or data are necessary for the performance and furnishing of the Work at the Contract Price, within the Contract Times and in accordance with the other terms and conditions of the Contract Documents.

- 7.5 CONTRACTOR is aware of the general nature of work to be performed by OWNER and others at the site that relates to the Work as indicated in the Contract Documents.
- 7.6 CONTRACTOR has correlated the information known to CONTRACTOR, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies and data with the Contract Documents.
- 7.7 CONTRACTOR has given ENGINEER written notice of all conflicts, errors, ambiguities or discrepancies that CONTRACTOR has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing of the Work.

Article 8. CONTRACT DOCUMENTS.

The Contract Documents which comprise the entire agreement between OWNER and CONTRACTOR concerning Work consist of the following:

- 8.1 This Agreement (pages A-1 to A-5, inclusive).
- 8.2 Exhibits to this Agreement (pages A-6 through A-14).
 - 8.2.1 Performance and other Bonds, identified as Exhibits B and C and consisting of 4 pages.
- 8.3 Notice to Proceed (page A-15).
- 8.4 General Conditions (pages GC-1 to GC-42, inclusive).
- 8.5 Supplementary Conditions (pages SC-1 to SC-12, inclusive) and Additional Supplementary Conditions (Pages ASC-1 to ASC-9.)
- 8.6 Specifications bearing the title Sewer Relocation Project Contract 13 and consisting of all sections listed in table of contents thereof.
- 8.7 Drawings, consisting of a cover sheet and sheets numbered 1 through 3, inclusive with each sheet bearing the following general title:

Sanitary Sewer Relocation

Contract 13

(The Drawings are not attached to this Agreement.)

- 8.8 Addenda numbers to , inclusive.
- 8.9 CONTRACTOR's Bid (pages B-1 to B- , inclusive) marked Exhibit A.
- 8.10 The following which may be delivered or issued after the Effective Date of the Agreement and are not attached hereto: All Written Amendments and other documents amending, modifying, or supplementing the Contract Documents pursuant to paragraphs 3.5 and 3.6 of the General Conditions.

The documents listed in paragraphs 8.2 et seq. above are attached to this Agreement (except as expressly noted otherwise above).

There are no Contract Documents other than those listed above in this Article 8. The Contract Documents may only be amended, modified or supplemented as provided in paragraphs 3.5 and 3.6 of the General Conditions.

Article 9. MISCELLANEOUS.

- 9.1 Terms used in this Agreement which are defined in Article 1 of the General Conditions will have the meanings indicated in the General Conditions.
- 9.2 No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.
- 9.3 OWNER and CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect of all covenants, agreements and obligations contained in the Contract Documents.
- 9.4 Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon OWNER and CONTRACTOR, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have signed _____ copies of this Agreement. One counterpart each has been delivered to OWNER, CONTRACTOR and ENGINEER. All portions of the Contract Documents have been signed or identified by OWNER and CONTRACTOR or identified by ENGINEER on their behalf.

This Agreement will be effective on _____, 20____ (which is the Effective Date of this Agreement).

Owner

Contractor

By _____

By _____

[CORPORATE SEAL]

Attest _____

Attest _____

Address for giving notices

Address for giving notices

License No. _____

Agent for service of process:

CERTIFICATION OF FISCAL OFFICER

The undersigned, as _____ of _____ hereby certifies that funds sufficient to meet the requirement of this Contract have been lawfully appropriated for such purpose and are in the treasury, or in the process of collection.

By: _____

Title: _____

APPROVAL BY OWNER'S LEGAL OFFICER

By: _____

Title: _____

Date: _____

INSTRUCTIONS FOR EXECUTING AGREEMENT

If the Contractor is a corporation, the following certificate should be executed by an officer of the firm other than the Agreement signee:

I, _____ certify that I am the _____ of the corporation named as Contractor hereinabove; that _____ who signed the foregoing Agreement on behalf of the Contractor was then _____ of said Corporation; that said Agreement was duly signed for and in behalf of said Corporation by authority of its governing body, and is within the scope of its corporate powers.

(Corporate Seal)

If the Agreement is signed by the secretary of the corporation, the above certificate should be executed by some other officer of the corporation, under the corporate seal. In lieu of the foregoing certificate there may be attached to the Agreement copies so much of records of the corporation as will show the official character and authority of the officers signing, duly certified by the secretary or assistant secretary under the corporate seal to be true copies.

The full name and business address of the CONTRACTOR should be inserted and the Agreement should be signed with his official signature. The name of the signing party or parties should be typewritten or printed under all signatures to the Agreement.

If the CONTRACTOR should be operating as a partnership, each partner should sign the Agreement. If the Agreement be not signed by each partner, there should be attached to the Agreement a duly authenticated power of attorney evidencing the signer's (signers') authority to sign such contract for and in behalf of the partnership.

If the CONTRACTOR be an individual, the trade name (if the CONTRACTOR be operating under a trade name) should be indicated in the Agreement and the Agreement should be signed by such individual. If signed by one other than the CONTRACTOR, there should be attached to the Agreement a duly authenticated power of attorney evidencing the signer's authority to execute such Agreement for and in behalf of the CONTRACTOR.

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that _____
 _____ Contractor, as Principal and _____
 _____, as Surety, are held and firmly bound
 unto _____, hereinafter called the Owner,
 in the penal sum of _____ dollars (\$ _____), good and lawful money of
 the United States of America to be paid to said Owner, its legal representatives and assigns, for which
 payment well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors
 and assigns, and each and every one of them jointly and severally, firmly by these presents.

WHEREAS, the above-named Principal has entered into a certain written Agreement with the
 Owner, dated the _____ day of _____ A.D. 20 _____,
 for construction of work entitled _____ (hereinafter called the Contract) which Contract and
 Specifications for said work shall be deemed a part hereof as fully as if set out herein.

NOW THEREFORE, THE CONDITIONS OF THIS OBLIGATION IS SUCH, that if the said
 Principal shall well and faithfully do and perform the things agreed by him to be done and performed
 according to the terms of said Contract and shall pay all lawful claims of subcontractors, material
 suppliers, and laborers, for labor performed and materials furnished in carrying forward, performing or
 completing of the said Contract, we agreeing and assenting that this undertaking shall be for the benefit of
 any material supplier or laborer having a just claim as well as for the obligee herein, then this obligation
 shall be void, otherwise the same shall remain in full force and effect; it being expressly understood and
 agreed that the liability of the surety for any and all claims hereunder shall in no event exceed the penal
 amount of this obligation as herein stated.

The said surety, for value received, hereby stipulates and agrees that no charge, extension of time,
 alteration or addition to the terms of the Contract or to the work to be performed thereunder or the
 Specifications accompanying the same shall in any wise affect its obligations on this bond, and it does
 hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the
 Contract or to the work of the Specifications.

WITNESS our hands and seals this _____ day of _____ A.D. 20 .

Witnesses:

Printed

Signature

Principal

(Seal)

Printed

Signature

Surety

(Seal)

I hereby approve the form and correctness of the foregoing Bond.

Owner's Legal Officer

Date: _____

MAINTENANCE AND GUARANTEE BOND

KNOW ALL MEN BY THESE PRESENTS, that _____ Contractor, as Principal and _____, as Surety, are held and firmly bound unto _____, hereinafter called the Owner, in the penal sum of _____ dollars (\$ _____), good and lawful money of the United States of America to be paid to said Owner, its legal representatives and assigns, for which payment well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, and each and every one of them jointly and severally, firmly by these presents.

WHEREAS, the above-named Principal has entered into a certain written Agreement with the Owner, dated the _____ day of _____ A.D. 20 _____, for construction of work entitled _____ (hereinafter called the Contract) which Contract and Specifications for said work shall be deemed a part hereof as fully as if set out herein.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION ARE SUCH, that by and under said Contract, the above-named Principal has agreed with the Owner that for a period specified in paragraph 13.12. of the General Conditions, to keep in good order and repair any defect in all the work done under said Contract either by the Principal or his Subcontractors, or his material suppliers, that may develop during said period due to improper materials, defective equipment, workmanship or arrangements, and any other work affected in making good such imperfections, shall also be made good all without expense to the Owner, excepting only such part or parts of said work as may have been disturbed without the consent or approval of the Principal after the final acceptance of the work, and that whenever directed so to do by the Owner by notice served in writing, either personally or by mail on the Principal at _____

OR _____ legal representatives, or successors, or on the Surety at _____

WILL PROCEED at once to make such repairs as directed by said Owner; and in case of failure so to do within one week from the date of service of such notice, or within reasonable time not less than one week, as shall be fixed in said notice, then the Owner shall have the right to purchase such materials and employ such labor and equipment as may be necessary for the purpose, and to undertake, do and make such repairs, and charge the expense thereof, to and receive same from said Principal or Surety. If any repair is necessary to be made at once to protect life and property, then and in that case, the Owner may take immediate steps to repair or barricade such defects without notice to the Contractor. In such accounting, The Owner shall not be held to obtain the lowest figures for the doing of the work, or any part thereof, but all sums actually paid therefore shall be charged to the Principal or Surety. In this connection, the judgment of the Owner is final and conclusive. If the said Principal for a period specified in paragraph 13.12. of the General Conditions and, shall keep said work so constructed under said Contract in good order and repair, excepting only such part or parts of said work which may have been disturbed without the consent or approval of said Principal after the final acceptance of the same, and shall whenever notice is given as hereinbefore specified, at once proceed to make repair as in said notice directed, or shall reimburse said Owner for any expense incurred by making such repairs, should the Principal or Surety fail to do as hereinbefore specified, and shall fully indemnify, defend, and save harmless the Owner from all suits and actions for damages of every name and description brought or claimed against it for or on account of any injury or damage to person or property received or sustained by any party or parties, by or from any of the acts or omissions or through the negligence of said Principal, servants, agents, or

employees, in the prosecution of the work included in said Contract, then the above obligation shall be void, otherwise to remain in full force and effect.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed by their respective authorized officers this _____ day of _____ A.D. 20 _____.

Signed, Sealed, and Delivered

In the Presence of:

Witnesses:

_____	_____
Printed	
_____	_____ (Seal)
Signature	Principal
_____	_____
Printed	
_____	_____ (Seal)
Signature	Surety

I hereby approve the form and correctness of the foregoing Bond.

Owner's Legal Officer

Date: _____

LABOR AND MATERIAL BOND

KNOW ALL MEN BY THESE PRESENTS, that we _____

(Contractor

(Address)

Hereinafter called the Principal and _____ hereinafter called Surety, are held and firmly bound unto the _____ in the sum of _____ Dollars

(\$ _____), to the payment whereof, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

Sealed with our seals, and dated _____ day of _____ A.D. 20_____.

WHEREAS, the above-named Principal has entered into a certain written Agreement with the _____ hereinafter called the Owner, dated the _____ day of _____ A.D. 20 _____, (hereinafter called the Contract) for construction of work entitled, _____

_____ which Contract and Specifications for said work shall be deemed a part hereof as fully as if set out herein.

AND WHEREAS, this Bond is given in compliance with and subject to all the provisions and conditions of Act No. 213 of the Public Acts of Michigan, for the year 1963, as amended, same being Section 129.201 to 129.211 inclusive of the Compiled Laws of the State of Michigan for 1948.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION ARE SUCH that if the above named Principal, legal representatives, or successors shall pay or cause to be paid to all Subcontractors, persons, firms, and corporations, as the same may become due and payable all indebtedness which may arise from said Principal to a sub-contractor or party performing labor or furnishing materials, or any sub-contractor, or to any person, firm, or corporation on account of any labor performed or materials furnished in connection with the Contract, construction, and work herein referred to, then this obligation shall be void; otherwise to remain in full force and effect.

AND PROVIDED, that any changes, alterations or modifications in the terms of said Contract, or in the work to be done under it, or the giving by the Owner of any extension of time for the performance of said Contract, or any other forbearance on the part of either party to the other, or the placing of an inspector or superintendent on the work, by the Owner shall not in any way release the Principal and the Surety or either or either of them, their heirs, executors, administrators, successors or assigns from any liability hereunder, notice to the Surety of any such alterations, extensions of time or any forbearance being hereby waived.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed by their respective authorized officers this _____ day of _____ A.D. 20_____ .

Principal (Seal)

Surety (Seal)

Signed, sealed and delivered in the presence of:

I hereby approve the form and correctness of the foregoing Bond.

Owner's Legal Officer

Attest:

Date:

Bond and Surety Approved:

Title

CONTRACTOR'S AFFIDAVIT

Final Estimate

STATE OF MICHIGAN _____)

)ss.

COUNTY OF _____)

The undersigned, _____
hereby represents that on _____ it was awarded
a contract by _____
hereinafter called the Owner, to _____
_____, in accordance with terms and conditions of Contract No.

; and the undersigned further represents that the subject work has now been accomplished and the
said Contract has now been completed.

The undersigned hereby warrants and certifies that all of its indebtedness arising by reason of the
said Contract has been fully paid or satisfactorily secured; and that all claims from Subcontractors and
others for labor and material used in accomplishing the said project, as well as all other claims arising
from the performance of the said Contract, have been fully paid or satisfactorily settled. The undersigned
further agrees that, if any such claim should hereafter arise, he (it) shall assume responsibility for the
same immediately upon request to do so by the Owner.

The undersigned, for a valuable consideration, the receipt of which is hereby acknowledged, does
further hereby waive, release and relinquish any and all claims or right of lien which the undersigned now
has or may hereafter acquire upon the subject premises for labor and material used in accomplishing said
project owned by the Owner.

This affidavit is freely and voluntarily given with full knowledge of the facts, on this
_____ day of _____, A.D. 20_____.

Contractor

By: _____

Title: _____

Sworn and subscribed before me this _____ day of _____ 20_____.

Notary Public in and for

My Commission Expires: 20_____

(Seal)

CONTRACTOR'S AFFIDAVIT

Current Estimate

STATE OF MICHIGAN _____)

)ss.

COUNTY OF _____)

The undersigned, _____ hereby represents that on _____ it was awarded a contract by _____ hereinafter called the Owner, to _____, in accordance with terms and conditions of Contract No.

; and the undersigned further represents that all progress payment heretofore received from the Owner on account of the Work have been applied by the Contractor to discharge in full all of the Contractor's obligations incurred in connection with the Work covered by all prior estimates.

This affidavit is freely and voluntarily given with full knowledge of the facts, on this _____ day of _____, A.D. 20 _____.

Contractor

By: _____

Title: _____

Sworn and subscribed before me this _____ day of _____ 20 _____.

Notary Public in and for

My Commission Expires: 20_____

(Seal)

NOTICE TO PROCEED

Dated _____, 20

TO: _____

ADDRESS: _____

PROJECT: _____

OWNER'S CONTRACT NO.: _____

CONTRACT FOR: _____

You are notified that the Contract Times under the above contract will commence to run on _____, 20____. By that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 3 of the Agreement the dates of Substantial Completion and completion and readiness for final payment are _____, 20____ and _____, 20____.

Before you may start Work at the site, paragraph 2.7 of the General Conditions provides that you must deliver to the Owner (with copies to ENGINEER and other identified additional insureds) certificates of insurance which you are required to purchase and maintain in accordance with the Contract Documents.

Also before you may start any Work at the site, you must

(OWNER)

By: _____
(AUTHORIZED SIGNATURE)

(TITLE)

c: Jones & Henry Engineers, Ltd.

PART B
CONDITIONS

FOREWORD

This PART includes the General Conditions, Supplementary Conditions, and Additional Supplementary Conditions.

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GENERAL CONDITIONS

ARTICLE 1—DEFINITIONS

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

1.1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the Bidding Requirements or the Contract Documents.

1.2. *Agreement*—The written contract between OWNER and CONTRACTOR covering the Work to be performed; other Contract Documents are attached to the Agreement and made a part thereof as provided therein.

1.3. *Application for Payment*—The form accepted by ENGINEER which is to be used by CONTRACTOR in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

1.4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

1.5. *Bid*—The offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

1.6. *Bidding Documents*—The advertisement or invitation to Bid, instructions to bidders, the Bid form, and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

1.7. *Bidding Requirements*—The advertisement or invitation to Bid, instructions to bidders, and the Bid form.

1.8. *Bonds*—Performance and Payment bonds and other instruments of security.

1.9. *Change Order*—A document recommended by ENGINEER, which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

1.10. *Contract Documents*—The Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR's Bid (including documentation accompanying the Bid and any post Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Notice to Proceed, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agree-

ment, together with all Written Amendments, Change Orders, Work Change Directives, Field Orders and ENGINEER's written interpretations and clarifications issued pursuant to paragraphs 3.5, 3.6.1, and 3.6.3 on or after the Effective Date of the Agreement. Shop Drawing submittals approved pursuant to paragraphs 6.26 and 6.27 and the reports and drawings referred to in paragraphs 4.2.1.1 and 4.2.2.2 are not Contract Documents.

1.11. *Contract Price*—The moneys payable by OWNER to CONTRACTOR for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.9.1 in the case of Unit Price Work).

1.12. *Contract Times*—The numbers of days or the dates stated in the Agreement: (i) to achieve Substantial Completion, and (ii) to complete the Work so that it is ready for final payment as evidenced by ENGINEER's written recommendation of final payment in accordance with paragraph 14.13.

1.13. *CONTRACTOR*—The person, firm or corporation with whom OWNER has entered into the Agreement.

1.14. *defective*—An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty or deficient, in that it does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER's recommendation of final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial Completion in accordance with paragraph 14.8 or 14.10).

1.15. *Drawings*—The drawings which show the scope, extent and character of the Work to be furnished and performed by CONTRACTOR and which have been prepared or approved by ENGINEER and are referred to in the Contract Documents. Shop drawings are not Drawings as so defined.

1.16. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

1.17. *ENGINEER*—The person, firm or corporation named as such in the Agreement.

1.18. *ENGINEER's Consultant*—A person, firm or corporation having a contract with ENGINEER to furnish services as ENGINEER's independent professional associate or consultant with respect to the Project and who is identified as such in the Supplementary Conditions.

See SC-1.18

1.19. *Field Order*—A written order issued by ENGINEER which orders minor changes in the Work in accordance with paragraph 9.5 but which does not involve a change in the Contract Price or the Contract Times.

1.20. *General Requirements*—Sections of Division 1 of the Specifications.

1.21. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

1.22. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes and orders of any and all governmental bodies, agencies, authorities and courts having jurisdiction.

1.23. *Liens*—Liens, charges, security interests or encumbrances upon real property or personal property.

1.24. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

1.25. *Notice of Award*—The written notice by OWNER to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein, within the time specified, OWNER will sign and deliver the Agreement.

1.26. *Notice to Proceed*—A written notice given by OWNER to CONTRACTOR (with a copy to ENGINEER) fixing the date on which the Contract Times will commence to run and on which CONTRACTOR shall start to perform CONTRACTOR's obligations under the Contract Documents.

1.27. *OWNER*—The public body or authority, corporation, association, firm or person with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be provided.

1.28. *Partial Utilization*—Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.

1.29. *PCBs*—Polychlorinated biphenyls.

1.30. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Wastes and crude oils.

1.31. *Project*—The total construction of which the Work to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.

1.32. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

1.33. *Resident Project Representative*—The authorized representative of ENGINEER who may be assigned to the site or any part thereof.

1.34. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

1.35. *Shop Drawings*—All drawings, diagrams, illustrations, schedules and other data or information which are specifically prepared or assembled by or for CONTRACTOR and submitted by CONTRACTOR to illustrate some portion of the Work.

1.36. *Specifications*—Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.

1.37. *Subcontractor*—An individual, firm 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.

1.38. *Substantial Completion*—The Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER as evidenced by ENGINEER's definitive certificate of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended; or if no such certificate is issued, when the Work is complete and ready for final payment as evidenced by ENGINEER's written recommendation of final payment in accordance with paragraph 14.13. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

1.39. *Supplementary Conditions*—The part of the Contract Documents which amends or supplements these General Conditions.

1.40. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman or vendor having a direct contract with CONTRACTOR or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by CONTRACTOR or any Subcontractor.

1.41. *Underground Facilities*—All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

1.42. *Unit Price Work*—Work to be paid for on the basis of unit prices.

1.43. *Work*—The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. *Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.*

1.44. *Work Change Directive*—A written directive of CONTRACTOR, issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER, ordering an addition, deletion or revision in the Work, or responding to differing or unforeseen physical conditions under which the Work is to be performed as provided in paragraph 4.2 or 4.3 or to emergencies under paragraph 6.23. A Work Change Directive will not change the Contract Price or the Contract Times, but is evidence that the parties expect that the change directed or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times as provided in paragraph 10.2.

1.45. *Written Amendment*—A written amendment of the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the nonengineering or nontechnical rather than strictly construction-related aspects of the Contract Documents.

ARTICLE 2—PRELIMINARY MATTERS

Delivery of Bonds:

2.1. When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish in accordance with paragraph 5.1.

Copies of Documents:

See SC-2.2

Commencement of Contract Times; Notice to Proceed:

2.3. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement, or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within thirty days after the Effective Date of the Agreement. In no event will the

Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

See SC-2.3

Starting the Work:

2.4. CONTRACTOR shall start to perform the Work on the date when the Contract Times commence to run, but no Work shall be done at the site prior to the date on which the Contract Times commence to run.

Before Starting Construction:

2.5. Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error, ambiguity or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error, ambiguity or discrepancy in the Contract Documents, unless CONTRACTOR knew or reasonably should have known thereof.

2.6. Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for review:

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

2.6.2. a preliminary schedule of Shop Drawing and Sample submittals which will list each required submittal and the times for submitting, reviewing and processing such submittal;

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

See SC-2.6.

See SC-2.7.

Preconstruction Conference:

2.8. Within twenty days after the Contract Times start to run, but before any Work at the site is started, a conference

attended by CONTRACTOR, ENGINEER and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in paragraph 2.6, procedures for handling Shop Drawings and other submittals, processing Applications for Payment and maintaining required records.

Initially Acceptable Schedules:

2.9. Unless otherwise provided in the Contract Documents, at least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to review for acceptability to ENGINEER as provided below the schedules submitted in accordance with paragraph 2.6. CONTRACTOR shall have an additional ten days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to CONTRACTOR until the schedules are submitted to and acceptable to ENGINEER as provided below. The progress schedule will be acceptable to ENGINEER as providing an orderly progression of the Work to completion within any specified Milestones and the Contract Times, but such acceptance will neither impose on ENGINEER responsibility for the sequencing, scheduling or progress of the Work nor interfere with or relieve CONTRACTOR from CONTRACTOR's full responsibility therefor. CONTRACTOR's schedule of Shop Drawing and Sample submissions will be acceptable to ENGINEER as providing a workable arrangement for reviewing and processing the required submittals. CONTRACTOR's schedule of values will be acceptable to ENGINEER as to form and substance.

**ARTICLE 3—CONTRACT DOCUMENTS: INTENT,
AMENDING, REUSE**

Intent:

3.1. The Contract Documents comprise the entire agreement between OWNER and CONTRACTOR concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project.

3.2. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work, materials or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be furnished and performed whether or not specifically called for. When words or phrases which have a well-known technical or construction industry or trade meaning are used to describe Work, materials or equipment, such words or phrases shall be interpreted in accordance with that meaning. Clarifi-

cations and interpretations of the Contract Documents shall be issued by ENGINEER as provided in paragraph 9.4.

3.3. Reference to Standards and Specifications of Technical Societies; Reporting and Resolving Discrepancies:

3.3.1. Reference to standards, specifications, manuals or codes of any technical society, organization or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard, specification, manual, code or Laws or Regulations in effect at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

3.3.2. If, during the performance of the Work, CONTRACTOR discovers any conflict, error, ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such Law or Regulation applicable to the performance of the Work or of any such standard, specification, manual or code or of any instruction of any Supplier referred to in paragraph 6.5, CONTRACTOR shall report it to ENGINEER in writing at once, and, CONTRACTOR shall not proceed with the Work affected thereby (except in an emergency as authorized by paragraph 6.23) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in paragraph 3.5 or 3.6; provided, however, that CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any such conflict, error, ambiguity or discrepancy unless CONTRACTOR knew or reasonably should have known thereof.

3.3.3. Except as otherwise specifically stated in the Contract Documents or as may be provided by amendment or supplement thereto issued by one of the methods indicated in paragraph 3.5 or 3.6, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity or discrepancy between the provisions of the Contract Documents and:

3.3.3.1. the provisions of any such standard, specification, manual, code or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

3.3.3.2. the provisions of any such Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

No provision of any such standard, specification, manual, code or instruction shall be effective to change the duties and responsibilities of OWNER, CONTRACTOR or ENGINEER, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall it be effective to assign to OWNER, ENGINEER or any of ENGINEER's Consultants, agents or employees any duty or authority to supervise or direct the furnishing or

performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of paragraph 9.13 or any other provision of the Contract Documents.

3.4. Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed," "as approved" or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper" or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of ENGINEER as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate, in general, the completed Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.13 or any other provision of the Contract Documents.

Amending and Supplementing Contract Documents:

3.5. The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways:

- 3.5.1. a formal Written Amendment,
- 3.5.2. a Change Order (pursuant to paragraph 10.4), or
- 3.5.3. a Work Change Directive (pursuant to paragraph 10.1).

3.6. In addition, the requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, in one or more of the following ways:

- 3.6.1. a Field Order (pursuant to paragraph 9.5),
- 3.6.2. ENGINEER's approval of a Shop Drawing or Sample (pursuant to paragraphs 6.26 and 6.27), or
- 3.6.3. ENGINEER's written interpretation or clarification (pursuant to paragraph 9.4).

Reuse of Documents:

3.7. CONTRACTOR, and any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with OWNER (i) shall not have or acquire any title to or ownership rights in any

of the Drawings, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER or ENGINEER's Consultant, and (ii) shall not reuse any of such Drawings, Specifications, other documents or copies on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adaption by ENGINEER.

**ARTICLE 4—AVAILABILITY OF LANDS;
SUBSURFACE AND PHYSICAL
CONDITIONS; REFERENCE POINTS**

Availability of Lands:

4.1. OWNER shall furnish, as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of CONTRACTOR. Upon reasonable written request, OWNER shall furnish CONTRACTOR with a correct statement of record legal title and legal description of the lands upon which the Work is to be performed and OWNER's interest therein as necessary for giving notice of or filing a mechanic's lien against such lands in accordance with applicable Laws and Regulations. OWNER shall identify any encumbrances or restrictions not of general application but specifically related to use of lands so furnished with which CONTRACTOR will have to comply in performing the Work. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by OWNER, unless otherwise provided in the Contract Documents. If CONTRACTOR and OWNER are unable to agree on entitlement to or the amount or extent of any adjustments in the Contract Price or the Contract Times as a result of any delay in OWNER's furnishing these lands, rights-of-way or easements, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

See SC-4.1

4.2. Subsurface and Physical Conditions:

4.2.1. *Reports and Drawings:* Reference is made to the Supplementary Conditions for identification of:

4.2.1.1. *Subsurface Conditions:* Those reports of explorations and tests of subsurface conditions at or contiguous to the site that have been utilized by ENGINEER in preparing the Contract Documents; and

See SC-4.2.1.1

4.2.1.2. *Physical Conditions:* Those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site (except Underground Facilities) that have been utilized by ENGINEER in preparing the Contract Documents.

See SC-4.2.1.2 & SC-4.2.1.3

4.2.2. *Limited Reliance by CONTRACTOR Authorized; Technical Data:* CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," CONTRACTOR may not rely upon or make any claim against OWNER, ENGINEER or any of ENGINEER's Consultants with respect to:

4.2.2.1. the completeness of such reports and drawings for CONTRACTOR's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto, or

4.2.2.2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings, or

4.2.2.3. any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such data, interpretations, opinions or information.

4.2.3. *Notice of Differing Subsurface or Physical Conditions:* If CONTRACTOR believes that any subsurface or physical condition at or contiguous to the site that is uncovered or revealed either:

4.2.3.1. is of such a nature as to establish that any "technical data" on which CONTRACTOR is entitled to rely as provided in paragraphs 4.2.1 and 4.2.2 is materially inaccurate, or

4.2.3.2. is of such a nature as to require a change in the Contract Documents, or

4.2.3.3. differs materially from that shown or indicated in the Contract Documents, or

4.2.3.4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents; then

CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as permitted by paragraph 6.23), notify OWNER and ENGINEER in writing about such condition. CONTRACTOR shall not further disturb such conditions or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

4.2.4. *ENGINEER's Review:* ENGINEER will promptly review the pertinent conditions, determine the necessity of OWNER's obtaining additional exploration or tests with respect thereto and advise OWNER in writing (with a copy to CONTRACTOR) of ENGINEER's findings and conclusions.

4.2.5. *Possible Contract Documents Change:* If ENGINEER concludes that a change in the Contract Documents is required as a result of a condition that meets one or more of the categories in paragraph 4.2.3., a Work Change Directive or a Change Order will be issued as provided in Article 10 to reflect and document the consequences of such change.

4.2.6. *Possible Price and Times Adjustments:* An equitable adjustment in the Contract Price or in the Contract Times, or both, will be allowed to the extent that the existence of such uncovered or revealed condition causes an increase or decrease in CONTRACTOR's cost of, or time required for performance of, the Work; subject, however, to the following:

4.2.6.1. such condition must meet any one or more of the categories described in paragraphs 4.2.3.1 through 4.2.3.4, inclusive;

4.2.6.2. a change in the Contract Documents pursuant to paragraph 4.2.5 will not be an automatic authorization of nor a condition precedent to entitlement to any such adjustment;

4.2.6.3. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of paragraphs 9.10 and 11.9; and

4.2.6.4. CONTRACTOR shall not be entitled to any adjustment in the Contract Price or Times if;

4.2.6.4.1. CONTRACTOR knew of the existence of such conditions at the time CONTRACTOR made a final commitment to OWNER in respect of Contract Price and Contract Times by the submission of a bid or becoming bound under a negotiated contract; or

4.2.6.4.2. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test or study of the site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for CONTRACTOR prior to CONTRACTOR's making such final commitment; or

4.2.6.4.3. CONTRACTOR failed to give the written notice within the time and as required by paragraph 4.2.3.

If OWNER and CONTRACTOR are unable to agree on entitlement to or as to the amount or length of any such equitable adjustment in the Contract Price or Contract Times, a claim may be made therefor as provided in Articles 11 and 12. However, OWNER, ENGINEER and ENGINEER's Consultants shall not be liable to CONTRACTOR for any claims, costs, losses or damages sustained by CONTRACTOR on or in connection with any other project or anticipated project.

4.3. *Physical Conditions—Underground Facilities:*

4.3.1. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is based on

information and data furnished to OWNER or ENGINEER by the owners of such Underground Facilities or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

4.3.1.1. OWNER and ENGINEER shall not be responsible for the accuracy or completeness of any such information or data; and

4.3.1.2. The cost of all of the following will be included in the Contract Price and CONTRACTOR shall have full responsibility for: (i) reviewing and checking all such information and data, (ii) locating all Underground Facilities shown or indicated in the Contract Documents, (iii) coordination of the Work with the owners of such Underground Facilities during construction, and (iv) the safety and protection of all such Underground Facilities as provided in paragraph 6.20 and repairing any damage thereto resulting from the Work.

4.3.2. *Not Shown or Indicated:* If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the Contract Documents, CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by paragraph 6.23), identify the owner of such Underground Facility and give written notice to that owner and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence of the Underground Facility. If ENGINEER concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued as provided in Article 10 to reflect and document such consequences. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility as provided in paragraph 6.20. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, to the extent that they are attributable to the existence of any Underground Facility that was not shown or indicated in the Contract Documents and that CONTRACTOR did not know of and could not reasonably have been expected to be aware of or to have anticipated. If OWNER and CONTRACTOR are unable to agree on entitlement to or the amount or length of any such adjustment in Contract Price or Contract Times, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12. However, OWNER, ENGINEER and ENGINEER's Consultants shall not be liable to CONTRACTOR for any claims, costs, losses or damages incurred or sustained by CONTRACTOR on or in connection with any other project or anticipated project.

Reference Points:

4.4. OWNER shall provide engineering surveys to establish reference points for construction which in ENGINEER's judgment are necessary to enable CONTRACTOR to proceed with the Work. CONTRACTOR shall be responsible for laying out the Work, shall protect and preserve the established reference points and shall make no changes or relocations

without the prior written approval of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points by professionally qualified personnel.

4.5. Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material:

4.5.1. OWNER shall be responsible for any Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material uncovered or revealed at the site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work and which may present a substantial danger to persons or property exposed thereto in connection with the Work at the site. OWNER shall not be responsible for any such materials brought to the site by CONTRACTOR, Subcontractor, Suppliers or anyone else for whom CONTRACTOR is responsible.

4.5.2. CONTRACTOR shall immediately: (i) stop all Work in connection with such hazardous condition and in any area affected thereby (except in an emergency as required by paragraph 6.23), and (ii) notify OWNER and ENGINEER (and thereafter confirm such notice in writing). OWNER shall promptly consult with ENGINEER concerning the necessity for OWNER to retain a qualified expert to evaluate such hazardous condition or take corrective action, if any. CONTRACTOR shall not be required to resume Work in connection with such hazardous condition or in any such affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR special written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (ii) specifying any special conditions under which such Work may be resumed safely. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of such Work stoppage or such special conditions under which Work is agreed by CONTRACTOR to be resumed, either party may make a claim therefor as provided in Articles 11 and 12.

4.5.3. If after receipt of such special written notice CONTRACTOR does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then OWNER may order such portion of the Work that is in connection with such hazardous condition or in such affected area to be deleted from the Work. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a claim therefor as provided in Articles 11 and 12. OWNER may have such deleted portion of the Work performed by OWNER's own forces or others in accordance with Article 7.

4.5.4. To the fullest extent permitted by Laws and Regulations, OWNER shall indemnify and hold harmless CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's

Consultants and the officers, directors, employees, agents, other consultants and subcontractors of each and any of them from and against all claims, costs, losses and damages arising out of or resulting from such hazardous condition, provided that: (i) any such claim, cost, loss or damage 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 (ii) nothing in this subparagraph 4.5.4 shall obligate OWNER to indemnify any person or entity from and against the consequences of that person's or entity's own negligence.

4.5.5. The provisions of paragraphs 4.2 and 4.3 are not intended to apply to Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material uncovered or revealed at the site.

ARTICLE 5—BONDS AND INSURANCE

Performance, Payment and Other Bonds:

5.1. CONTRACTOR shall furnish Performance and Payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, except as provided otherwise by Laws or Regulations or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary Conditions. All Bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

See SC-5.1

5.2. If the surety on any Bond furnished by CONTRACTOR is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of paragraph 5.1, CONTRACTOR shall within ten days thereafter substitute another Bond and surety, both of which must be acceptable to OWNER.

5.3. Licensed Sureties and Insurers; Certificates of Insurance:

5.3.1. All Bonds and insurance required by the Contract Documents to be purchased and maintained by OWNER or CONTRACTOR shall be obtained from surety or insurance

companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue Bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

See SC-5.3.1.

See SC-5.3.2.

CONTRACTOR's Liability Insurance:

5.4. CONTRACTOR shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and furnished and as will provide protection from claims set forth below which may arise out of or result from CONTRACTOR's performance and furnishing of the Work and CONTRACTOR's other obligations under the Contract Documents, whether it is to be performed or furnished by CONTRACTOR, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform or furnish any of the Work, or by anyone for whose acts any of them may be liable:

5.4.1. claims under workers' compensation, disability benefits and other similar employee benefit acts;

5.4.2. claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR's employees;

5.4.3. claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR's employees;

5.4.4. claims for damages insured by customary personal injury liability coverage which are sustained: (i) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR, or (ii) by any other person for any other reason;

5.4.5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

5.4.6. 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.

The policies of insurance so required by this paragraph 5.4 to be purchased and maintained shall:

See SC-5;4.6.1.

5.4.7. through 5.4.12. deleted.

OWNER's Liability Insurance:

5.5. In addition to the insurance required to be provided by CONTRACTOR under paragraph 5.4, OWNER, at OWNER's option, may purchase and maintain at OWNER's expense OWNER's own liability insurance as will protect OWNER against claims which may arise from operations under the Contract Documents.

Property Insurance:

See SC-5.6

5.7. OWNER shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and any other persons or entities identified in the Supplementary Conditions, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

5.8. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained by OWNER in accordance with paragraphs 5.6 and 5.7 will contain a provision or endorsement that the coverage afforded will not be cancelled or materially changed or renewal refused until at least thirty days' prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with paragraph 5.11.

5.9. OWNER shall not be responsible for purchasing and maintaining any property insurance to protect the interests of CONTRACTOR, Subcontractors or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount, will be borne by CONTRACTOR, Subcontractor or others suffering any such loss and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

5.10. If CONTRACTOR requests in writing that other special insurance be included in the property insurance policies provided under paragraphs 5.6 or 5.7, OWNER shall, if possible, include such insurance, and the cost thereof will be charged to CONTRACTOR by appropriate Change Order or Written Amendment. Prior to commencement of the Work at the site, OWNER shall in writing advise CONTRACTOR whether or not such other insurance has been procured by OWNER.

See SC-5.10

5.11. Waiver of Rights:

See SC-5.11.1.

5.11.2. In addition, OWNER waives all rights against CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and the officers, directors, employees and agents of any of them, for:

5.11.2.1. loss due to business interruption, loss of use or other consequential loss extending beyond direct physical loss or damage to OWNER's property or the Work caused by, arising out of or resulting from fire or other peril, whether or not insured by OWNER; and

5.11.2.2. loss or damage to the completed Project or part thereof caused by, arising out of or resulting from fire or other insured peril covered by any property insurance maintained on the completed Project or part thereof by OWNER during partial utilization pursuant to paragraph 14.10, after substantial completion pursuant to paragraph 14.8 or after final payment pursuant to paragraph 14.13.

Any insurance policy maintained by OWNER covering any loss, damage or consequential loss referred to in this paragraph 5.11.2 shall contain provisions to the effect that in the event of payment of any such loss, damage or consequential loss the insurers will have no rights of recovery against any of CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and the officers, directors, employees and agents of any of them.

Receipt and Application of Insurance Proceeds

5.12. Any insured loss under the policies of insurance required by paragraphs 5.6 and 5.7 will be adjusted with OWNER and made payable to OWNER as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of paragraph 5.13. OWNER shall deposit in a separate account any money so received, and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof and the Work and the cost thereof covered by an appropriate Change Order or Written Amendment.

5.13. OWNER as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within fifteen days after the occurrence of loss to OWNER's exercise of this power. If such objection be made, OWNER as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, OWNER as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, OWNER as fiduciary shall give bond for the proper performance of such duties.

Acceptance of Bonds and Insurance; Option to Replace:

5.14. If either party (OWNER or CONTRACTOR) has any objection to the coverage afforded by or other provisions of the Bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within ten days after receipt of the certificates (or other evidence requested) required by paragraph 2.7. OWNER and CONTRACTOR shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the Bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent Bonds or insurance to protect such other party's interests at the expense of the party who was

required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

Partial Utilization—Property Insurance:

5.15. See SC-5.15

ARTICLE 6—CONTRACTOR'S RESPONSIBILITIES

Supervision and Superintendence:

6.1. CONTRACTOR shall supervise, inspect and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction, but CONTRACTOR shall not be responsible for the negligence of others in the design or specification of a specific means, method, technique, sequence or procedure of construction which is shown or indicated in and expressly required by the Contract Documents. CONTRACTOR shall be responsible to see that the completed Work complies accurately with the Contract Documents.

6.2. CONTRACTOR shall keep on the Work at all times during its progress a competent resident superintendent, who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the site and shall have authority to act on behalf of CONTRACTOR. All communications to the superintendent shall be as binding as if given to CONTRACTOR.

Labor, Materials and Equipment:

6.3. CONTRACTOR shall provide competent, suitably qualified personnel to survey, lay out and construct the Work as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the site. Except as otherwise required for the safety or protection of persons or the Work or property at the site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all Work at the site shall be performed during regular working hours and

CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without OWNER's written consent given after prior written notice to ENGINEER.

6.4. Unless otherwise specified in the General Requirements, CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work.

6.5. All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of OWNER. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with instructions of the applicable Supplier, except as otherwise provided in the Contract Documents.

Progress Schedule:

6.6. CONTRACTOR shall adhere to the progress schedule established in accordance with paragraph 2.9 as it may be adjusted from time to time as provided below:

6.6.1. CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.9) proposed adjustments in the progress schedule that will not change the Contract Times (or Milestones). Such adjustments will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

6.6.2. Proposed adjustments in the progress schedule that will change the Contract Times (or Milestones) shall be submitted in accordance with the requirements of paragraph 12.1. Such adjustments may only be made by a Change Order or Written Amendment in accordance with Article 12.

6.7. Substitutes and "Or-Equal" Items:

6.7.1. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be accepted by ENGINEER under the following circumstances:

6.7.1.1. *“Or-Equal”*: If in ENGINEER’s sole discretion an item of material or equipment proposed by CONTRACTOR is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by ENGINEER as an “or-equal” item, in which case review and approval of the proposed item may, in ENGINEER’s sole discretion, be accomplished without compliance with some or all of the requirements for acceptance of proposed substitute items.

6.7.1.2. *Substitute Items*: If in ENGINEER’s sole discretion an item of material or equipment proposed by CONTRACTOR does not qualify as an “or-equal” item under subparagraph 6.7.1.1, it will be considered a proposed substitute item. CONTRACTOR shall submit sufficient information as provided below to allow ENGINEER to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. The procedure for review by the ENGINEER will include the following as supplemented in the General Requirements and as ENGINEER may decide is appropriate under the circumstances. Requests for review of proposed substitute items of material or equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR. If CONTRACTOR wishes to furnish or use a substitute item of material or equipment, CONTRACTOR shall first make written application to ENGINEER for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified and be suited to the same use as that specified. The application will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice CONTRACTOR’s achievement of Substantial Completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which will be considered by ENGINEER in evaluating the proposed substitute. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute.

6.7.1.3. *CONTRACTOR’s Expense*: All data to be provided by CONTRACTOR in support of any proposed “or-equal” or substitute item will be at CONTRACTOR’s expense.

6.7.2. *Substitute Construction Methods or Procedures*: If a specific means, method, technique, sequence or procedure of

construction is shown or indicated in and expressly required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, technique, sequence or procedure of construction acceptable to ENGINEER. CONTRACTOR shall submit sufficient information to allow ENGINEER, in ENGINEER’s sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in subparagraph 6.7.1.2.

6.7.3. *Engineer’s Evaluation*: ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to paragraphs 6.7.1.2 and 6.7.2. ENGINEER will be the sole judge of acceptability. No “or-equal” or substitute will be ordered, installed or utilized without ENGINEER’s prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing. OWNER may require CONTRACTOR to furnish at CONTRACTOR’s expense a special performance guarantee or other surety with respect to any “or-equal” or substitute. ENGINEER will record time required by ENGINEER and ENGINEER’s Consultants in evaluating substitutes proposed or submitted by CONTRACTOR pursuant to paragraphs 6.7.1.2 and 6.7.2 and in making changes in the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) occasioned thereby. Whether or not ENGINEER accepts a substitute item so proposed or submitted by CONTRACTOR, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER’s Consultants for evaluating each such proposed substitute item.

Concerning Subcontractors, Suppliers and Others:

6.8.1. CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization (including those acceptable to OWNER and ENGINEER as indicated in paragraph 6.8.2), whether initially or as a substitute, against whom OWNER or ENGINEER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier or other person or organization to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

6.8.2. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers or other persons or organizations (including those who are to furnish the principal items of materials or equipment) to be submitted to OWNER in advance of the specified date prior to the Effective Date of the Agreement for acceptance by OWNER and ENGINEER, and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, OWNER’s or ENGINEER’s acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the bidding documents or the Contract Documents) of any such Subcontractor, Supplier or other person or organization so identified may be revoked on the basis of reasonable objection after due investigation, in which case CONTRACTOR shall submit an acceptable substitute, the Contract Price will be adjusted by the difference in the cost occasioned by such

substitution and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by OWNER or ENGINEER of any such Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of OWNER or ENGINEER to reject defective Work.

6.9.1. CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier or other person or organization any contractual relationship between OWNER or ENGINEER and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier or other person or organization except as may otherwise be required by Laws and Regulations.

6.9.2. CONTRACTOR shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR. CONTRACTOR shall require all Subcontractors, Suppliers and such other persons and organizations performing or furnishing any of the Work to communicate with the ENGINEER through CONTRACTOR.

See SC-6.9.3

6.10. The divisions and sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

6.11. All Work performed for CONTRACTOR by a Subcontractor or Supplier will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in paragraph 5.6 or 5.7, the agreement between the CONTRACTOR and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against OWNER, CONTRACTOR, ENGINEER, ENGINEER's Consultants and all other additional insureds for all losses and damages caused by, arising out of or resulting from any of the perils covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, CONTRACTOR will obtain the same.

Patent Fees and Royalties:

6.12. CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance

of the Work or the incorporation in the Work of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of OWNER or ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by OWNER in the Contract Documents. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants and the officers, directors, employees, agents and other consultants of each and any of them from and against all claims, costs, losses and damages arising out of or resulting from any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product or device not specified in the Contract Documents.

Permits:

6.13. Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall obtain and pay for all construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the Work, which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto such as plant investment fees.

Laws and Regulations:

6.14.1. CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to furnishing and performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither OWNER nor ENGINEER shall be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.

6.14.2. If CONTRACTOR performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, CONTRACTOR shall bear all claims, costs, losses and damages caused by, arising out of or resulting therefrom; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve CONTRACTOR of CONTRACTOR's obligations under paragraph 3.3.2.

Taxes:

6.15. CONTRACTOR shall pay all sales, consumer, use and other similar taxes required to be paid by CONTRACTOR in accordance with the Laws and Regulations of the place of

the Project which are applicable during the performance of the Work.

See SC-6.15.1

Use of Premises:

6.16. CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and Regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any adjacent land or areas, resulting from the performance of the Work. Should any claim be made by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law. CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultant and anyone directly or indirectly employed by any of them from and against all claims, costs, losses and damages arising out of or resulting from any claim or action, legal or equitable, brought by any such owner or occupant against OWNER, ENGINEER or any other party indemnified hereunder to the extent caused by or based upon CONTRACTOR's performance of the Work.

6.17. During the progress of the Work, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work CONTRACTOR shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery and surplus materials. CONTRACTOR shall leave the site clean and ready for occupancy by OWNER at Substantial Completion of the Work. CONTRACTOR shall restore to original condition all property not designated for alteration by the Contract Documents.

6.18. CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

Record Documents:

6.19. CONTRACTOR shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Change Directives, Field Orders and written interpretations and clarifications (issued pursuant to paragraph 9.4) in good order and annotated to show all changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to ENGINEER for reference. Upon completion of

the Work, these record documents, Samples and Shop Drawings will be delivered to ENGINEER for OWNER.

Safety and Protection:

6.20. CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

6.20.1. all persons on the Work site or who may be affected by the Work;

6.20.2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and

6.20.3. other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and Underground Facilities not designated for removal, relocation or replacement in the course of construction.

CONTRACTOR shall comply with all applicable Laws and Regulations of any public body having jurisdiction for safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property referred to in paragraph 6.20.2 or 6.20.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of OWNER or ENGINEER or ENGINEER's Consultant or anyone employed by any of them or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR or any Subcontractor, Supplier or other person or organization directly or indirectly employed by any of them). CONTRACTOR's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.13 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

See SC-6.20

Safety Representative:

6.21. CONTRACTOR shall designate a qualified and experienced safety representative at the site whose duties and

responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

Hazard Communication Programs:

6.22. CONTRACTOR shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the site in accordance with Laws or Regulations.

Emergencies:

6.23. In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from OWNER or ENGINEER, is obligated to act to prevent threatened damage, injury or loss. CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If ENGINEER determines that a change in the Contract Documents is required because of the action taken by CONTRACTOR in response to such an emergency, a Work Change Directive or Change Order will be issued to document the consequences of such action.

6.24. Shop Drawings and Samples:

6.24.1. CONTRACTOR shall submit Shop Drawings to ENGINEER for review and approval in accordance with the accepted schedule of Shop Drawings and Sample submittals (see paragraph 2.9). All submittals will be identified as ENGINEER may require and in the number of copies specified in the General Requirements. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to show ENGINEER the materials and equipment CONTRACTOR proposes to provide and to enable ENGINEER to review the information for the limited purposes required by paragraph 6.26.

6.24.2. CONTRACTOR shall also submit Samples to ENGINEER for review and approval in accordance with said accepted schedule of Shop Drawings and Sample submittals. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which intended and otherwise as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by paragraph 6.26. The numbers of each Sample to be submitted will be as specified in the Specifications.

6.25. Submittal Procedures:

6.25.1. Before submitting each Shop Drawing or Sample, CONTRACTOR shall have determined and verified:

6.25.1.1. all field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar information with respect thereto,

6.25.1.2. all materials with respect to intended use, fabrication, shipping, handling, storage, assembly and installation pertaining to the performance of the Work, and

6.25.1.2. all information relative to CONTRACTOR's sole responsibilities in respect of means, methods, techniques, sequences and procedures of construction and safety precautions and programs incident thereto.

CONTRACTOR shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

6.25.2. Each submittal will bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's obligations under the Contract Documents with respect to CONTRACTOR'S review and approval of that submittal.

6.25.3. At the time of each submission, CONTRACTOR shall give ENGINEER specific written notice of such variations, if any, that the Shop Drawing or Sample submitted may have from the requirements of the Contract Documents, such notice to be in a written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each Shop Drawing and Sample submitted to ENGINEER for review and approval of each such variation.

6.26. ENGINEER will review and approve Shop Drawings and Samples in accordance with the schedule of Shop Drawings and Sample submittals accepted by ENGINEER as required by paragraph 2.9. ENGINEER's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. ENGINEER's review and approval will not extend to means, methods, techniques, sequences or procedures of construction (except where a particular means, method, technique, sequence or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. CONTRACTOR shall make corrections required by ENGINEER, and shall return the required number of corrected copies of Shop Drawings and submit as required new Samples for review and approval. CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by ENGINEER on previous submittals.

6.27. ENGINEER's review and approval of Shop Drawings or Samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract

Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of submission as required by paragraph 6.25.3 and ENGINEER has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for complying with the requirements of paragraph 6.25.1.

6.28. Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submissions accepted by ENGINEER as required by paragraph 2.9, any related Work performed prior to ENGINEER's review and approval of the pertinent submittal will be at the sole expense and responsibility of CONTRACTOR.

Continuing the Work:

6.29. CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by paragraph 15.5 or as OWNER and CONTRACTOR may otherwise agree in writing.

6.30. CONTRACTOR's General Warranty and Guarantee:

6.30.1. CONTRACTOR warrants and guarantees to OWNER, ENGINEER and ENGINEER's Consultants that all Work will be in accordance with the Contract Documents and will not be *defective*. CONTRACTOR's warranty and guarantee hereunder excludes defects or damage caused by:

6.30.1.1. abuse, modification or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors or Suppliers; or

6.30.1.2. normal wear and tear under normal usage.

6.30.2. CONTRACTOR's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents:

6.30.2.1. observations by ENGINEER;

6.30.2.3. recommendation of any progress or final payment by ENGINEER;

6.30.2.3. the issuance of a certificate of Substantial Completion or any payment by OWNER to CONTRACTOR under the Contract Documents;

6.30.2.4. use or occupancy of the Work or any part thereof by OWNER;

6.30.2.5. any acceptance by OWNER or any failure to do so;

6.30.2.6. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER pursuant to paragraph 14.13;

6.30.2.7. any inspection, test or approval by others; or

6.30.2.8. any correction of *defective* Work by OWNER.

Indemnification:

6.31. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants and the officers, directors, employees, agents and other consultants of each and any of them from and against all claims, costs, losses and damages (including but not limited to all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) caused by, arising out of or resulting from the performance of the Work, provided that any such claim, cost, loss or damage: (i) 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 (ii) is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of a person or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such person or entity.

6.32. In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors or employees by any employee (or the survivor or personal representative of such employee) of CONTRACTOR, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.31 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for CONTRACTOR or any such Subcontractor, Supplier or other person or organization under workers' compensation acts, disability benefit acts or other employee benefit acts.

6.33. The indemnification obligations of CONTRACTOR under paragraph 6.31 shall not extend to the liability of ENGINEER and ENGINEER's Consultants, officers, directors, employees or agents caused by the professional negligence, errors or omissions of any of them.

Survival of Obligations:

6.34. All representations, indemnifications, warranties and guarantees made in, required by or given in accordance with

the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion and acceptance of the Work and termination or completion of the Agreement.

ARTICLE 7—OTHER WORK

Related Work at Site:

7.1. OWNER may perform other work related to the Project at the site by OWNER's own forces, or let other direct contracts therefor which shall contain General Conditions similar to these, or have other work performed by utility owners. If the fact that such other work is to be performed was not noted in the Contract Documents, then: (i) written notice thereof will be given to CONTRACTOR prior to starting any such other work, and (ii) CONTRACTOR may make a claim therefor as provided in Articles 11 and 12 if CONTRACTOR believes that such performance will involve additional expense to CONTRACTOR or requires additional time and the parties are unable to agree as to the amount or extent thereof.

7.2. CONTRACTOR shall afford each other contractor who is a party to such a direct contract and each utility owner (and OWNER, if OWNER is performing the additional work with OWNER's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly connect and coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of ENGINEER and the others whose work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other contractors.

7.3. If the proper execution or results of any part of CONTRACTOR's Work depends upon work performed by others under this Article 7, CONTRACTOR shall inspect such other work and promptly report to ENGINEER in writing any delays, defects or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of CONTRACTOR's Work. CONTRACTOR's failure so to report will constitute an acceptance of such other work as fit and proper for integration with CONTRACTOR's Work except for latent or nonapparent defects and deficiencies in such other work.

Coordination:

7.4. If OWNER contracts with others for the performance of other work on the Project at the site, the following will be set forth in Supplementary Conditions:

7.4.1. the person, firm or corporation who/will have authority and responsibility for coordination of the activities among the various prime contractors will be identified;

7.4.2. the specific matters to be covered by such authority and responsibility will be itemized; and

7.4.3. the extent of such authority and responsibilities will be provided.

See SC-7.4

Unless otherwise provided in the Supplementary Conditions, OWNER shall have sole authority and responsibility in respect of such coordination.

See SC-7.5

ARTICLE 8—OWNER'S RESPONSIBILITIES

8.1. Except as otherwise provided in these General Conditions, OWNER shall issue all communications to CONTRACTOR through ENGINEER.

8.2. In case of termination of the employment of ENGINEER, OWNER shall appoint an engineer against whom CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER.

8.3. OWNER shall furnish the data required of OWNER under the Contract Documents promptly and shall make payments to CONTRACTOR promptly when they are due as provided in paragraphs 14.4 and 14.13.

8.4. OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.4. Paragraph 4.2 refers to OWNER's identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions at the site and drawings of physical conditions in existing structures at or contiguous to the site that have been utilized by ENGINEER in preparing the Contract Documents.

8.5. Deleted

8.6. OWNER is obligated to execute Change Orders as indicated in paragraph 10.4.

8.7. OWNER's responsibility in respect of certain inspections, tests and approvals is set forth in paragraph 13.4.

8.8. In connection with OWNER's right to stop Work or suspend Work, see paragraphs 13.10 and 15.1. Paragraph 15.2 deals with OWNER's right to terminate services of CONTRACTOR under certain circumstances.

8.9. The OWNER shall not supervise, direct or have control or authority over, nor be responsible for, CONTRACTOR's means, methods, techniques, sequences or procedures of construction or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the furnishing or performance of the Work. OWNER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

8.10. OWNER'S responsibility in respect of undisclosed Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Materials uncovered or revealed at the site is set forth in paragraph 4.5.

8.11. If and to the extent OWNER has agreed to furnish CONTRACTOR reasonable evidence that financial arrangements have been made to satisfy OWNER's obligations under the Contract Documents, OWNER's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9—ENGINEER'S STATUS DURING CONSTRUCTION

OWNER's Representative:

9.1. ENGINEER will be OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as OWNER's representative during construction are set forth in the Contract Documents and shall not be extended without written consent of OWNER and ENGINEER.

Visits to Site:

9.2. ENGINEER will make visits to the site at intervals appropriate to the various stages of construction as ENGINEER deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of CONTRACTOR's executed Work. Based on information obtained during such visits and observations, ENGINEER will endeavor for the benefit of OWNER 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 generally to the Contract Documents. On the basis of such visits and on-site observations, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defective Work. ENGINEER's visits and on-site observations are subject to all the limitations on ENGINEER's authority and responsibility set forth in paragraph 9.13, and particularly, but without limitation, during or as a result of ENGINEER's on-site visits or

observations of CONTRACTOR's Work ENGINEER will not supervise, direct, control or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the furnishing or performance of the Work.

Project Representative:

9.3. If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project Representative to assist ENGINEER in providing more continuous observation of the Work. The responsibilities and authority and limitations thereon of any such Resident Project Representative and assistants will be as provided in paragraph 9.13 and in the Supplementary Conditions. If OWNER designates another representative or agent to represent OWNER at the site who is not ENGINEER's Consultant, agent or employee, the responsibilities and authority and limitations thereon of such other person will be as provided in the Supplementary Conditions.

See SC-9.3

Clarifications and Interpretations:

9.4. ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as ENGINEER may determine necessary, which shall be consistent with the intent of and reasonably inferable from Contract Documents. Such written clarifications and interpretations will be binding on OWNER and CONTRACTOR. If OWNER or CONTRACTOR believes that a written clarification or interpretation justifies an adjustment in the Contract Price or the Contract Times and the parties are unable to agree to the amount or extent thereof, if any, OWNER or CONTRACTOR may make a written claim therefor as provided in Article 11 or Article 12.

Authorized Variations in Work:

9.5. ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on OWNER and also on CONTRACTOR who shall perform the Work involved promptly. If OWNER or CONTRACTOR believes that a Field Order justifies an adjustment in the Contract Price or the Contract Times and the parties are unable to agree as to the amount or extent thereof, OWNER or CONTRACTOR may make a written claim therefor as provided in Article 11 or 12.

Rejecting Defective Work:

9.6. ENGINEER will have authority to disapprove or reject Work which ENGINEER believes to be *defective*, or

that ENGINEER believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. ENGINEER will also have authority to require special inspection or testing of the Work as provided in paragraph 13.9, whether or not the Work is fabricated, installed or completed.

Shop Drawings, Change Orders and Payments:

9.7. In connection with ENGINEER's authority as to Shop Drawings and Samples, see paragraphs 6.24 through 6.28 inclusive.

9.8. In connection with ENGINEER's authority as to Change Orders, see Articles 10, 11, and 12.

9.9. In connection with ENGINEER's authority as to Applications for Payment, see Article 14.

Determinations for Unit Prices:

9.10. ENGINEER will determine the actual quantities and classifications of Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR the ENGINEER's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). ENGINEER's written decision thereon will be final and binding upon OWNER and CONTRACTOR, unless, within ten days after the date of any such decision, either OWNER or CONTRACTOR delivers to the other and to ENGINEER written notice of intention to appeal from ENGINEER's decision and: (i) an appeal from ENGINEER's decision is taken within the time limits and in accordance with the procedures set forth in Exhibit GC-A, "Dispute Resolution Agreement," entered into between OWNER and CONTRACTOR pursuant to Article 16, or (ii) if no such Dispute Resolution Agreement has been entered into, a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction to exercise such rights or remedies as the appealing party may have with respect to ENGINEER's decision, unless otherwise agreed in writing by OWNER and CONTRACTOR. Such appeal will not be subject to the procedures of paragraph 9.11.

Decisions on Disputes:

9.11. ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work and Claims under Articles 11 and 12 in respect of changes in the Contract Price or Contract Times will be referred initially to ENGINEER in writing with a request for a formal decision in accordance with this paragraph. Written notice of each such claim, dispute or other matter will be delivered by the claimant

to ENGINEER and the other party to the Agreement promptly (but in no event later than thirty days) after the start of the occurrence or event giving rise thereto, and written supporting data will be submitted to ENGINEER and the other party within sixty days after the start of such occurrence or event unless ENGINEER allows an additional period of time for the submission of additional or more accurate data in support of such claim, dispute or other matter. The opposing party shall submit any response to ENGINEER and the claimant within thirty days after receipt of the claimant's last submittal (unless ENGINEER allows additional time). ENGINEER will render a formal decision in writing within thirty days after receipt of the opposing party's submittal, if any, in accordance with this paragraph. ENGINEER's written decision on such claim, dispute or other matter will be final and binding upon OWNER and CONTRACTOR unless: (i) an appeal from ENGINEER's decision is taken within the time limits and in accordance with the procedures set forth in EXHIBIT GC-A, "Dispute Resolution Agreement," entered into between OWNER and CONTRACTOR pursuant to Article 16, or (ii) if no such Dispute Resolution Agreement has been entered into, a written notice of intention to appeal from ENGINEER's written decision is delivered by OWNER or CONTRACTOR to the other and to ENGINEER within thirty days after the date of such decision and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction to exercise such rights or remedies as the appealing party may have with respect to such claim, dispute or other matter in accordance with applicable Laws and Regulations within sixty days of the date of such decision, unless otherwise agreed in writing by OWNER and CONTRACTOR.

9.12. When functioning as interpreter and judge under paragraphs 9.10 and 9.11, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to paragraphs 9.10 or 9.11 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.16) will be a condition precedent to any exercise by OWNER or CONTRACTOR of payment as provided in paragraph 14.15) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter pursuant to Article 16.

9.13.1. Neither ENGINEER's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise or performance of any authority or responsibility by ENGINEER shall create, impose or give rise to any duty owed by ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, any other person or organization, or to any surety for or employee or agent of any of them.

9.13.2. ENGINEER will not supervise, direct, control or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the furnishing or performance of the Work. ENGINEER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

9.13.3. ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

9.13.4. ENGINEER's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds and certificates of inspection, tests and approvals and Other documentation required to be delivered by paragraph 14.12 will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests and approvals that the results certified indicate compliance with, the Contract Documents.

9.13.5. The limitations upon authority and responsibility set forth in this paragraph 9.13 shall also apply to ENGINEER's Consultants, Resident Project Representative and assistants.

ARTICLE 10—CHANGES IN THE WORK

10.1. Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions or revisions in the Work. Such additions, deletions or revisions will be authorized by a Written Amendment, a Change Order, or a Work Change Directive. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

10.2. If OWNER and CONTRACTOR are unable to agree as to the extent, if any, of an adjustment in the Contract Price or an adjustment of the Contract Times that should be allowed as a result of a Work Change Directive, a claim may be made therefor as provided in Article 11 or Article 12.

10.3. CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in paragraphs 3.5 and 3.6 except in the case of an emergency as provided in paragraph 6.23 or in the case of uncovering Work as provided in paragraph 13.9.

10.4. OWNER and CONTRACTOR shall execute appropriate Change Orders recommended by ENGINEER (or Written Amendments) covering:

10.4.1. changes in the Work which are (i) ordered by OWNER pursuant to paragraph 10.1, (ii) required because of acceptance of *defective* Work under paragraph 13.13 or correcting *defective* Work under paragraph 13.14, or (iii) agreed to by the parties;

10.4.2. changes in the Contract Price or Contract Times which are agreed to by the parties; and

10.4.3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 9.11;

provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in paragraph 6.29.

10.5. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR's responsibility, and the amount of each applicable Bond will be adjusted accordingly.

ARTICLE 11—CHANGE OF CONTRACT PRICE

11.1. The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to CONTRACTOR for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR shall be at CONTRACTOR's expense without change in the Contract Price.

11.2. The Contract Price may only be changed by a Change Order or by a Written Amendment. Any claim for an adjustment in the Contract Price shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the start of the occurrence or event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within sixty days after the start of such occurrence or event (unless ENGINEER allows additional time for claimant to submit additional or more accurate data in support of the claim) and shall be accompanied by claimant's written statement that the adjustment claimed covers all known amounts to which the claimant is entitled as a result of said occurrence or event. All claims for adjustment in the Contract Price shall be determined by ENGINEER in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree on the amount involved. No claim for an adjustment in the Contract Price will

be valid if not submitted in accordance with this paragraph 11.2.

11.3. The value of any Work covered by a Change Order or of any claim for an adjustment in the Contract Price will be determined as follows:

See SC-11.3

11.3.1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of paragraphs 11.9.1 through 11.9.3, inclusive);

11.3.2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 11.6.2);

11.3.3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under paragraph 11.3.2, on the basis of the Cost of the Work (determined as provided in paragraphs 11.4 and 11.5) plus a CONTRACTOR's fee for overhead and profit (determined as provided in paragraph 11.6).

Cost of the Work:

11.4. The term Cost of the Work means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in paragraph 11.5:

11.4.1. Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by OWNER and CONTRACTOR. Such employees shall include without limitation superintendents, foremen and other personnel employed full-time at the site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work after regular working hours, on Saturday, Sunday or legal holidays, shall be included in the above to the extent authorized by OWNER.

11.4.2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to CONTRACTOR unless OWNER deposits funds with CONTRACTOR with which to make payments, in which case the

cash discounts shall accrue to OWNER. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to OWNER, and CONTRACTOR shall make provisions so that they may be obtained.

11.4.3. Payments made by CONTRACTOR to the Subcontractors for Work performed or furnished by Subcontractors. If required by OWNER, CONTRACTOR shall obtain competitive bids from subcontractors acceptable to OWNER and CONTRACTOR and shall deliver such bids to OWNER who will then determine, with the advice of ENGINEER, which bids, if any, will be accepted. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work Plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as CONTRACTOR's Cost of the Work and fee as provided in paragraphs 11.4, 11.5, 11.6 and 11.7. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.

11.4.4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys and accountants) employed for services specifically related to the Work.

11.4.5. Supplemental costs including the following:

11.4.5.1. The proportion of necessary transportation, travel and subsistence expenses of CONTRACTOR's employees incurred in discharge of duties connected with the Work.

11.4.5.2. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost less market value of such items used but not consumed which remain the property of CONTRACTOR.

11.4.5.3. Rentals of all construction equipment and machinery and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements approved by OWNER with the advice of ENGINEER, and the costs of transportation, loading, unloading, installation, dismantling and removal thereof—all in accordance with the terms of said rental agreements. The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the Work.

11.4.5.4. Sales, consumer, use or similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

11.4.5.5. Deposits lost for causes other than 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, and royalty payments and fees for permits and licenses.

11.4.5.6. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by CONTRACTOR in connection with the performance and furnishing of the Work (except losses and damages within the deductible amounts of property insurance established by OWNER in accordance with paragraph 5.9), provided they have resulted from causes other than 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. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR's fee. If, however, any such loss or damage requires reconstruction and CONTRACTOR is placed in charge thereof, CONTRACTOR shall be paid for services a fee proportionate to that stated in paragraph 11.6.2.

11.4.5.7. The cost of utilities, fuel and sanitary facilities at the site.

11.4.5.8. Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the Work.

11.4.5.9. Cost of premiums for additional Bonds and insurance required because of changes in the Work.

11.5. The term Cost of the Work shall not include any of the following:

11.5.1. Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks and other personnel employed by CONTRACTOR whether at the site or in CONTRACTOR's principal or a branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.4.1 or specifically covered by paragraph 11.4.4—all of which are to be considered administrative costs covered by the CONTRACTOR's fee.

11.5.2. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the site.

11.5.3. Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.

11.5.4. Cost of premiums for all Bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by subparagraph 11.4.5.9 above).

11.5.5. Costs 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, disposal of materials or equipment wrongly supplied and making good any damage to property.

Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 11.4.

11.6. The CONTRACTOR's fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:

11.6.1. a mutually acceptable fixed fee; or

11.6.2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

11.6.2.1. for costs incurred under paragraphs 11.4.1 and 11.4.2, the CONTRACTOR's fee shall be fifteen percent;

11.6.2.2. for costs incurred under paragraph 11.4.3, the CONTRACTOR's fee shall be five percent;

11.6.2.3. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of paragraphs 11.4.1, 11.4.2, 11.4.3 and 11.6.2 is that the Subcontractor who actually performs or furnishes the Work, at whatever tier, will be paid a fee of fifteen percent of the costs incurred by such Subcontractor under paragraphs 11.4.1 and 11.4.2 and that any higher tier Subcontractor and CONTRACTOR will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

11.6.2.4. no fee shall be payable on the basis of costs itemized under paragraphs 11.4.4, 11.4.5 and 11.5;

11.6.2.5. the amount of credit to be allowed by CONTRACTOR to OWNER for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in CONTRACTOR's fee by an amount equal to five percent of such net decrease; and

11.6.2.5. when both additions and credits are involved in any one change, the adjustment in CONTRACTOR's fee shall be computed on the basis of the net change in accordance with paragraphs 11.6.2.1 through 11.6.2.5, inclusive.

11.7. Whenever the cost of any Work is to be determined pursuant to paragraphs 11.4 and 11.5, CONTRACTOR will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

Cash Allowances:

11.8. It is understood that CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be furnished and performed for such sums as may be acceptable to OWNER and ENGINEER. CONTRACTOR agrees that:

11.8.1. the allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the site, and all applicable taxes; and

11.8.2. CONTRACTOR's costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances and no demand for additional payment on account of any of the foregoing will be valid.

Prior to final payment, an appropriate Change Order will be issued as recommended by ENGINEER to reflect actual amounts due CONTRACTOR on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.9. Unit Price Work:

11.9.1. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER in accordance with paragraph 9.10.

11.9.2. Each unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for each separately identified item.

11.9.3. See SC-11.9.3

ARTICLE 12—CHANGE OF CONTRACT TIMES

12.1. The Contract Times (or Milestones) may only be changed by a Change Order or a Written Amendment. Any claim for an adjustment of the Contract Times (or Milestones) shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within sixty days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Times (or Milestones) shall be determined by ENGINEER in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Times (or Milestones) will be valid if not submitted in accordance with the requirements of this paragraph 12.1.

12.2. All time limits stated in the Contract Documents are of the essence of the Agreement.

12.3. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost due to such delay if a claim is made therefor as provided in paragraph 12.1. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by OWNER, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions or acts of God. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

12.4. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay. In no event shall OWNER be liable to CONTRACTOR, any Subcontractor, any Supplier, any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from (i) delays caused by or within the control of CONTRACTOR, or (ii)

delays beyond the control of both parties including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God or acts or neglect by utility owners or other contractors performing other work as contemplated by Article 7.

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

13.1. *Notice of Defects:* Prompt notice of all *defective* Work of which OWNER or ENGINEER have actual knowledge will be given to CONTRACTOR. All *defective* Work may be rejected, corrected or accepted as provided in this Article 13.

Access to Work:

13.2. OWNER, ENGINEER, ENGINEER's Consultants, other representatives and personnel of OWNER, independent testing laboratories and governmental agencies with jurisdictional interests will have access to the Work at reasonable times for their observation, inspecting and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's site safety procedures and programs so that they may comply therewith as applicable.

Tests and Inspections:

13.3. CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspections, tests or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

See SC-13.4

13.4. OWNER shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

13.4.1. for inspections, tests or approvals covered by paragraph 13.5 below;

13.4.2. that costs incurred in connection with tests or inspections conducted pursuant to paragraph 13.9 below shall be paid as provided in said paragraph 13.9; and

13.4.3. as otherwise specifically provided in the Contract Documents.

13.5. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested or approved by an employee or other representative of such public body, CONTRACTOR shall assume full responsibility for arranging and obtaining such inspections, tests or approvals, pay all costs in connection therewith, and furnish ENGINEER the required certificates of inspection, or

approval. CONTRACTOR shall also be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests or approvals required for OWNER's and ENGINEER's acceptance of materials or equipment to be incorporated in the Work, or of materials, mix designs, or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work.

13.6. If any Work (or the work of others) that is to be inspected, tested or approved is covered by CONTRACTOR without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation.

13.7. Uncovering Work as provided in paragraph 13.6 shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

Uncovering Work:

13.8. If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observation and replaced at CONTRACTOR's expense.

13.9. If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, CONTRACTOR, at ENGINEER's request, shall uncover, expose or otherwise make available for observation, inspection or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is *defective*, CONTRACTOR shall pay all claims, costs, losses and damages caused by, arising out of or resulting from such uncovering, exposure, observation, inspection and testing and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, may make a claim therefor as provided in Article 11. If, however, such Work is not found to be *defective*, CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Times (or Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

OWNER May Stop the Work:

13.10. If the Work is *defective*, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, OWNER may order CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of OWNER to stop the Work

shall not give rise to any duty on the part of OWNER to exercise this right for the benefit of CONTRACTOR or any surety or other party.

Correction or Removal of Defective Work:

13.11. If required by ENGINEER, CONTRACTOR shall promptly, as directed, either correct all *defective* Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by ENGINEER, remove it from the site and replace it with Work that is not *defective*. CONTRACTOR shall pay all claims, costs, losses and damages caused by or resulting from such correction or removal (including but not limited to all costs of repair or replacement of work of others).

13.12. Correction Period:

13.12.1. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be *defective*, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions: (i) correct such *defective* Work, or, if it has been rejected by OWNER, remove it from the site and replace it with Work that is not *defective*, and (ii) satisfactorily correct or remove and replace any damage to other Work or the work of others resulting therefrom. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the *defective* Work corrected or the rejected Work removed and replaced, and all claims, costs, losses and damages caused by or resulting from such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by CONTRACTOR.

13.12.2. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Written Amendment.

13.12.3. Where *defective* Work (and damage to other Work resulting therefrom) has been corrected, removed or replaced under this paragraph 13.12, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

Acceptance of Defective Work:

13.13. If, instead of requiring correction or removal and replacement of *defective* Work, OWNER (and, prior to ENGINEER's recommendation of final payment, also ENGINEER) prefers to accept it, OWNER may do so. CONTRACTOR shall

pay all claims, costs, losses and damages attributable to OWNER's evaluation of and determination to accept such *defective* Work (such costs to be approved by ENGINEER as to reasonableness). If any such acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefor as provided in Article 11. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.

OWNER May Correct Defective Work:

13.14. If CONTRACTOR fails within a reasonable time after written notice from ENGINEER to correct *defective* Work or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.11, or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER may, after seven days' written notice to CONTRACTOR, correct and remedy any such deficiency. In exercising the rights and remedies under this paragraph OWNER shall proceed expeditiously. In connection with such corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the site, take possession of all or part of the Work, and suspend CONTRACTOR's services related thereto, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the site and incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow OWNER, OWNER's representatives, agents and employees, OWNER's other contractors and ENGINEER and ENGINEER's Consultants access to the site to enable OWNER to exercise the rights and remedies under this paragraph. All claims, costs, losses and damages incurred or sustained by OWNER in exercising such rights and remedies will be charged against CONTRACTOR and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefor as provided in Article 11. Such claims, costs, losses and damages will include but not be limited to all costs of repair or replacement of work of others destroyed or damaged by correction, removal or replacement of CONTRACTOR's *defective* Work. CONTRACTOR shall not be allowed an extension of the Contract Times (or Milestones) because of any delay in the performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies hereunder.

ARTICLE 14—PAYMENTS TO CONTRACTOR AND COMPLETION

Schedule of Values:

14.1. The schedule of values established as provided in paragraph 2.9 will serve as the basis for progress payments and

will be incorporated into a form of Application for Payment acceptable to ENGINEER. Progress payments on account of Unit Price Work will be based on the number of units completed.

Application for Progress Payment:

14.2. At least twenty days before the date established for each progress payment (but not more often than once a month), CONTRACTOR shall submit to ENGINEER for review an Application for Payment filled out and signed by CONTRACTOR covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation warranting that OWNER has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect OWNER's interest therein, all of which will be satisfactory to OWNER. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

See SC-14.2

CONTRACTOR's Warranty of Title:

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

Review of Applications for Progress Payment:

14.4. ENGINEER will, within ten days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to OWNER, or return the Application to CONTRACTOR indicating in writing ENGINEER's reasons for refusing to recommend payment. In the latter case, CONTRACTOR may make the necessary corrections and resubmit the Application. Ten days after presentation of the Application for Payment to OWNER with ENGINEER's recommendation, the amount recommended will (subject to the provisions of the last sentence of paragraph 14.7) become due and when due will be paid by OWNER to CONTRACTOR.

See SC-14.4

14.5. ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based on ENGINEER's on-site observations of the executed Work as an experienced and qualified design professional and on ENGINEER's review of the Application for Payment and the accompanying data and schedules, that to the best of ENGINEER's knowledge, information and belief:

14.5.1. the Work has progressed to the point indicated,

14.5.2. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.10, and to any other qualifications stated in the recommendation), and

14.5.3. the conditions precedent to CONTRACTOR's being entitled to such payment appear to have been fulfilled in so far as it is ENGINEER's responsibility to observe the Work.

However, by recommending any such payment ENGINEER will not thereby be deemed to have represented that: (i) exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents or (ii) that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by OWNER or entitle OWNER to withhold payment to CONTRACTOR:

14.6. ENGINEER's recommendation of any payment, including final payment, shall not mean that ENGINEER is responsible for CONTRACTOR's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the furnishing or performance of Work, or for any failure of CONTRACTOR to perform or furnish Work in accordance with the Contract Documents.

14.7. ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER's opinion, it would be incorrect to make the representations to OWNER referred to in paragraph 14.5. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

14.7.1. the Work is *defective*, or completed Work has been *damaged requiring correction or replacement*,

14.7.2. the Contract Price has been reduced by Written Amendment or Change Order,

14.7.3. OWNER has been required to correct *defective* Work or complete Work in accordance with paragraph 13.14, or

14.7.4. ENGINEER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 15.2.1 through 15.2.4 inclusive.

OWNER may refuse to make payment of the full amount recommended by ENGINEER because:

14.7.5. claims have been made against OWNER on account of CONTRACTORs performance or furnishing of the Work,

14.7.6. Liens have been filed in connection with the Work, except where CONTRACTOR has delivered a specific Bond satisfactory to OWNER to secure the satisfaction and discharge of such Liens,

14.7.7. there are other items entitling OWNER to a set-off against the amount recommended, or

14.7.8. OWNER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.7.1 through 14.7.3 or paragraphs 15.2.1 through 15.2.4 inclusive;

but OWNER must give CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action and promptly pay CONTRACTOR the amount so withheld, or any adjustment thereto agreed to by OWNER and CONTRACTOR, when CONTRACTOR corrects to OWNER's satisfaction the reasons for such action.

Substantial Completion:

14.8. When CONTRACTOR considers the entire Work ready for its intended use CONTRACTOR shall notify OWNER and ENGINEER in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, OWNER, CONTRACTOR and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. OWNER shall have seven days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not substantially complete, ENGINEER will within fourteen days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefor. If, after consideration of OWNER's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said fourteen days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. At the time of delivery of the tentative certificate of Substantial Completion ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, heat, utilities, insurance and warranties and guarantees. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform

ENGINEER in writing prior to ENGINEER's issuing the definitive certificate of Substantial Completion, ENGINEER's aforesaid recommendation will be binding on OWNER and CONTRACTOR until final payment.

14.9. OWNER shall have the right to exclude CONTRACTOR from the Work after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

Partial Utilization:

14.10. Use by OWNER at OWNER's option of any substantially completed part of the Work which: (i) has specifically been identified in the Contract Documents, or (ii) OWNER, ENGINEER and CONTRACTOR agree constitutes a separately functioning and usable part of the Work that can be used by OWNER for its intended purpose without significant interference with CONTRACTOR's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work subject to the following:

14.10.1. OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees that such part of the Work is substantially complete, CONTRACTOR will certify to OWNER and ENGINEER that such part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, OWNER, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER does not consider that part of the Work to be substantially complete, ENGINEER will notify OWNER and CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers that part of the Work to be substantially complete, the provisions of paragraphs 14.8 and 14.9 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

14.10.2. See SC-14.10.2.

Final Inspection:

14.11. Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will make a final inspection with OWNER and CONTRACTOR and will notify CONTRACTOR in writing of all

particulars in which this inspection reveals that the Work is incomplete or *defective*. CONTRACTOR shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

Final Application for Payment:

14.12. After CONTRACTOR has completed all such corrections to the satisfaction of ENGINEER and delivered in accordance with the Contract Documents all maintenance and operating instructions, schedules, guarantees, Bonds, certificates or other evidence of insurance required by paragraph 5.4, certificates of inspection, marked-up record documents (as provided in paragraph 6.19) and other documents, CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied (except as previously delivered) by: (i) all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by subparagraph 5.4.13, (ii) consent of the surety, if any, to final payment, and (iii) complete and legally effective releases or waivers (satisfactory to OWNER) of all Liens arising out of or filed in connection with the Work. In lieu of such releases or waivers of Liens and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full and an affidavit of CONTRACTOR that: (i) the releases and receipts include all labor, services, material and equipment for which a Lien could be filed, and (ii) all payrolls, material and equipment bills and other indebtedness connected with the Work for which OWNER or OWNER's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, CONTRACTOR may furnish a Bond or other collateral satisfactory to OWNER to indemnify OWNER against any Lien.

See SC-14.12

Final Payment and Acceptance:

14.13. If, on the basis of ENGINEER's observation of the Work during construction and final inspection, and ENGINEER's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within ten days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application to OWNER for payment. At the same time ENGINEER will also give written notice to OWNER and CONTRACTOR that the Work is acceptable subject to the provisions of paragraph 14.15. Otherwise, ENGINEER will return the Application to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application. Thirty days after the presentation to OWNER of the Application and accompanying documentation, in appropriate form and substance and with ENGINEER's recommendation and notice of acceptability, the amount recommended by ENGINEER will become due and will be paid by OWNER to

CONTRACTOR.

14.14. If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.1, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

Waiver of Claims:

14.15. The making and acceptance of final payment will constitute:

14.15.1. a waiver of all claims by OWNER against CONTRACTOR, except claims arising from unsettled Liens, from *defective* Work appearing after final inspection pursuant to paragraph 14.11, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from CONTRACTOR's continuing obligations under the Contract Documents; and

14.15.2. a waiver of all claims by CONTRACTOR against OWNER other than those previously made in writing and still unsettled.

ARTICLE 15—SUSPENSION OF WORK AND TERMINATION

OWNER May Suspend Work:

15.1. At any time and without cause, OWNER may suspend the Work or any portion thereof for a period of not more than ninety days by notice in writing to CONTRACTOR and ENGINEER which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if CONTRACTOR makes an approved claim therefor as provided in Articles 11 and 12.

OWNER May Terminate:

15.2. Upon the occurrence of any one or more of the following events:

15.2.1. if CONTRACTOR persistently fails to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.9 as adjusted from time to time pursuant to paragraph 6.6);

15.2.2. if CONTRACTOR disregards Laws or Regulations of any public body having jurisdiction;

15.2.2. if CONTRACTOR disregards the authority of ENGINEER; or

15.2.4. if CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents;

OWNER may, after giving CONTRACTOR (and the surety, if any,) seven days' written notice and to the extent permitted by Laws and Regulations, terminate the services of CONTRACTOR, exclude CONTRACTOR from the site and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses and damages sustained by OWNER arising out of or resulting from completing the Work such excess will be paid to CONTRACTOR. If such claims, costs, losses and damages exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such claims, costs, losses and damages incurred by OWNER will be reviewed by ENGINEER as to their reasonableness and when so approved by ENGINEER incorporated in a Change Order, provided that when exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.

15.3. Where CONTRACTOR's services have been so terminated by OWNER, the termination will not affect any rights or remedies of OWNER against CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

15.4. Upon seven days' written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy of OWNER, elect to terminate the Agreement. In such case, CONTRACTOR shall be paid (without duplication of any items):

15.4.1. for completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

15.4.2. for expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

15.4.3. for all claims, costs, losses and damages incurred in settlement of terminated contracts with Subcontractors, Suppliers and others; and

15.4.4. for reasonable expenses directly attributable to termination.

CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

CONTRACTOR May Stop Work or Terminate:

15.5. If, through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within thirty days after it is submitted or OWNER fails for thirty days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days' written notice to OWNER and ENGINEER, and provided OWNER or ENGINEER do not remedy such suspension or failure within that time, terminate the Agreement and recover from OWNER payment on the same terms as provided in paragraph 15.4. In lieu of terminating the Agreement and without prejudice to any other right or remedy, if ENGINEER has failed to act on an Application for Payment within thirty days after it is submitted, or OWNER has failed for thirty days to pay CONTRACTOR any sum finally determined to be due, CONTRACTOR may upon seven day's written notice to OWNER and ENGINEER stop the Work until payment of all such amounts due CONTRACTOR, including interest thereon. The provisions of this paragraph 15.5 are not intended to preclude CONTRACTOR from making claim under Articles 11 and 12 for an increase in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to CONTRACTOR's stopping Work as permitted by this paragraph.

ARTICLE 16- Deleted

ARTICLE 17—MISCELLANEOUS

Giving Notice:

17.1. Whenever any provision of the Contract Documents requires the giving of written notice, it will 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 delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

Computation of Times:

17.2.1. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.2.2. A calendar day of twenty-four hours measured from midnight to the next midnight will constitute a day.

Notice of Claim:

17.3. Should OWNER or CONTRACTOR suffer injury or damage to person or property because of any error, omission or

act of the other party or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The provisions of this paragraph 17.3 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose.

Cumulative Remedies:

17.4. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon CONTRACTOR by paragraphs 6.12, 6.16, 6.30, 6.31, 6.32, 13.1, 13.12, 13.14, 14.3 and 15.2 and all of the rights and remedies available to OWNER and ENGINEER thereunder, are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply.

Professional Fees and Court Costs Included:

17.5. Whenever reference is made to "claims, costs, losses and damages," it shall include in each case, but not be limited to, all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs.

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SUPPLEMENTARY CONDITIONS

FOREWORD

These Supplementary Conditions amend or supplement the General Conditions of the Construction Contract and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

SC-1. The terms used in these Supplementary Conditions, which are defined in the General Conditions, have the meanings assigned to them in the General Conditions.

SC-1.18. The following are ENGINEER's Consultants:

SC-2.2. Delete paragraph GC-2.2. in its entirety and insert the following in its place:

OWNER will furnish to CONTRACTOR three copies of the Contract Documents. Additional copies will be furnished upon request at cost of reproduction.

The Contract Documents, in electronic format (PDF) may be provided, upon request from Contractor and approval of Owner and Engineer. The Contract Documents, as printed by the Engineer, shall be the record copy and used to resolve any ambiguities or discrepancies.

SC-2.3. Amend the last sentence of paragraph GC-2.3 to read as follows:

In no event will the Contract Times commence to run later than the thirtieth day after the Effective Date of the Agreement.

SC-2.6. Add the following language following paragraph 2.6.3.

SC-2.6.3.1 Mobilization for CONTRACTOR and any tier of subcontractor(s) shall be considered collectively and shall not exceed 10 percent of the Contract Price. Mobilization shall be those costs associated with the initiation of the project and site work, including but not limited to, transporting of personnel, equipment, materials, supplies, incidental items; establishment of the field offices, temporary facilities necessary for the project, bonds and insurances, submittal requirements, permits, field supervision, final cleanup and demobilization. Mobilization does not include such items as, contract negotiations and bid preparation.

SC-2.6.3.1.1 Where the work is covered by unit price and no item has been included for mobilization as defined in SC 2.6.3.1., then this work is considered incidental to the work and will not be paid separately.

SC-2.6.3.1.2 Where the work is covered by unit prices, and item(s) for mobilization, as described in 2.6.3.1 have been included, the maximum allowable amount shall be ten percent of the aggregate of all items excluding mobilization. Where mobilization is included as multiple items, then the aggregate amount of all mobilization items shall not exceed the allowable ten percent.

SC-2.6.3.2 Costs for submittal requirements, field office and supervision, where identified separately in the schedule of values shall be considered for payment monthly. When the cost is a lump sum as submitted in accordance with 2.6, the monthly cost shall be established by dividing the lump sum by the number of monthly estimates based on the original contract time. No adjustments shall be made for any contract time extensions.

SC-2.6.3.3 Mobilization shall be included in the progress payments, in accordance with the schedule of values and unit prices. When the work, excluding mobilization and inventory, has progressed to an amount equal to five percent or more of the contract price, then an amount of not more than 50 percent of the mobilization cost will be considered for inclusion in the progress payment. Prior to the established five percent, Owner may consider payment on invoices for bonds and insurances and permits; this amount shall be subtracted for the total amount from mobilization. Not more than 40

percent of the mobilization cost will be considered for inclusion in the progress payments once the work, excluding mobilization and inventory, has progressed to an amount equal to 50 percent of the Contract Price. The remaining mobilization payment will be paid as part of the final payment.

SC-2.6.4 Where the work is covered by unit prices and there have been included lump sum items, the Contractor shall submit to Engineer a schedule of values in accordance with the GC 2.6 for those lump sum items.

SC-2.7. Delete paragraph 2.7. in its entirety and substitute the following in its place:

Before any Work at the site is started, CONTRACTOR shall deliver to the OWNER and ENGINEER, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which OWNER or any additional insured may reasonably request) which CONTRACTOR is required to purchase and maintain in accordance with paragraphs 5.4. and 5.6.

SC-4.1. Add the following language at the end of paragraph GC-4.1.:

The OWNER shall provide permanent easements and temporary construction easements as shown on the Drawings for buried pipelines across private property. If the easements obtained are not sufficient for the work, the CONTRACTOR shall obtain any additional easements required. There will be no additional compensation made for obtaining these easements, damages to private property outside easements, or additional cost to the CONTRACTOR because of the easements or lack thereof.

SC-4.2. Add the following language to paragraphs GC-4.2.1.1. and GC-4.2.1.2.:

In the preparation of Drawings and Specifications, ENGINEER or ENGINEER's Consultant have relied upon:

SC-4.2.1.1. The following reports of explorations and tests of subsurface conditions at the site of the Work. The technical data contained in such report(s) upon which CONTRACTOR may rely are the boring method, plan and logs; level of subsurface water; laboratory test methods and results, if any; and similar factual data, all as of the dates made.

SC-4.2.1.1.1. Geotechnical Exploration, Three Rivers FY 2016 Engineering Improvements, Three Rivers, MI, SME Report - prepared by Soils & Materials Engineers, Kalamazoo, Michigan.

SC-4.2.1.2. The following drawings of physical conditions in or relating to existing surface and sub-surface structures (except Underground Facilities) which are at or contiguous to the site of the Work:

SC-4.2.1.3. Copies of the reports listed in paragraph SC-4.2.1.1. and Drawings listed in paragraph SC-4.2.1.2. may be examined at the ENGINEER's office during normal working hours. These reports and drawings are not part of the Contract Documents, but the technical data contained therein upon which the Contractor is entitled to rely as provided in paragraph GC-4.2. and as identified and established above are incorporated therein by reference. CONTRACTOR is not entitled to rely upon other information and data utilized by ENGINEER and ENGINEER's Consultants in the preparation of Drawings and Specifications.

SC-5.1. Amend the first sentence of paragraph GC-5.1 to read as follows:

CONTRACTOR shall furnish a Performance Bond and a Maintenance and Guarantee Bond, each in the amount of at least 100 percent of the Contract Price and a Labor and Material Bond in the amount of at least 50 percent of the Contract Price, as security for the faithful performance and payment of all CONTRACTOR'S obligations under the Contract Documents

SC-5.3.1. Add the following language at the end of Paragraph, GC-5.3.1.:

The surety and insurance companies providing any coverages on this Project shall have and maintain during the term of this contract a minimum A.M. Best (Best's Key Rating Guide) rating classification of "A-".

Contractor shall deliver to Owner, with copies to each additional insured, evidence of the A.M. Best (Best's Key Rating Guide) rating classification of the surety and insurance companies.

Contractor shall notify the Owner, and each additional insured, if at any time during the term of the Contract, the A.M. Best (Best's Key Rating Guide) rating classification of the surety or insurance companies is reduced below "A-".

SC-5.3.2. Delete paragraph GC-5.3.2. in its entirety and insert the following:

SC-5.3.2.1. CONTRACTOR shall deliver to OWNER, with copies to each additional insured identified in the Supplemental Conditions, certificates of insurance (and other evidence of insurance requested by OWNER or any other additional insured) which CONTRACTOR is required to purchase and maintain in accordance with paragraph 5.4.

SC-5.3.2.2. The CONTRACTOR shall file Policies and/or Certificates of Insurance, in duplicate, for all coverages required with the OWNER and the ENGINEER, naming the OWNER and the ENGINEER as Certificate Holders. Addresses of OWNER and ENGINEER must also be shown.

SC-5.3.2.3. The certificate of insurance shall show that all coverages are provided on an occurrence basis and shall indicate the aggregate limit available for this project as of the date the certificate is issued. Binders will be accepted as evidence of coverage for only the first 90 days and cannot be renewed or extended beyond that time.

SC-5.3.2.4. All insurance policies and certificates of insurance must include a provision stating a minimum 30 days' prior written notice will be provided to the OWNER and ENGINEER for any cancellation, non-renewal, material change, or reduction of coverage. The CONTRACTOR shall cease operations upon the occurrence of any such cancellation, non-renewal, material change, or reduction of coverage, and shall not resume operations until satisfactory replacement insurance is provided, coverage is effective and certificates of insurance are received.

SC-5.4.6.1. Delete the last sentence of paragraph GC-5.4.6. and paragraphs GC-5.4.7. through GC-5.4.12. in their entirety and substitute the following in their place:

The insurance shall comply with the following:

SC-5.4.7. Workers' Compensation Insurance

SC-5.4.7.1. Compensation and Employers Liability Insurance shall be provided for all employees engaged in work under this Contract, and, in case any such work is sublet, the CONTRACTOR shall require the Sub-contractor to provide insurance for all employees of the Sub-contractor engaged in such work unless such employees are covered by the coverage afforded by the CONTRACTOR's insurance. The employer's liability shall be as provided by statutory requirements of the State.

SC-5.4.7.2.A. A current Certificate of Premium Payment shall be submitted for the entire term of this Contract.

SC-5.4.7.3. If any work under this Contract involves activities within the scope of the United States Longshoremen's and Harbor Worker's Act and/or the Jones Act, coverage for such exposure shall be provided with a minimum limit of \$1,000,000 per occurrence.

SC-5.4.8. CONTRACTOR'S Liability Insurance

SC-5.4.8.1. Commercial general liability and commercial automobile liability insurance shall be maintained during the entire term of this Contract. The policies shall be based on terms commonly referred to in the insurance industry as an occurrence coverage form. (Claims made policy forms are not acceptable.)

SC-5.4.8.2. The certificate of insurance shall indicate the amount of the aggregate limit remaining for this project as of the date of the certificate.

SC-5.4.8.3. The commercial general liability coverage shall include premises coverage, products and completed operations coverage, personal injury coverage, Ohio stop gap liability coverage, coverage for explosion, collapse, and underground coverages, and contractual liability coverage to satisfy the indemnification clause in its entirety (GC-6.12., GC-6.16., and GC-6.31. through GC-6.33., inclusive) included in these Specifications.

SC-5.4.8.4. The commercial general liability policy must contain the following definition of "insured contract":

SC-5.4.8.4.1. "That part of any other contract or agreement pertaining to your business (including an indemnification of a municipality in connection with work performed for a municipality) under which you assume the tort liability of another party to pay for "bodily injury" or "property damage" to a third person or organization. Tort liability means a liability that would be imposed by law in the absence of any contract or agreement."

SC-5.4.8.4.2. The certificate of insurance shall include this specific language on the certificate of insurance confirming this definition of an insured contract or a certified copy of the policy is to be submitted which includes this definition of an insured contract.

SC-5.4.8.5. The CONTRACTOR shall maintain commercial automobile liability coverages for any owned vehicles. Non-owned and hired auto liability coverages shall also be included.

SC-5.4.9. OWNERS' and CONTRACTORS' Protective Liability Insurance

SC-5.4.9.1. The CONTRACTOR shall purchase and maintain during the entire term of this Contract one separate policy providing OWNERS' and CONTRACTORS' Protective Liability coverages. The named insured on this policy shall be:

- a. The OWNER; and
- b. The ENGINEER - Jones & Henry Engineers, Ltd.; and
- c. Others if specifically required by special provision in the Contract Documents.

SC-5.4.9.2. The policy shall be provided on a form commonly referred to in the insurance industry as an "occurrence" type of policy form. (Claims made policy forms are not acceptable.)

SC-5.4.9.3. This shall be a separate policy in addition to the coverage required in paragraph SC-5.4.8. No other insurance policy may substitute for or contribute to the coverage or limits afforded by this policy, except a separate excess OWNERS' and CONTRACTORS' Protective Policy.

SC-5.4.9.4. This policy shall cover the total project and include explosion, collapse, and underground coverages for the entire Work provided by the CONTRACTOR and Subcontractors.

SC-5.4.9.5. The policy shall stipulate that the "designated CONTRACTOR" includes the CONTRACTOR and all Sub-contractors engaged in the Work.

SC-5.4.9.6. The original policy shall be submitted to and filed with the OWNER or its designated representative.

SC-5.4.10. Limits of Coverage

SC-5.4.10.1. The minimum limits of liability for all coverages in each of paragraphs SC-5.4.8. and SC-5.4.9. above shall be as follows, unless otherwise specifically required by special provision in the Specifications.

Commercial General Liability:

- (1) General Aggregate (except products/completed operations) - \$5,000,000
- (2) Products/Completed Operations Aggregate - \$5,000,000
- (3) Personal and Advertising Injury (Per Person/Organization) - \$4,000,000
- (4) Each Occurrence (Bodily Injury and Property Damage) - \$4,000,000
- (5) Employer's Liability Bodily Injury Liability
Each Accident - \$1,000,000
By Disease, Each Employee - \$1,000,000

Commercial Automobile Liability:

- (1) Combined Single Limit (Bodily Injury and Property Damage): \$4,000,000 Each Accident

SC-5.4.10.2. If policies with separate limits are provided, then the following minimums apply:

Commercial General Liability:

Bodily Injury Liability

- Each Person - \$1,500,000
- Each Accident - \$1,500,000
- Aggregate - \$3,000,000

Property Damage Liability:

- Each Accident - \$1,500,000
- Aggregate - \$3,000,000

Employer's Liability:

Bodily Injury Liability

- Each Accident - \$1,000,000
- By Disease, Each Employee - \$1,000,000

Commercial Automobile Liability:

Bodily Injury

Each Person - \$2,000,000

Each Accident - \$2,000,000

Property Damage

Each Accident - \$2,000,000

SC-5.4.10.3. No aggregate applies to automobile liability coverages.

SC-5.4.10.4. If an umbrella liability policy is used to satisfy the minimum limits of liability requirements, the combined limits must equal these minimum limits of liability.

SC-5.4.10.5. If the aggregate liability limits required by this Contract for any policy subsequently fall below the aggregate limits required by this Contract for this project, immediate steps shall be taken to effect reinstatement of the minimum aggregate liability limits required by this Contract. A revised certificate of insurance, in compliance with paragraph SC-5.3.2., is required to confirm compliance with this requirement.

SC-5.4.10.6. Any additional premiums resulting from such reinstatement shall be at no additional cost to OWNER.

SC-5.4.10.7. Upon specific request by OWNER or ENGINEER, the original policy shall be filed with the OWNER or his designated representative within 30 days of request.

SC-5.4.11. The policies of insurance so required by paragraph GC-5.4. and paragraphs SC-5.4.7. through SC-5.4.9. to be obtained and maintained shall, with respect to the insurance required:

SC-5.4.11.1. Include as insureds or additional insureds (subject to any customary exclusion in respect to professional liability) OWNER, ENGINEER, ENGINEER'S Consultants, and any other persons or entities identified in the Supplementary Conditions, all of whom shall be listed as insureds or additional insureds, and include coverage for the respective officers and employees of all such insureds or additional insureds;

SC-5.4.11.2. Include the specific coverages and be written for not less than the limits of liability provided in the Supplemental Conditions or required by Laws or Regulations, whichever is greater;

SC-5.4.11.3. Contain a provision or endorsement that the coverage afforded will not be cancelled, materially changed, or reduced in coverage until at least 30 days' prior written notice, and ten days written notice for non-renewed, has been given to OWNER and ENGINEER and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the CONTRACTOR);

SC-5.4.11.4. Remain in effect at least until final payment and at all times thereafter when CONTRACTOR may be correcting, removing, or replacing defective Work in accordance with paragraph 13.12; and

SC-5.4.11.5. With respect to products and/or completed operations insurance, will remain in effect for at least two years after final payment (and CONTRACTOR shall furnish OWNER, and each other insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued, evidence satisfactory to OWNER and any such other insured or additional insured of continuation of such insurance at final payment and one year thereafter).

SC-5.4.12.1. These coverage requirements and minimum coverage limits are to provide the minimum acceptable insurance coverages and their existence does not in any way limit or reduce the CONTRACTOR'S or Subcontractor's indemnity obligations under paragraphs GC-6.12.; GC-6.16.; and GC-6.31. through GC-6.33., inclusive.

SC-5.4.12.2. No representation or warranty is made by the OWNER or ENGINEER regarding the sufficiency or adequacy of the insurance requirements, coverages or limits stated in the Contract Documents. The CONTRACTOR and Subcontractors are advised to consult with their

respective insurance agents or professional advisors to determine their coverage needs and requirements.

SC-5.6. Delete paragraph GC-5.6. of the General Conditions in its entirety and insert the following in its place.

PROPERTY INSURANCE

SC-5.6. CONTRACTOR shall purchase and maintain property insurance upon the Work at the site of the project in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in these Supplementary Conditions or required by Laws and Regulations).

SC-5.6.1. The CONTRACTOR shall purchase and maintain special form coverage and include demolition occasioned by enforcement of Laws and Regulations; earthquake; water damage; and such other perils as may be specifically required by the Supplemental Conditions Builders Risk Property Insurance upon the Work at the site to the full insurable replacement cost value thereof, including underground pipelines. The CONTRACTOR shall also purchase and maintain special form coverage and include demolition occasioned by enforcement of Laws and Regulations; earthquake; water damage; and such other perils as may be specifically required by the Supplemental Conditions on any property, whether real property or personal property, whether or not it is located at the site or in transit, in which the OWNER and/or ENGINEER have an insurable interest as evidenced by current Estimates, or other terms of this agreement, and include the interests of OWNER, CONTRACTOR, Subcontractors of any tier, ENGINEER, ENGINEER'S Consultants and any other persons or entities identified in the Supplementary Conditions, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

SC-5.6.2. This coverage is to be provided on a separate Builder's Risk completed value policy, with special form coverage. This insurance shall:

SC-5.6.2.1. include expense incurred in the repair or replacement of any insured property (including, but not limited to, fees and charges of ENGINEERS and architects);

SC-5.6.2.2. cover materials, property, and equipment in transit for incorporation in the Work or stored at the site or at another location prior to being incorporated in the Work;

SC-5.6.2.3. be maintained in effect until final payment is made unless otherwise agreed to in writing by OWNER, CONTRACTOR, and ENGINEER with thirty (30) days written notice to each other additional insured to whom a certificate of insurance has been issued prior to the cessation of such coverage.

SC-5.10. Delete paragraph GC-5.10. in its entirety and substitute the following in its place:

SC-5.10.1. The OWNER and ENGINEER (and others if required by special provisions in the Contract Documents), shall be named as insureds on the insurance. All parties insured shall receive a certified copy of the insurance policy prior to commencement of work. The original policy and a copy thereof shall be filed with the OWNER or his designated representative.

SC-5.10.2. The CONTRACTOR for the general work contract shall provide the Builder's Risk coverage for the entire project, and the policy so required shall include all other contractors and Subcontractors for the total project and the entire work of all of them.

SC-5.11.1. Delete paragraph GC-5.11.1. in its entirety and insert the following in its place:

OWNER and CONTRACTOR intend that all policies purchased in accordance with paragraphs SC-5.6. will protect OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER'S Consultants and all other persons or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds in such policies and will provide primary coverage for all losses and damages caused by the perils covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage, the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. OWNER and CONTRACTOR waive all rights against each other and their respective officers, directors, employees, and

agents for all losses and damages caused by, arising out of, or resulting from any of the perils covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, ENGINEER, ENGINEER'S Consultants and all other persons or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such a waiver may have to the proceeds of insurance held by CONTRACTOR as trustee or otherwise payable under any policy so issued. The property insurance policies shall be modified to reflect and approve this waiver of subrogation rights.

SC-5.15. Delete paragraph GC-5.15. in its entirety and insert the following in its place:

If the OWNER finds it necessary to occupy or use a portion or portions of the Work prior to substantial completion thereof, such occupancy shall not commence prior to a time mutually agreed to by the OWNER and CONTRACTOR and to which the insurance company or companies providing the property insurance have consented by endorsement to the policy or policies. This insurance shall not be cancelled, reduced, limited, excluded, or lapsed on account of such partial occupancy. Consent of the CONTRACTOR and of the insurance company or companies to such occupancy or use shall not be unreasonably withheld. Coverage shall be maintained by CONTRACTOR until the OWNER agrees to provide this coverage or the completion of this and all terms of this agreement, whichever is later.

SC-6.9.3. Add the following new paragraph immediately after paragraph GC-6.9.2.:

OWNER or ENGINEER may furnish to any such Subcontractor, Supplier, or other person or organization, to the extent practicable, information about amounts paid to CONTRACTOR in accordance with CONTRACTOR's Applications for Payment on account of the particular Sub-contractor's, Supplier's, other person's, or other organization's work.

SC-6.15.1. No change to GC-6.15

SC-6.20. Add the following language at the end of paragraph GC-6.20:

Owners of utilities are listed in Additional Supplemental Conditions.

SC-7.5. Should CONTRACTOR cause damage to the work or property of any separate contractor at the site, or should any claim arising out of CONTRACTOR's performance of the Work at the site be made by any separate contractor against CONTRACTOR, OWNER, ENGINEER, ENGINEER's Consultant, or any other person, CONTRACTOR shall promptly attempt to settle with such other contractor by agreement, or to otherwise resolve the dispute by arbitration or at law. CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold OWNER, ENGINEER, and ENGINEER's Consultant harmless from and against all claims, damages, losses and expenses (including, but not limited to, fees of engineers, architects, attorneys and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any separate contractor against OWNER, ENGINEER, or ENGINEER's Consultant to the extent based on a claim arising out of CONTRACTOR's performance of the Work. Should a separate contractor cause damage to the Work or property of CONTRACTOR or should the performance of Work by any separate contractor at the site give rise to any other claim, CONTRACTOR shall not institute any action, legal or equitable, against OWNER, ENGINEER, or ENGINEER's Consultant or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose liability on or to recover damages from OWNER, ENGINEER, or ENGINEER's Consultant on account of any such damage or claim. If CONTRACTOR is delayed at any time in performing or furnishing Work by any act or neglect of a separate contractor, and OWNER and CONTRACTOR are unable to agree as to the extent of any adjustment in Contract Time attributable thereto, CONTRACTOR may make a claim for an extension of time in accordance with Article 12. An extension of the Contract Time shall be CONTRACTOR's exclusive remedy with respect to OWNER,

ENGINEER, or ENGINEER's Consultant for any delay, disruption, interference, or hindrance caused by any separate contractor. This paragraph does not prevent recovery from OWNER, ENGINEER, or ENGINEER's Consultant for activities that are their respective responsibilities.

SC-9.3. Add new paragraphs after paragraph GC-9.3. as follows:

SC-9.3.1. Duties and Responsibilities

The Resident Project Representative (hereafter referred to as RPR) will:

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

6. Interpretation of Contract Documents: Reports to ENGINEER when clarifications and interpretations of the Contract Documents are needed and transmit to CONTRACTOR clarifications and interpretations as issued by ENGINEER.
7. Modifications: Consider and evaluate CONTRACTOR's suggestions for modifications in Drawings or Specifications and report with RPR's recommendations to ENGINEER. Transmit to CONTRACTOR decisions as issued by ENGINEER.
8. Records:
 - a. Maintain at the job site orderly files for correspondence, reports of job conferences, Shop Drawings and samples, reproductions of original Contract Documents including all Work Directive Changes, Addenda, Change Orders, Field Orders, additional drawings issued subsequent to the execution of the Contract, ENGINEER's clarifications and interpretations of the Contract Documents, progress reports, and other Project related documents.
 - b. Keep a diary or log book, recording CONTRACTOR hours on the job site, weather conditions, data relative to questions of Work Directive Changes, Change Orders or changed conditions, list of job site visitors, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to ENGINEER.
 - c. Record names, addresses, and telephone numbers of all CONTRACTORS, subcontractors and major suppliers of material and equipment.
9. Reports:
 - a. Furnish ENGINEER periodic reports as required of progress of the Work and of CONTRACTOR's compliance with the progress schedule and schedule of Shop Drawing and sample submittals.
 - b. Consult with ENGINEER in advance of scheduled major tests, inspections, or start of important phases of the Work.
 - c. Draft Proposed Change Orders and Work Directive Changes, obtaining backup material from CONTRACTOR, and recommend to ENGINEER Change Orders, Work Directive Changes, and Field Orders.
 - d. Report immediately to ENGINEER and OWNER upon the occurrence of any accident.
10. Payment Requests: Review applications for payment with CONTRACTOR for compliance with the established procedure for their submission and forward with recommendations to ENGINEER, noting particularly the relationship of the payment requested to the schedule of values, Work completed, and materials and equipment delivered at the site but not incorporated in the Work.
11. Certificates, Maintenance and Operation Manuals: 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 in accordance with the Contract Documents, and have this material delivered to ENGINEER for review and forwarding to OWNER prior to final payment for the Work.
12. Completion:
 - a. Before ENGINEER issues a Certificate of Substantial Completion, submit to CONTRACTOR a list of observed items requiring completion or correction.
 - b. Conduct final inspection in the company of ENGINEER, OWNER, and CONTRACTOR and prepare a final list of items to be completed or corrected.

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

SC-9.3.2. Limitations of Authority

Resident Project Representative:

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

SC-11.3. Amend the first sentence of paragraph GC-11.3. to read as follows:

The value of any work covered by a Change Order, any claim for an adjustment in the Contract Price, or any claim for damages shall be determined in one of the following ways:

SC-11.9.3. Delete paragraph GC-11.9.3. in its entirety and insert the following in its place:

The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:

SC-11.9.3.1. If the total cost of a particular item of Unit Price Work amounts to five percent or more of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 20 percent from the estimated quantity of such item indicated in the Agreement; and

SC-11.9.3.2. If there is no corresponding adjustment with respect to any other item of Work; and

SC-11.9.3.3. If CONTRACTOR believes that CONTRACTOR has incurred additional expense as a result thereof; or if OWNER believes that the quantity variation entitles OWNER to an adjustment in the unit price, either OWNER or CONTRACTOR may make a claim for an adjustment in the Contract Price in accordance with Article 11 if the parties are unable to agree as to the effect of and such variation in the quantity of Unit Price Work performed.

SC-13.4. Delete paragraph GC-13.4 in its entirety and insert the following in its place:
CONTRACTOR shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Document

SC-14.2. Add the following language at the end of paragraph GC-14.2.

As a requisite for payment of any current estimate, the CONTRACTOR will be required to sign the Contractor's Affidavit - Current Estimates on the Form attached herein, and have the same properly notarized.

SC-14.4. Delete the last sentence in paragraph GC-14.4. and insert the following in its place:

Thirty days after presentation of the Application for Payment to OWNER with ENGINEER's recommendation, the amount recommended will (subject to the provision of the last sentence of paragraph 14.7.) become due and when due will be paid by OWNER to CONTRACTOR.

SC-14.10.2. Delete paragraph GC-14.10.2. in its entirety and insert the following in its place:

OWNER may at any time request CONTRACTOR in writing to permit OWNER to take over operation of any such part of the Work although it is not substantially complete. A copy of such request will be sent to ENGINEER and within a reasonable time thereafter OWNER, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion and will prepare a list of the items remaining to be completed or corrected thereon before final payment. If CONTRACTOR does not object in writing to OWNER and ENGINEER that such part of the Work is not ready for separate operation by OWNER, ENGINEER will finalize the list of items to be completed or corrected and will deliver such lists to OWNER and CONTRACTOR together with a written recommendation as to the division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, utilities, insurance, warranties and guarantees for that part of the Work which will become binding upon OWNER and CONTRACTOR at the time when OWNER takes over such operation (unless they shall have otherwise agreed in writing and so informed ENGINEER). During such operation and prior to Substantial Completion of such part of the Work, OWNER shall allow CONTRACTOR reasonable access to complete or correct items on said list and to complete other related Work.

SC-14.12. Add the following language at the end of paragraph GC-14.12.

As a requisite for payment of the final estimate, the CONTRACTOR will be required to sign the Contractor's Affidavit on the form attached herein, and have the same properly notarized.

ADDITIONAL SUPPLEMENTARY CONDITIONS

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UTILITY OWNERS

Owners of utilities are as follows:

Water	City of Three Rivers Mark Glessner, Water System Superintendent 333 W. Michigan Avenue Three Rivers, MI 49093 269-273-1845
Sanitary Sewer	City of Three Rivers Amy Roth, Department of Public Services Director 333 W. Michigan Avenue Three Rivers, MI 49093 269-273-1845
Local City Roadway	City of Three Rivers Amy Roth, Department of Public Services Director 333 W. Michigan Avenue Three Rivers, MI 49093 269-273-1845
Local County Roadway	St. Joseph County Road Commission Chris Minger, Project Manager 20914 M-86 Centerville, MI 49032 269-467-6393
Power	AEP (Indiana – Michigan Power) Rick Demars 269-506-9526
Natural Gas	SEMCO Energy Gas Company Mike Kessler, Engineer 1000 Bell Road Niles, MI 49120 616-638-4893
Telephone	Frontier Communications Scott Macfarlane 269-273-0383
Cable	Comcast Rob Hofstra 269-506-1569 Joe Schopf 269-209-9908

ACT 53, P.A. 1974 - STATE OF MICHIGAN

AN ACT to protect the public safety by providing for notices to public utilities by persons excavating or discharging explosives near underground facilities or demolishing buildings containing utility facilities; to provide for notices when underground facilities are damaged; to provide for the establishment of prima facie presumption of negligence for failure to give the notices; and to prescribe penalties.

The People of the State of Michigan enact:

Sec. 1. As used in this act:

(a) "Person" includes an individual, partnership, corporation, or association including a person engaged as a contractor by a public agency but "person" does not mean a public agency.

(b) "Public agency" means the state, a city, village, township, county or any other governmental entity.

(c) "Public utility" means a natural gas company subject to the jurisdiction of the federal power commission or an electric, steam, gas, telephone, power, water or pipeline company subject to the jurisdiction of the public service commission pursuant to Act No. 3 of the Public Acts of 1939, as amended, being sections 460.1 to 460.8 of the Michigan Compiled Laws, Act No. 9 of the Public Acts of 1929, being sections 483.101 to 483.120 of the Michigan Compiled Laws, Act No. 16 of the Public Acts of 1929, being sections 483.1 to 483.11 of the Michigan Compiled Laws, Act no. 19 of the Public Acts of 1967, as amended, being sections 486.551 to 486.571 of the Michigan Compiled Laws, or Act No. 165 of the Public Acts of 1969, being sections 483.151 to 483.162 of the Michigan Compiled Laws, a person, city, village, county, the state, or other governmental entity owning or operating cable television facilities, and a city, village, county, the state, or other governmental entity owning public service facilities for supplying water, light, heat, gas, power, or sewage disposal.

Sec. 2. This act does not apply to a person or public agency using only nonpowered hand tools in performing excavating or tunneling operations described herein.

Sec. 3. A person or public agency shall not discharge explosives, excavate, or tunnel in a street, highway, public place, a private easement of a public utility, or near the location of a public utility facility owned, maintained, or installed on a customer's premises, or demolish a building containing a public utility facility without having first ascertained in the manner prescribed in sections 5 or 7 the location of all underground facilities of a public utility in the proposed area of excavation, discharging of explosives, tunneling, or demolition.

Sec. 4. A public utility having underground facilities in a county shall file with the clerk of the county a list containing the name of every city, village, township, and section within the township in the county in which it has underground facilities, the name of the public utility and the title and address of its representative designated to receive the written notice of intent required by section 5.

Sec. 5. Except as provided in sections 7 and 9, a person or public agency responsible for excavating or tunneling operations or discharge of explosives in a street, highway, other public place, a private easement for a public utility, or near the location of utility facilities on a customer's property, or demolition of a building containing a utility facility, shall serve a written notice of intent to excavate, tunnel, discharge explosives, or demolish at least 2 full working days, excluding Saturdays, Sundays, and holidays, but not more than 3 months, before commencing the excavating, demolishing, discharging of explosives or tunneling operations on the public utility having underground facilities located in the proposed area of excavation, discharging of explosives, tunneling, or demolition.

The written notice of intent shall contain the name, address, and telephone number of the person or public agency filing the notice of intent, the name of the person or public agency performing the excavation, discharging of explosives, tunneling, or demolition, the date and type of excavating, discharging of explosives, demolishing, or tunneling operation to be conducted, and the location of the excavation, tunneling, discharging of explosives, or demolition.

Sec. 6. A public agency that pursuant to law requires a person to obtain a permit, shall require as a condition of the permit that the person shall comply with the requirement of this act.

Sec. 7. (1) Two or more public utilities may form and operate an association providing for mutual receipt of notification of construction activities in a specified area. In areas where such an association is formed, notification to the association shall be effected in writing as set forth in section 5 or by telephone call, providing the same information required by section 5, made by the person or public agency responsible for the excavating, demolishing, discharging of explosives, or tunneling operations. In areas where such an association is formed, the public utilities having underground facilities in the area shall become a member of the association or shall participate in and receive the services furnished by the association. A public utility owned by a public agency shall participate in and receive the services furnished by the association and shall pay their share of the costs and services furnished, but shall not be required to become a member of the association. The association, whose members or participants have underground facilities within a county, shall file with the clerk of the county a description of the geographical area served by the association and list the name and address of every member and participating public utility.

(2) If notification is made by telephone an adequate record shall be maintained by the association to document compliance with the requirements of this act.

Sec. 8. A public utility served with the notice in accordance with sections 5 or 7 shall, not less than 1 working day in advance of proposed construction, unless otherwise agreed between the person or public agency performing the excavation, discharging of explosives, tunneling, or demolition and the public utility, inform the person or public agency of the approximate location of the underground facilities owned or operated by the public utility in the proposed area of excavation, discharging of explosives, tunneling, or demolition, in a manner as to enable the person or public agency to employ hand-dug test holes or other similar means of establishing the precise location of the underground facilities using reasonable care to establish the precise location of the underground facilities in advance of construction. For the purposes of this act the approximate location of underground facilities is defined as a strip of land at least 3 feet wide but not wider than the width of the facility plus 1-1/2 feet on either side of the facility. If the approximate location of an underground facility is marked with stakes or other physical means the public utility shall follow the color coding prescribed herein.

Utility and Type of Product	Specific Group Identifying Color
Electric power distribution & transmission	Safety red
Municipal electric systems	Safety red
Gas distribution and transmission	High visibility safety yellow
Oil distribution and transmission	High visibility safety yellow
Dangerous materials, product lines	High visibility safety yellow
Telephone and telegraph systems	Safety alert orange
Cable television	Safety alert orange
Police and fire communications	Safety alert orange
Water systems	Safety precaution blue
Sewer systems	Safety brown

If the precise location of the underground facilities cannot be established, the person or public agency shall then notify the public utility which shall provide such further assistance as may be needed to determine the precise location of the underground facilities in advance of the proposed excavating, tunneling, discharging of explosives, or demolition operations. Where demolition of a building is proposed and the public utility is notified, it shall be given reasonable time to remove or protect its facilities before demolition of the building.

Sec. 9. (1) In case of emergency involving danger to life, health, or property or which requires immediate correction in order to continue the operation of a major industrial plant, or to assure the continuity of public utility service, excavation, maintenance, or repairs may be made without using explosives if notice and advice thereof, in writing or otherwise, are given to the public utility or association as soon as reasonably possible.

(2) In case of an emergency involving an immediate and substantial danger of death or serious personal injury, explosives may be discharged if notice and advice thereof, in writing or otherwise, are given to a public utility or an association at any time before the discharge is undertaken.

Sec. 10. This act shall not be construed to authorize, affect or impair local ordinances, charters or other provisions of law requiring permits to be obtained before excavating or tunneling in a public street or highway or to construct or demolish buildings or other structures on private property nor construed to grant to any person or public agency any rights not specifically provided by this act. A permit issued by a public agency shall not be deemed to relieve a person from the responsibility for complying with the provisions of this act. The failure of any person, who has been granted a permit, to comply with the provision of this act shall not be deemed to impose any liability upon the public agency issuing the permit. This act shall not preclude establishment of working agreements between public utilities and contractor associations to accomplish the intent and purpose of this act.

Sec. 11. Upon receiving the information provided for in sections 5 or 7, a person or public agency excavating, tunneling or discharging explosives shall exercise reasonable care when working in close proximity to the underground facilities of any public utility. If the facilities are to be exposed, or are likely to be exposed, only hand-digging shall be employed in such circumstances and such support, as may be reasonably necessary for protection of the facilities, shall be provided in and near the construction area.

Sec. 12. When any contact with or damage to any pipe, cable, or its protective coating or any other underground facility of a public utility occurs, the public utility shall be notified immediately by the person or public agency responsible for the operations causing the damage. Upon receiving the notice, the public utility shall dispatch personnel to the location as soon as possible to effect temporary or permanent repair of the damage. If a serious electrical short is occurring or if dangerous fluids or gases are escaping from a broken line, the person or public agency responsible for the operations causing the damage shall evacuate the immediate area while awaiting the arrival of the public utility personnel.

Sec. 13. A public utility whose underground facilities are damaged may file a complaint against the person responsible therefore with the prosecuting attorney of the county wherein the damage occurred. If the person failed to comply with the notice or due care requirements of this act, the prosecuting attorney shall prosecute the case in a court of competent jurisdiction. This act does not affect any civil remedies for damage to public utility facilities except as otherwise specifically provided for in this act.

Sec. 14. In a civil action in a court of this state, when it is shown by competent evidence that damage to the underground facilities of a public utility resulted from excavating, tunneling, or demolishing operations, or the discharge of explosives, as described in section 3, and that the person responsible for giving the notice of intent to excavate, tunnel, demolish, or discharge explosives failed to give the notice, or the person did not employ hand-digging or failed to provide support, the person is deemed prima facie guilty of negligence.

Sec. 15. A person who damages the facilities of a public utility on more than 3 occasions on any 1 construction contract location because of his failure to comply with any of the provisions of this act may be enjoined from engaging in any further excavating, demolition, discharging of explosives, or tunneling work within the state, except under such terms and conditions as the county may prescribe to insure the safety of the public. A court may prescribe such penalties as it deems necessary or appropriate for violation of the injunctive order up to a maximum of \$1,000.00 per violation.

Sec. 16. A person who willfully violates any provision of this act shall be fined not more than \$1,000.00 for each offense. An officer, agent, representative, servant, or employee of any person or public agency who willfully causes, aids, or assists or participates in any willful violation of this act is guilty of a misdemeanor, and shall be fined not more than \$1,000.00, for each offense or imprisoned for not more than 90 days, or both. These penalties are in addition to any civil liability. A person who willfully removes or otherwise destroys the stakes or other physical markings used by a public utility to mark the approximate location of underground facilities is guilty of a misdemeanor.

Sec. 17. If any provision of this act or the application thereof to any person or circumstance is held invalid, the remainder of the act and the application of such provision to other persons or circumstances shall not be affected thereby.

Sec. 18. This act shall become effective August 1, 1974.

M

10374

Act 524, 1980, p. 2277 - State of Michigan

An Act to provide for the terms of certain construction contracts with certain public agencies; to regulate the payment and retainage of payments on construction contracts with certain public agencies; and to provide for the resolution of certain disputes.

The following is a portion of Act 524:

Sec.2 Construction contract; progress payment; public agency failing to make timely progress payment; effect.

(1) The construction contract shall designate a person representing the Contractor who will submit written requests for progress payments, and a person representing the public agency to whom requests for progress payments are to be submitted. The written requests for progress payments shall be submitted to the designated person in a manner and at such times as provided in the construction contract.

(2) The processing of progress payments by the public agency may be deferred by the public agency until work having a prior sequence, as provided in the Contract Documents, is in place and is approved.

(3) Each progress payment requested, including reasonable interest if requested under subsection (4), shall be paid within one of the following time periods, whichever is later:

(a) Thirty days after the architect or professional engineer has certified to the public agency that applicable request for payment in accordance with the Contract Documents.

(b) Fifteen days after the public agency has received the funds with which to make the progress payment from a department or agency of the Federal or State government, if any funds are to come from either of those sources.

(4) Upon failure of a public agency to make a timely progress payment pursuant to this Section, the person designated to submit requests for progress payments may include reasonable interest on amounts past due in the next request for payment.

Sec.3 Contractor's performance; retained funds; interest; release; letter of credit.

(1) To assure proper performance of a construction contract by the Contractor, a public agency may retain a portion of each progress payment otherwise due as provided in this Section.

(2) The retainage shall be limited to the following:

(a) Not more than 10 percent of the dollar value of all work in place until work is 50 percent in place.

(b) After the work is 50 percent in place, additional retainage shall not be withheld unless the public agency determines that the Contractor is not making satisfactory progress, or for other specific cause relating to the Contractor's performance under the contract. If the public agency so determines, the public agency may retain not more than 10 percent of the dollar value of work more than 50 percent in place.

(3) The retained funds shall not exceed the pro rata share of the public agency's matching requirement under the construction contract and shall not be commingled with other funds of the public agency and shall be deposited in an interest bearing account in a regulated financial institution in this State wherein all such retained funds are kept by the public agency which shall account for both retainage and interest on each construction contract separately. A public agency is not required to deposit retained funds in an interest bearing account if the retained funds are to be provided under a State or Federal Grant and the retained funds have not been paid to the public agency.

(4) Except as provided in Section 4 (7) and (8), retainage and interest earned on retainage shall be released to a Contractor together with the final progress payment.

(5) Any time after 94 percent of work under the Contract is in place and at the request of the original Contractor, the public agency shall release the retainage plus interest to the original

Contractor only if the original Contractor provides to the public agency an irrevocable letter of credit in the amount of the retainage plus interest, issued by a bank authorized to do business in this State containing terms mutually acceptable to the Contractor and the public Agency.

(MCL Section 125.1563.)

Sec.4 Construction agreements; resolution of certain disputes; procedure; purpose; decision; performance bond.

(1) The construction contract shall contain an agreement to submit those matters described in subsection (3) to the decision of an agent at the option of the public agency.

(2) If a dispute regarding a matter described in subsection (3) arises, the Contractor and the public agency shall designate an agent who has background, training, and experience in the construction of facilities similar to that which is the subject of the contract, as follows:

(a) In an agreement reached within 10 days after a dispute arises.

(b) If an agreement cannot be reached within 10 days after a dispute arises, the public agency shall designate an agent who has background, training, and experience in the construction of facilities similar to that which is the subject of the Contract and who is not an employee of the agency.

(3) The public agency may request dispute resolution by the agent regarding the following:

(a) At any time during the term of the Contract, to determine whether there has been a delay for reasons that were within the control of the Contractor, and the period of time that delay has been caused, continued, or aggravated by actions of the Contractor.

(b) At any time after 94 percent of work under the Contract is in place, whether there has been an unacceptable delay by the Contractor in performance of the remaining 6 percent of work under the Contract. The agent shall consider the terms of the Contract and the procedures normally followed in the industry and shall determine whether the delay was for failure to follow reasonable and prudent practices in the industry for completion of the project.

(4) This dispute resolution process shall be used only for the purpose of determining the rights of the parties to retained funds and interest earned on retained funds and is not intended to alter, abrogate, or limit any rights with respect to remedies that are available to enforce or compel performance of the terms of the Contract by either party.

(5) The agent may request and shall receive all pertinent information from the parties and shall provide an opportunity for an informal meeting to receive comments, documents, and other relevant information in order to resolve the dispute. The agent shall determine the time, place, and procedure for the informal meeting. A written decision and reasons for the decision shall be given to the parties within 14 days after the meeting.

(6) The decision of the agency shall be final and binding upon all parties. Upon application of either party, the decision of the agent may be vacated by order of the Circuit Court only upon a finding by the Court that the decision was procured by fraud, duress, or other illegal means.

(7) If the dispute resolution results in a decision:

(a) That there has been a delay as described in subsection (3) (a), all interest earned on retained funds during the period of delay shall become the property of the public agency.

(b) That there has been unacceptable delay as described in subsection (3) (b), the public agency may contract with a subsequent contractor to complete the remaining 6 percent of work under the Contract, and interest earned on retained funds shall become the property of the public agency. A subsequent contractor under this subdivision shall be paid by the public agency from the following sources until each source is depleted, in the order listed below:

(i) The dollar value of the original Contract, less the dollar value of funds already paid to the original Contractor, and the dollar value of work in place for which the original Contractor has not received payment.

(ii) Retainage from the original Contractor, or funds made available under a letter of credit provided under Section 3 (5).

(iii) Interest earned on retainage from the original Contractor, or funds made available under a letter of credit provided under Section 3 (5).

(8) If the public agency contracts with a subsequent contractor as provided in subsection (7) (b), the final progress payment shall be payable to the original Contractor within the time period specified in Section 2 (3). The amount of the final progress payment to the original Contractor shall not include interest earned on retained funds. The public agency may deduct from the final progress payment all expenses of contracting with the subsequent contractor. This act shall not impair the right of the public agency to bring an action or to otherwise enforce a Performance Bond to complete work under a construction contract.

The person representing the Contractor in submitting written requests for progress payments is as follows:

Name: _____

Title: _____

Address: _____

The person representing the Owner to whom requests for progress payments are to be submitted is as follows:

Name: _____

Title: _____

Address: _____

SOIL BORINGS



SOILS & STRUCTURES

February 12, 2016

Wolverine Building Group
4045 Barden Drive, S.E.
Grand Rapids, Michigan 49512

Attention: Mr. Roger Faulkner

Regarding: Addendum- Report of Geotechnical Investigation - January 5, 2016
Metal Technologies
Three Rivers, St. Joseph County, Michigan
Project No. 2015.1361

Dear Mr. Faulkner

Soils & Structures was contacted by Mr. Adam Tuffs of Wolverine Building Group regarding the report of geotechnical investigation referenced above and a municipal underground utility present in the proposed building addition location. Additional geotechnical investigation, including test borings, was requested by Wolverine Building Group to determine the subsurface conditions in the area of the underground utility. This addendum presents the results from the additional test borings.

The investigation included three (3) test borings (Four, Five and Six), which were drilled on February 5, 2016 to a depth of 20.0 feet in accordance with ASTM D 1586 procedures at the locations determined jointly by Wolverine Building Group and Soils & Structures. The ASTM D 1586 standard describes the procedure for testing the soil. An automatic hammer was used to obtain the soil samples.

Description of Soil

The general soil profile is similar to that identified in the referenced geotechnical investigation report and consisted of sand and clay fill to a depth of 6.5 feet over the natural sand layer which is present to a depth of at least 20.0 feet. Clay and sand fill were not encountered in the area of Test Boring Five. Asphalt pavement is generally present at the surface over the profile.

Asphalt pavement generally consists of 3.0 to 5.0 inches of asphalt over a gravel base with a thickness of 5.0 to 8.0 inches. The gravel base consists of a natural aggregate with varying amounts of sand and slag.

The sand portions of the fill are present at depths between 0.8 and 6.5 feet in the area of Test Boring Four and between 4.0 and 6.5 feet in the area of Test Boring Six. The sand fill generally consists of a brown to dark brown fine to medium silty sand with occasional gravel. Most of the sand fill is compact with "N" values in the range of 10 to 12 which correspond to an estimated internal friction angle of 30 to 31 degrees. The exception is the loose zone present at a depth between 0.8 and 4.0 feet in the area of Test Boring Four. The "N" value for the loose zone is 4 which corresponds to an estimated internal friction angle of 28 degrees.

The clay portion of the fill is present at a depth between 0.9 and 4.0 feet in the area of Test Boring Six and consists of a dark brown sandy silty clay. The clay fill is soft with an estimated shear strength less than 500 pounds per square foot which is low. The "N" value for the clay fill is 2 which is low. The water content for the clay is estimated between 20.0 and 30.0 percent which is moderate to high. The low "N" value indicates the clay fill is soft and compressible.

The natural sand is part of a glacial outwash sand that is present throughout most of St. Joseph County. Most of the sand consists of a brown fine to medium sand with a trace of gravel. The exception is the brown fine to medium sand with a trace of silt present at a depth between 4.0 and 6.5 feet in the area of Test Boring Five. Most of the natural sand is compact to very compact with "N" values in the range of 11 to 39 which correspond to "N" values in the range of 11 to 39 which correspond to an estimated internal friction angle of 30 to at least 36 degrees. The exceptions are the zones of loose to slightly compact sand present at depths between 1.0 and 6.5 feet and between 9.0 and 13.0 feet in the area of Test Boring Five and between 9.0 and 13.0 feet in the area of Test Boring Six. The "N" values for the loose to slightly compact zones are in the range of 5 to 6 which correspond to an estimated internal friction angle of 29 degrees or less.

Description of Groundwater Conditions

Groundwater was encountered at depths of 1.5 to 4.0 feet below existing grade at the Test Boring Four, Five and Six locations. The volume of groundwater entering the test boring holes was low to heavy. The groundwater encountered at the Test Boring Six location is a perched unit over the clay so that groundwater will enter excavations mostly by horizontal flow.

Discussion

Most of the sand fill and natural sand present at the site is compact to very compact. The exceptions are the loose to slightly compact sand zones present at various depths throughout the profile and the soft clay zone present in the area of Test Boring Six as discussed in the "Description of Soil" section of this letter.

General Conditions & Reliance

This report addendum was prepared in accordance with generally accepted practices of the geotechnical engineering profession. The scope of work consisted of performing three test borings and describing soil conditions encountered in the test borings. The scope of work did not include an environmental study or wetland determination.

The report and the associated test borings were prepared specifically for the previously described project and site. Soils & Structures should be consulted if a significant change in the scope of the project is made.

The test borings represent point information and may not have encountered all of the soil types and materials present on this site. This report addendum does not constitute a guarantee of the soil or groundwater conditions or that the test borings are an exact representation of the soil or groundwater conditions at all points on this site.

The descriptions and recommendations contained in this report addendum are based on an interpretation of the test borings. The test borings should not be used independently of this report addendum. If soil conditions are encountered which are significantly different from the test borings Soils & Structures should be consulted for additional recommendations.

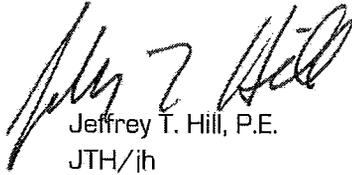
The report addendum and test borings may be relied upon by Wolverine Building Group for the design, construction, permitting and financing associated with the construction of the new building addition at the Metal Technologies property located at 429 4th Street in Three Rivers, St. Joseph County, Michigan. The use of the report addendum and test borings by third parties not associated with this project or for other sites has not been agreed upon by Soils & Structures. Soils & Structures does not recommend or consent to third party use or reliance of the report addendum or test borings unless allowed to review the proposed use of these materials. Unless obtained in writing consent to third party use should not be assumed. Third parties using the report addendum or test boring logs do so at their own risk and are offered no guarantee or promise of indemnity.



SOILS & STRUCTURES

We appreciate the opportunity to be of service to you. If you have a question concerning this report please contact our office.

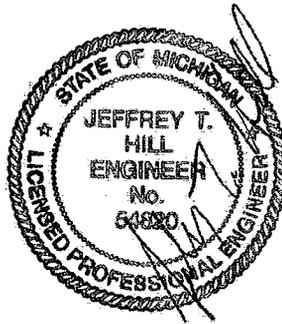
Sincerely,
Soils & Structures, Inc.



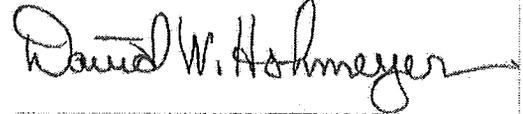
Jeffrey T. Hill, P.E.
JTH/jh

File No. 2015.1361

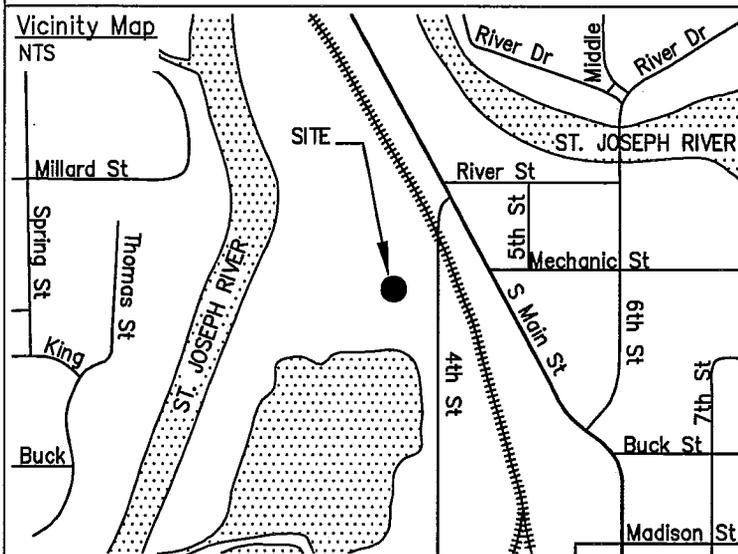
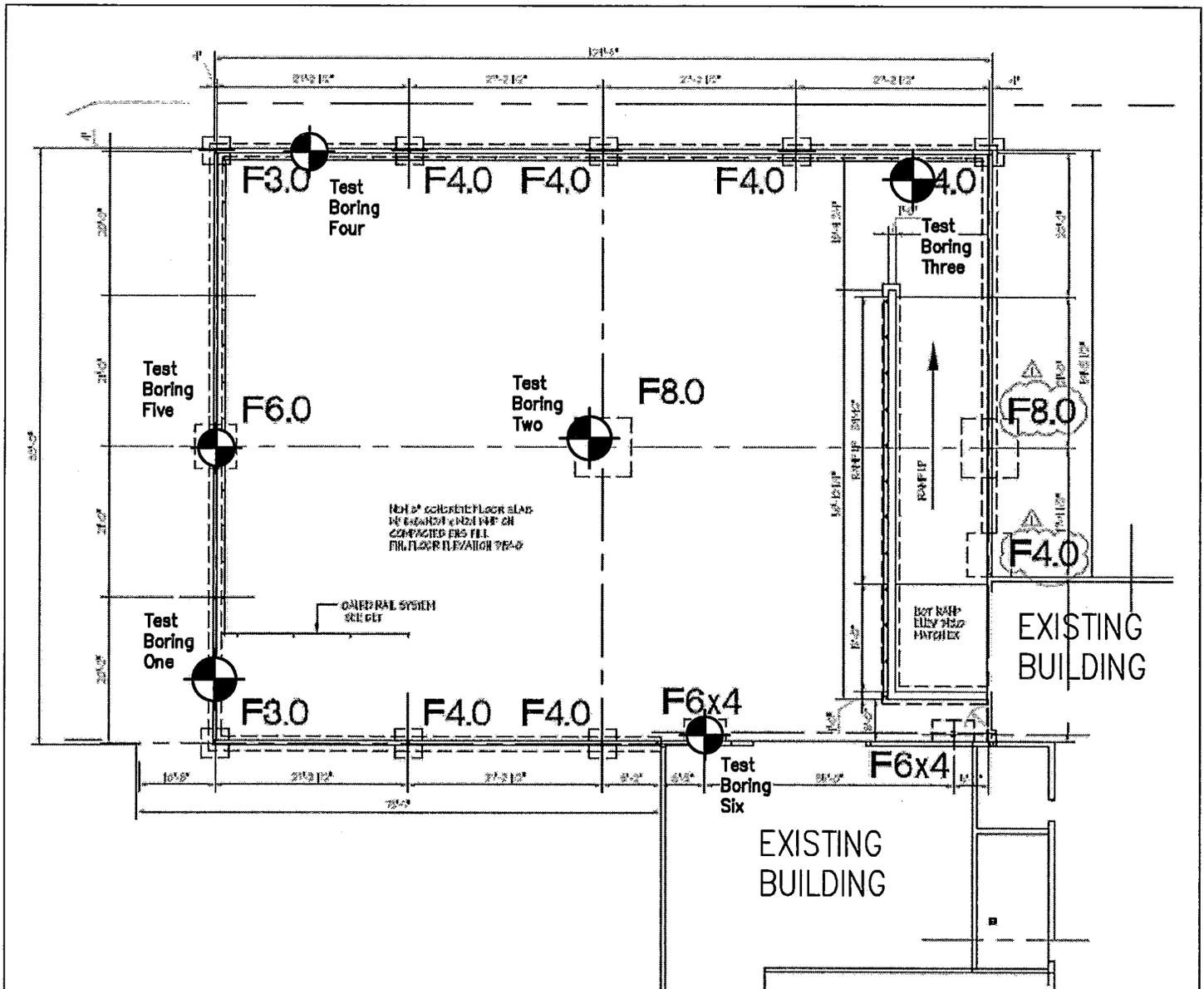
Attachments



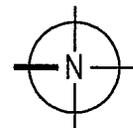
Reviewed By:
Soils & Structures, Inc.



David W. Hohmeyer, P.E.



TEST BORING LOCATION PLAN
NTS



Note: The background of the test boring location plan is a portion of drawing titled in part, "FOUNDATION PLAN, ...WAREHOUSE ADDITION METAL TECHNOLOGIES INC, ...THREE RIVERS, ...ST.01," dated December 1, 2015 by Vander Weele Design Consultants

Metal Technologies 429 4th Street	
Three Rivers, St. Joseph County, Michigan	
Soils & Structures, Inc. 6480 Grand Haven Road Muskegon, Michigan 49441	
JOB NO. 2015.1361	DATE 12-30-2015

Log of Test Boring

Soils & Structures Inc.

Muskegon 1-800-933-3959 Traverse City

Project Metal Technologies

Location Three Rivers, Michigan

Job Number 2015.1361

Boring Number <u>4</u>	Crew Chief <u>B. Hutt</u>	Ground Water Encountered <u>2.0</u> ft.	Plugging Record
Depth Drilled <u>20</u> ft.	Helper <u>B. Slayton</u>	After Completion <u>2.0</u> ft.	Boring Sealed with: <u>Excavated Soil</u>
Surface Elev. _____ ft.	Drill Rig <u>D-50</u>	After <u>1/4</u> hrs. <u>2.0</u> ft.	<u>AsphPatch</u> between <u>0.0</u> ft. & <u>0.4</u> ft.
Date Started <u>2-5-16</u>	Boring Method <u>3 1/4" ID</u>	Volume <u>Low</u>	<u>Ex Soil</u> between <u>0.4</u> ft. & <u>20.0</u> ft.
Date Completed <u>2-5-16</u>	<u>Hollow Stem Auger</u>	Seepage at <u>2.0</u> ft.	

Depth in Feet	Soil Sym.	Soil Description	Penetration ASTM D 1586	"N" (BPF)	Laboratory Data			
					Water Content (%)	Dry Density (pcf)	Shear Strength (pcf)	Unified Soil Classif.
0.4'		ASPHALT - (5.0")						
0.8'		GRAVEL - natural aggregate with slag (5.0")						
		SAND - loose dark brown fine silty with a trace of gravel (Fill)	5-2-2	4				Fill
4.0'		SAND - compact brown fine to medium silty with a trace of gravel (Fill)	2-2-8	10				Fill
6.5'			4-11-12	23				SP
			4-6-6	12				SP
		SAND - compact to very compact brown fine to medium with a trace of gravel	4-8-13	21				SP
20.0'		End of Boring	8-14-25	39				SP

Log of Test Boring

Soils & Structures Inc.

Muskegon 1-800-933-3959 Traverse City

Project Metal Technologies

Location Three Rivers, Michigan

Job Number 2015.1361

Boring Number <u>5</u>	Crew Chief <u>B. Hutt</u>	Ground Water Encountered <u>4.0</u> ft.	Plugging Record
Depth Drilled <u>20</u> ft.	Helper <u>B. Slayton</u>	After Completion <u>4.0</u> ft.	Boring Sealed with: <u>Excavated Soil</u>
Surface Elev. _____ ft.	Drill Rig <u>D-50</u>	After <u>1/4</u> hrs. <u>4.0</u> ft.	<u>AsphPatch</u> between <u>0.0</u> ft. & <u>0.4</u> ft.
Date Started <u>2-5-16</u>	Boring Method <u>3 1/4" ID</u>	Volume <u>Heavy</u>	<u>Ex Soil</u> between <u>0.4</u> ft. & <u>20.0</u> ft.
Date Completed <u>2-5-16</u>	<u>Hollow Stem Auger</u>	Seepage at <u>4.0</u> ft.	

Depth in Feet	Soil Sym.	Soil Description	Penetration ASTM D 1586	"N" (BPF)	Laboratory Data			
					Water Content (%)	Dry Density (pcf)	Shear Strength (psf)	Unified Soil Classif.
0.3'		ASPHALT - (4.0")						
1.0'		GRAVEL - natural aggregate (8.0")						
		SAND - slightly compact brown fine	5-3-3	6				SP
4.0'		SAND - loose brown fine to medium with a trace of silt	2-2-3	5				SP-SM
6.5'		SAND - compact brown fine to medium	6-6-5	11				SP
9.0'		SAND - loose brown fine to medium	3-2-3	5				SP
13.0'		SAND - very compact brown fine to medium	5-10-11	21				SP
20.0'		End of Boring	20-12-22	34				SP

Log of Test Boring

Soils & Structures Inc.

Muskegon 1-800-933-3959 Traverse City

Project Metal Technologies

Location Three Rivers, Michigan

Job Number 2015.1361

Boring Number <u>6</u>	Crew Chief <u>B. Hutt</u>	Ground Water Encountered <u>1.5</u> ft.	Plugging Record
Depth Drilled <u>20</u> ft.	Helper <u>B. Slayton</u>	After Completion <u>1.5</u> ft.	Boring Sealed with: <u>Excavated Soil</u>
Surface Elev. _____ ft.	Drill Rig <u>D-50</u>	After <u>1/4</u> hrs. <u>1.5</u> ft.	<u>AsphPatch</u> between <u>0.0</u> ft. & <u>0.4</u> ft.
Date Started <u>2-5-16</u>	Boring Method <u>3 1/4" ID</u>	Volume <u>Low</u>	<u>Ex Soil</u> between <u>0.4</u> ft. & <u>20.0</u> ft.
Date Completed <u>2-5-16</u>	<u>Hollow Stem Auger</u>	Seepage at <u>1.5</u> ft.	

Depth in Feet	Soil Sym.	Soil Description	Penetration ASTM D 1586	"N" (BPF)	Laboratory Data			
					Water Content (%)	Dry Density (pcf)	Shear Strength (psf)	Unified Soil Classif.
0.3'		ASPHALT - (3.0")						
0.9'		GRAVEL - natural aggregate sandy (8.0")						
		CLAY - soft dark brown sandy silty (Fill)	2-1-1	2				Fill
4.0'		SAND - compact brown fine to medium silty (Possible Fill)	2-8-4	12				Fill
6.5'		SAND - compact brown fine to medium	4-5-8	13				SP
9.0'		SAND - slightly compact brown fine to medium with silt seams	2-3-3	6				SP-SM
13.0'		SAND - very compact brown fine	4-12-14	26				SP
17.0'		SAND - very compact brown fine to medium with a trace of gravel	5-9-14	23				SP
20.0'		End of Boring						

PART C
SPECIFICATIONS

FOREWORD

This PART includes the Specifications and is composed of Divisions with each Division further separated into Sections. The first two digits of the five digit group Section number are Division designations.

Sections are divided into four parts. PART 4, entitled Special Provisions, has been added to some Sections and includes special or additional requirements of the Owner or other agencies, special construction requirements, and supplemental specifications. In cases of conflicting or overlapping provisions, those in PART 4 shall take precedence.

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SECTION 01010

DEFINITION OF CONTRACT ITEMS

PART 1 GENERAL

1.01 FOREWORD

- A. This Section describes the various Contract Items listed in the Bid.

1.02 WORK INCLUDED

- A. Under each Item the Contractor shall furnish all labor, materials, tools, plant equipment, supplies, maintenance of equipment, heating, lighting and power, insurance and bonds, coordination, and all work that may be specifically described and included under the respective Items and necessary to complete the work in accordance with the obvious or expressed intent of the Contract Documents.

1.03 WORKMANSHIP AND MATERIALS

- A. The quality of workmanship and materials entering into any and all of the Items and the work included shall conform to pertinent sections, paragraphs, sentences, and clauses, both directly and indirectly applicable thereto, contained in the Contract Documents, whether or not direct reference to such occurs under each Item in this Section.

1.04 PAYMENT

- A. The lump sum and unit prices stated in the Bid shall be payment in full for the completion of all work specified and described or required to be included in the Contract, complete, and ready for use.

PART 2 PRODUCTS

None.

PART 3 EXECUTION

None.

PART 4 SPECIAL PROVISIONS

4.01 CONTRACT ITEMS

- A. The contract items are defined on the following pages.

ITEM 1
MOBILIZATION

1.01 DESCRIPTION

- A. Under this Item, the Contractor shall mobilize all equipment necessary to complete the project as described in the specifications and plans.

1.02 DEFINITION OF ITEMS

- A. Item 1 - Includes Mobilization.

1.03 PAYMENT

- A. The unit price stated in the Bid shall be full compensation for mobilization as specified and required.

ITEM 2
TRAFFIC CONTROL

2.01 DESCRIPTION

- A. Under this Item, the Contractor shall mobilize all equipment necessary to complete the project as described in the specifications and plans.

2.02 DEFINITION OF ITEMS

- A. Item 2 - Includes Traffic Control for 4th Street lane closures at the sewer project.

2.03 PAYMENT

- A. The unit price stated in the Bid shall be full compensation for traffic control as specified and required.

ITEM 3
AUDIO-VIDEO RECORDING

3.01 DESCRIPTION

- A. Under this Item, the Contractor shall produce and deliver to the Owner, color audio-video recordings of existing topography within the zone of influence along the proposed sewer route and audio-video recordings of designated buildings and dwellings as specified and directed.

3.02 DEFINITION OF ITEMS

- A. Item 3 - Includes audio-video recording of the Zone of Influence (Construction Limits).

3.03 PAYMENT

- A. The unit price stated in the Bid for Item 3 shall be full compensation for audio-video recording production as specified and required.

ITEM 4
SURFACE REPLACEMENT

4.01 DESCRIPTION

- A. Under this Item, the Contractor shall reconstruct pavement items, concrete items, and lawns that are removed for the sewer construction, shown on the Drawings and specified herein.
- B. No additional payment will be made for the following:
 - 1. Aggregate used for adjusting roadway shoulders and driveways to match new roadway surfaces.
 - 2. Saw-cutting to provide clean edges for jointing to existing surface items.
 - 3. Asphalt surface course used for adjusting driveways to match new roadway surfaces.

4.02 WORK NOT INCLUDED

- A. Pavement replacement required beyond specified construction limits and items included for payment under other Items.
- B. Pavement and curb and gutters damaged or destroyed beyond specified pay limits shall be replaced at the Contractor's expense.
- C. Concrete curb and gutter listed for payment under other Items.

4.03 DEFINITION OF ITEMS

- A. Item 4a - Includes gravel sub-base, base and surface pavement, concrete curb and slabs, and topsoil and seed to complete replacement of the surfaces disturbed to accommodate the sewer construction.

4.04 MEASUREMENT

- A. Quantities to be paid for under these Items shall be the actual quantity constructed, measured in place within the limits as defined below, and/or scheduled on the Drawings, unless otherwise authorized by the Engineer; in which case, measurement will be made to the authorized limits. When uniform courses are specified, the volume to be paid for shall not exceed the quantity calculated from plan lines and dimensions.
- B. Pay Limits:
 - 1. Depth - As specified, scheduled, or ordered.
 - 2. Length - The actual length ordered.
 - 3. Width - The actual width ordered.

4.05 PAYMENT

- A. The unit price stated in the Bid for Item 4a shall be full compensation for each square yard surface replacement as specified, so measured.

ITEM 13A THROUGH 13C

SEWER PIPE

13.01 DESCRIPTION

- A. Under these Items, the Contractor shall furnish and perform all work necessary for the installation of the sewer pipe as scheduled, shown on the Drawings and specified, in conformance with relevant sections of the Specifications.
- B. These Items shall include all work under the Contract unless specifically included for payment under other Items.
- C. These Items shall include all work to install the sewers, including but not limited to the following (unless included separately): excavation; pavement removal; concrete drive, curb and walk removal; backfill; compaction; bedding; pipe materials; fittings; connections to existing sewers; and related work such as performing infiltration tests.
- D. Connections of new pipe to catch basins or manholes shall be paid for under these Items.
- E. Tap connection for existing or new sewer pipe to the new sewer shall be paid for under these Items.
- F. Removal or abandonment of existing sewers, and removal of manholes or catch basins that are not designated to be replaced with a new respective structure, shall be paid for under these Items.
- G. Additional new sewer pipe required to connect existing sewers into new manholes shall be paid for under the corresponding sewer pipe size Item.
- H. Maintaining existing sewers in operation and making connections to new sewer systems is included under these Items.
- I. Replacement of existing sewers removed or damaged as a result of sewer construction shall be done at the Contractor's expense.
- J. The furnishing and placing of special backfill in areas specified under Section 02200, Subsection 3.07 H. is included under other this Item.
- K. All work required to dewater trenches is included for payment under these Items.

13.02 WORK NOT INCLUDED

- A. Pavement replacement within Contract limits is included for payment under other Items. Pavement removed or damaged beyond specified limits shall be replaced at the Contractor's expense.

13.03 DEFINITION OF ITEMS

- A. Item 13a – Includes removal or abandonment of existing Sanitary Sewer.
- B. Item 13b - Includes 12-inch Sanitary Sewer.
- C. Item 13c – Includes 18-inch Sanitary Sewer.

13.04 MEASUREMENT

- A. The quantities to be paid for under the respective Items shall be the measured length of sewers of the specified sizes.
- B. Payment will be to the center of existing and new manholes and the inside face of poured chambers. No deduction will be made for precast manholes on lines of the same size. Where branches or lines of different diameters enter such manholes, each will be measured to the center thereof.

- C. Sewers installed to bypass sewage during construction will not be measured for payment.
- D. No pipe will be included in these measurements if specifically included for payment under other Items.

13.05 PAYMENT

- A. The unit prices stated in the Bid for item 13a and 13b shall be full compensation for each linear foot of pipe of the sizes furnished and installed as specified, so measured.

ITEM 14
MANHOLES

14.01 DESCRIPTION

- A. Under these Items the Contractor shall construct manholes in locations and of types shown and scheduled on the Drawings and in conformance with relevant Sections of the Specifications.
- B. Work beyond the specified pay limits for the sewer and water main pipe, but necessary for the placement of the manholes, shall be included under these Items. Such work shall include excavation of any material encountered, special backfill material, and pavement replacement.

14.02 WORK NOT INCLUDED

- A. Replacement of existing manholes or catch basins removed or damaged as a result of sewer or water main construction shall be done at the Contractor's expense.

14.03 DEFINITION OF ITEMS

- A. Item 14 – Includes installation of Type I Sanitary Sewer Manholes, including casting and cover, as well as, concrete casting surrounds.

14.04 PAYMENT

- A. The unit prices stated in the Bid for Item 14 shall be full compensation for each item, as specified and required.

ITEM 16
POLLUTION CONTROL

16.01 DESCRIPTION

- A. Under this Item, the Contractor shall obtain and follow the general pollution control measures provided in the specifications and plans. Included are soil erosion and control measures, sanitary sewage control, dechlorination of water from flushing mains, dust control, etc..

16.02 DEFINITION OF ITEMS

- A. Item 16 - Includes Pollution Control.

16.03 PAYMENT

- A. The unit price stated in the Bid shall be full compensation for pollution control as specified and required.

ITEM 18
CONSTRUCTION STAKING

18.01 DESCRIPTION

- A. Under these Items, the Contractor shall provide construction staking as specified.

18.02 DEFINITION OF ITEMS

- A. Item 18 - Includes Construction Staking. The Surveyor shall coordinate the layout and staking for the project with the Engineer.

18.03 PAYMENT

- A. The lump sum price stated in the Bid shall be full compensation for construction staking as specified and required.

END OF SECTION

SECTION 01043

COORDINATION AND CONTROL OF THE WORK

PART 1 GENERAL

1.01 SCOPE

A. This Section includes coordination and control of the Work.

1.02 SUBMITTALS

A. Submittals shall be in accordance with all requirements of Section 01300 and shall include:

1. Information for the Record:
 - a. Bypass Pumping plan and procedures.
 - b. Haul routes to and from project site.

1.03 LINES AND GRADES

A. All work under this Contract shall be built in accordance with the lines and grades shown on the Drawings or as altered or modified by authority of the Owner and Engineer.

1.04 EXISTING STRUCTURES SHOWN ON DRAWINGS

- A. Where underground and surface structures are shown on the Drawings, the location, depth, and dimensions of such structures are believed to be reasonably correct but are not guaranteed.
- B. Such structures are shown for the information of the Contractor, but information so given is not to be construed as a representation that such structures will in all cases be found or encountered just where shown, or that they represent all the structures which may be encountered.

1.05 COOPERATION OF CONTRACTOR

- A. The Contractor shall conduct his operations so as to interfere as little as possible with those of the Owner, other contractors, utilities, or any public authority on or near the Work.
- B. The Owner reserves the right to perform other work by contract or otherwise, and to permit other public bodies, public utility companies, and others to do work on or near the project during progress of the Work. If a conflict arises, the Owner will determine when and how the work shall proceed.
- C. Claims for delay or inconvenience due to operations of such other parties on work specified, shown on the Drawings, as directed or which can be reasonably expected to be encountered by the nature and location of the Work will not be considered.

1.06 MAINTENANCE OF SANITARY SYSTEM DURING CONSTRUCTION

- A. All construction which requires interruption of existing sanitary system flow shall be executed during periods designated by the Owner.
- B. Bypassing of untreated sanitary wastewater to any stream or body of water is prohibited.

1.07 PERMANENT PAVEMENT AND FINAL RESTORATION

A. Permanent pavement and final restoration shall be completed prior to the close of the last paving season prior to the Contract's final completion.

1.08 RESERVED.

1.09 TEMPORARY PARKING FACILITIES

A. Parking spaces for the Contractor's personnel shall be provided and maintained in usable condition by the Contractor at all times. Provisions shall be made so that sediment is not tracked onto paved roadways from the vehicles operated by the Contractor's personnel. The parking areas shall consist of temporary parking areas or new permanent parking areas shown on the Drawings. Temporary parking areas are to be located in the area designated by the Owner and Engineer. At the completion of the project, temporary parking areas shall be removed and the surface restored as specified, shown on the Drawings, as directed or to its original condition.

- B. The Contractor's personnel shall not utilize existing permanent parking areas unless specifically noted otherwise on the Drawings.
- 1.10 RESERVED.
- 1.11 DISPOSAL OF DEBRIS
- A. All debris resulting from construction operations, i.e., packaging, waste materials, damaged equipment, etc., shall be trucked from the site by the Contractor and disposed of at spoil sites.
 - B. The Contractor shall police the hauling of debris to ensure that all spillage from haul trucks is promptly and completely removed from public or private rights-of-way.
 - C. All debris shall be disposed of in accordance with federal, state, and local laws and regulations.
- 1.12 CONTROL OF NOISE
- A. The Contractor shall eliminate noise to as great an extent as possible at all times. Air compressors shall be equipped with silencers and the exhaust of all gasoline motors and other power equipment shall be provided with mufflers. In the vicinity of hospitals, libraries, and schools, precautions shall be taken to avoid noise and other nuisance, and the Contractor shall require strict observances of all pertinent ordinances and regulations. Any blasting permitted in such locations shall be done with reduced charges.
- 1.13 SMOKE PREVENTION
- A. Strict compliance with all ordinances regulating the production and emission of smoke will be required, and the Contractor shall accept full responsibility for all damage that may occur to property as a result of negligence in providing required control.
- 1.14 DEBRIS AND DUST CONTROL
- A. Contractor shall perform debris and dust control in accordance with Section 01568.
- 1.15 SANITARY REGULATIONS
- A. The Contractor shall provide all necessary housing accommodations for the workers for changing clothes and for protection during inclement weather. Toilet accommodations shall also be maintained for the use of the employees on the Work. The accommodations shall be in approved locations, properly screened from public observance and shall be maintained in a strictly sanitary manner. The Contractor shall obey and enforce all other sanitary regulations and orders; shall take precautions against infectious diseases and the spread of same; and shall maintain at all times satisfactory sanitary conditions around all shanties, tool and supply houses, and on all other parts of the Work.
- 1.16 RESERVED.
- 1.17 EMERGENCY MAINTENANCE SUPERVISOR
- A. The Contractor shall submit to the Engineer the names, addresses, and telephone numbers of two employees responsible for performing emergency maintenance and repairs when the Contractor is not working. These employees shall be designated in writing by the Contractor to act as his representative and shall have full authority to act on his behalf as specified in GC 6.2 of the General Conditions.
 - B. Contractor shall post at job site, in a conspicuous location, the emergency numbers for the project.
 - C. Contractor shall be responsible for contacting the local fire, police, and emergency response personnel and organizations in advance of the work. The Contractor shall be responsible for the coordination and compliance with emergency response plans, whether developed by the governing agency, laws, or the Contractor for the project.
 - D. At least one of the designated employees shall be available for a telephone call any time an emergency arises.
- 1.18 PUBLIC SERVICE STRUCTURES
- A. Public service structures shall be understood to include all poles, tracks, pipes, wires, conduits, house-service connections, vaults, manholes, and other appurtenances, whether owned or controlled by the Owner or other public bodies or by privately-owned corporations, used to supply the public with transportation, heating, electric, telephone, gas, water, sewer, or other services.

- B. At least a week in advance of breaking ground, the Contractor shall notify the registered underground protection service, all public bodies, and other owners of such facilities of the proposed location of his operations, advising them that their property may be affected and that such measures as they may deem necessary should be promptly taken to protect, adjust, remove, or build them.
- C. House service connections for water and sewer may not be marked in the field as a part of the protection measure for public utilities. In developed residential and commercial areas, the Contractor shall assume each building and dwelling has water and sewer services and that they shall be protected and repaired as needed as part of the pipeline installation. No additional payment will be made for work associated with supporting or repairs of such services.
- D. Three conditions which may be encountered will be dealt with as follows:
 - 1. Structures which are adjacent to but not included within the limits of an excavation required for performance of the Work shall be protected, supported, and maintained in service by the Contractor at his expense.
 - 2. Structures within the limits of the Work which can be satisfactorily supported and maintained in service and which do not require removal and rebuilding in the judgment of the Engineer shall be thus supported by the Contractor at his expense, including cost of repair of damage incident to his operations.
 - a. Supports for water and gas mains, sewers, conduits, and similar structures shall be constructed of timber or other acceptable materials; shall be supported from undisturbed foundations, and shall be sufficiently substantial to ensure against settlement when pipe trenches or other excavations are backfilled. In all cases where permits or inspection fees are required by utilities in connection with changes to or temporary support of their conduits, the Contractor shall secure such permits and pay all permit and inspection fees.
 - b. The Contractor shall assume full responsibility for maintaining all public service structures in service and shall support and protect, or remove and rebuild them at his own expense. Such services shall not be interrupted without permission of the owner of the public service structure.
 - 3. In case relocation of pipelines or other utility structures is required because of direct interference, as determined jointly by the Owner, Engineer, and Contractor, with the installation of the Work, the Contractor shall notify the Owners of the utility structure involved.
 - a. The Contractor will not be reimbursed for the cost of the relocation if the interference is shown on the Drawings, described in the Specifications, apparent on visual inspection, or specifically included in the Work to be performed by the Contractor.
 - b. The Contractor will not be paid for time lost because of such direct interference. Where it is the policy of any utility owner to perform such work with his own forces, the Contractor shall cooperate to the fullest extent with such utility owner.

1.19 UNAUTHORIZED WORK

- A. Work done beyond the lines shown on the Drawings or ordered, work done without required inspection, except as herein provided, or any Extra Work done without authority will be considered as unauthorized and will not be paid for under the provisions of the Contract. Work so done may be ordered removed at the Contractor's expense. Work done without lines and grades being given shall be considered as unauthorized and subject to rejection.

1.20 RESERVED.

PART 2 PRODUCTS

None.

PART 3 EXECUTION

None.

PART 4 SPECIAL PROVISIONS

4.01 MAINTAINING FLOW IN EXISTING SEWERS

A. Flow in existing storm, sanitary and private sewers shall be maintained at all times during construction of this project. The Contractor shall furnish and install all necessary temporary facilities required to maintain the flow in existing sewers including bulkheads, plugs, stop planks, flumes, coffer dams, pumping equipment, valves, etc.

4.02 REQUIRED SAFETY DOCUMENTATION TO BE SUBMITTED

A. On all projects that require the Contractor's or subcontractor's personnel to occupy permitted confined spaces and/or hazardous atmospheres on the project site, the Contractor shall submit to the Owner, a written proposed safety program. The safety program shall comply with all Federal, State, and local requirements. If the Owner has a safety plan that is more stringent than the Federal and State requirements, it will be made available to the Contractor for review. The submittal of the proposed safety program to the Owner shall be made well in advance of the start of construction at the project site. The submittal shall include a written Safety Management Plan including Confined Space Entry procedures. The Contractor shall be responsible to maintain documentation that anyone employed by the Contractor, subcontractors, or suppliers of any tier to the Contractor occupying such hazardous locations has received the appropriate confined space entry training and other applicable training. The Contractor is also responsible to maintain completed confined space entry permits.

END OF SECTION

SECTION 01090

REFERENCE STANDARDS

PART 1 GENERAL

1.01 SCOPE

A. This Section includes reference standards.

1.02 DESIGNATION OF ASSOCIATIONS, INSTITUTIONS, SOCIETIES & STANDARDS

A. Whenever in these Specifications reference is made to Associations, Institutions, Societies, or Standards, they will be designated as follows:

AA	-	Aluminum Association
AAMA	-	Architectural Aluminum Manufacturers Association
AASHTO	-	American Association of State Highway and Transportation Officials
ACI	-	American Concrete Institute
ADAAG	-	Americans with Disabilities Act Accessibility Guidelines
AFBMA	-	Anti-Friction Bearing Manufacturers Association
AFI	-	Air Filter Institute
AGA	-	American Gas Association
AGMA	-	American Gear Manufacturers Association
AIHA	-	American Industrial Hygiene Association
AISC	-	American Institute of Steel Construction
AISI	-	American Iron & Steel Institute
AITC	-	American Institute of Timber Construction
AMCA	-	Air Moving and Conditioning Association
ANSI	-	American National Standards Institute
API	-	American Petroleum Institute
ARI	-	Air Conditioning and Refrigeration Institute
ASA	-	American Standards Association
ASHRAE	-	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASME	-	American Society of Mechanical Engineers
ASTM	-	American Society for Testing Materials
AWS	-	American Welding Society
AWWA	-	American Water Works Association
BLS	-	Bureau of Labor Standards
CISPI	-	Cast Iron Soil Pipe Institute
FS	-	Federal Specifications
IBR	-	Institute of Boiler and Radiator Manufacturers
IEEE	-	Institute of Electrical and Electronic Engineers
ISA	-	Instrument Society of America
JIC	-	Joint Industrial Council
MDOT	-	Michigan Department of Transportation
NBS	-	National Bureau of Standards
NEC	-	National Electrical Code
NEMA	-	National Electrical Manufacturers Association
NFPA	-	National Fire Protection Association
NSF	-	National Sanitation Foundation
OSHA	-	Occupational Safety and Health Act
SMACNA	-	Sheet Metal and Air Conditioning Contractors National Association, Inc.

SSPC	-	Steel Structures Painting Council
MBC	-	Michigan Building Code
UL	-	Underwriters Laboratories, Inc.
USBM	-	United States Bureau of Mines

- B. Wherever specific standard numbers are indicated, i.e., ASTM C 150, it shall be understood to mean the latest revision thereof.

PART 2 PRODUCTS

None.

PART 3 EXECUTION

None.

PART 4 SPECIAL PROVISIONS

None.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.01 SCOPE

- A. This Section includes requirements for submittals.
- B. Contractor shall adhere to the submittal schedule as submitted under the provisions of the General Conditions. Contractor shall modify the schedule as required to allow sufficient time for submittal review based on current construction schedule.

1.02 COORDINATION OF SUBMITTALS

- A. The Contractor shall be responsible for the coordination of submittals and field verifications as required for the various parts of the work.
- B. All submittals to the Engineer, unless otherwise specified, shall be made only by the Contractor. Direct submittals from subcontractors or suppliers will not be accepted.
- C. All submittals shall reference the Specification item that it covers, the Contractor's name, the Contract title and location, and the date of submission. Submittal shall also indicate whether the information is for the Engineer's review and approval, for record purposes, or for the fulfillment of the operation and maintenance requirements.

PART 2 PRODUCTS

2.01 GENERAL

- A. Two Categories of Information are Normally Required:
 - 1. Shop drawings for Review.
 - 2. Information for Record.

2.02 SHOP DRAWINGS FOR REVIEW

- A. Shop Drawings:
 - 1. The Contractor shall submit shop drawings in accordance with the General Conditions, as required by individual Sections, shown on the Drawings or as directed.
 - 2. The Contractor shall indicate all variances from the requirements of the Contract Documents in accordance with the General Conditions.
 - 3. The Contractor shall clearly indicate the exact intended use of the equipment or material contained in the submittal.
 - 4. Color charts or samples shall be included for all submittals where a color selection by the Owner is required.
- B. Samples shall be provided as required in the individual Sections. Samples shall be of the precise material proposed to be furnished. The number of samples and sample size shall be the industry standard unless otherwise stated in the individual Sections.

2.03 INFORMATION FOR RECORD

- A. Material certificates shall be submitted for materials as indicated in the individual Sections. The certificate shall state that the products have been sampled and tested in accordance with the proper industrial and governmental standards and meet the requirements of the Specifications. Certificates shall be signed by an authorized agent of the manufacturer.

- B. Licenses and Permits - The Contractor shall submit copies of all licenses and permits required by Local, State, and Federal laws to the Engineer.
- C. Installation and calibration certificates shall be submitted for equipment as indicated in the individual Sections. These certificates shall indicate manufacturer's satisfaction with the installation, the accuracy of calibration and alignment, and the operation of the equipment. Such certificates must be signed by an authorized agent of the manufacturer.
- D. Progress Schedules shall be submitted in accordance with the General Conditions and Section 01310.
- E. Schedule of Shop Drawings and Sample Submittals shall be submitted in accordance with the General Conditions.
- F. Schedule of Values shall be submitted in accordance with the General Conditions.

2.04 OPERATION AND MAINTENANCE INFORMATION

- A. Operation and Maintenance manuals shall be submitted as information for the record.
- B. This information will be reviewed only if properly identified with Contract Section Numbers and only after revised, where necessary, to conform to the Engineer's notes on previous submittals that have been marked "Make Corrections Noted." Manuals shall be tailored to suit the specific equipment provided.
- C. Submittals Shall Include But Not Limited to the Following:
 1. Descriptive literature, bulletins, or other data covering equipment or system.
 2. Complete list of equipment and appurtenances included with system, complete with manufacturer serial number and model number.
 3. Utility requirements.
 4. General arrangement drawing.
 5. Sectional assembly.
 6. Dimension print.
 7. Materials of construction.
 8. Certified performance curve.
 9. Parts list with assembly drawings.
 10. Recommended spare parts list with part and catalog number.
 11. Lubrication recommendations and instructions.
 12. Schematic wiring diagrams.
 13. Schematic piping diagrams.
 14. Description of associated instrumentation.
 15. Drive dimensions and data.
 16. Operating instructions.
 17. Maintenance instructions including trouble-shooting guidelines, lubrication, and preventive maintenance instructions with task schedule.
 18. Special tools and equipment required for operation and maintenance.
 19. Description of equipment controls.
 20. Pump seal data.
 21. Assembly, installation, alignment, adjustment, and checking instructions.

22. Confirmation of all corrections noted on shop drawings marked "Make Corrections Noted."
 23. Manufacturer's name, address, and telephone number along with manufacturers job number and Purchase Order number.
 24. Manufacturer's local sales representative, address, telephone number.
 25. All installation instructions that were provided to Contractor for use to install equipment.
- D. All manuals shall be tailored to the project by high-lighting appropriate information and deleting or crossing out nonapplicable information or the Contractor shall provide a data sheet with all necessary information to correctly identify the applicable Sections of the manuals for the actual equipment furnished. All options furnished shall be indicated.
 - E. Manuals shall be printed on 8-1/2 by 11 inch size with standard three hole punching. Large manuals shall be submitted in three-ring binders. Small manuals shall be submitted in folders with metal fasteners. Index tabs shall be furnished for all manuals containing data for three or more items of equipment. All manuals shall have a title label on the cover stating the specification item number and item name. A table of contents shall be included in all manuals.
 - F. Drawings shall be reduced to 8-1/2 by 11 inch or 11 by 17 inch. Where reduction is not possible, larger drawings shall be folded separately and placed in envelopes which are bound into the manual.
 - G. Equipment installations shall not be considered substantially complete until all associated O&M submittals are accepted by the Engineer.
 - H. Field modifications to equipment during installation shall be included in the manual so that the manual reflects as-built conditions. Revisions to the manual may be submitted for incorporation into the manual where appropriate. However, the Engineer reserves the right to return all six manuals for revision to reflect as-built conditions.

PART 3 EXECUTION

3.01 IDENTIFICATION OF SUBMITTALS

- A. All submittals shall be numbered in consecutive order.
- B. Resubmittals shall carry the same number as that of the original submittal and shall be further identified in consecutive order by alphabetical letters (i.e., 1, 1A, 1b, etc.).
- C. Submittals to satisfy the Operation and Maintenance information requirements shall be numbered as resubmittals along with the prefix "O&M" (i.e. Submittal O&M 1B).

3.02 DISTRIBUTION

- A. Distribution of submittals shall be as follows unless otherwise directed in Part 4 or the individual Sections:
 1. Shop Drawings for Review:
 - a. The Contractor shall submit to the Engineer six copies of all documents requiring the Engineer's review and approval.
 - b. If the submittals are found insufficient, three copies will be returned to the Contractor for correction. The Contractor shall then make corrections and resubmit six new copies of the entire submittal.
 - c. Upon acceptance, the Engineer will distribute marked copies via construction bulletins as follows:

One Copy - Owner

One Copy - Resident Project Representative

Three Copies - Contractor

One Copy - Engineer

2. Information for the Record:

- a. The Contractor shall submit three copies of all test certificates, licenses, permits, and installation and calibration certificates directly to the Engineer for distribution to Owner, Resident Project Representative and Engineer.

3. Operation and Maintenance Information:

- a. The Contractor shall submit to the Engineer six copies of information for all equipment requiring maintenance.
- b. Upon acceptance, the Engineer will distribute copies via construction bulletins as follows:
 - 1) Four Copies - Owner
 - 2) One Copy - Resident Project Representative
 - 3) One Copy - Engineer

PART 4 SPECIAL PROVISIONS

None.

END OF SECTION

SECTION 01310

CONSTRUCTION SCHEDULES & DOCUMENTATION

PART 1 GENERAL

1.01 SCOPE

- A. This Section includes the requirements for construction schedules and construction sequences.
- B. This Section includes the requirements for the tracking and documentation of the progress and activities driving the completion of the work as specified, shown on the Drawings and as directed.

1.02 SUBMITTALS

- A. Submittals shall be in accordance with all the requirements of Section 01300 and shall include:
 - 1. Information for the Record:
 - a. Preliminary Construction Schedule.
 - b. Contractor's Construction Schedule and monthly updates.
 - c. Submittals Schedule.
- B. Contractor shall submit three copies of the 24-inch by 36-inch construction schedule, unless approved otherwise by the Engineer.

1.03 QUALITY ASSURANCE

- A. Scheduling conference shall be held prior to the commencement of the construction to discuss the following including, but not limited to.
 - 1. Construction sequencing
 - 2. Contractor's coordination of subcontractors
 - 3. Coordination with the Owner's operations
 - 4. Coordination with other Contractor's or other work.
 - 5. Project milestones.
 - 6. Owner's partial utilization.

PART 2 PRODUCTS

2.01 PRELIMINARY CONSTRUCTION SCHEDULE

- A. Preliminary construction schedule shall be completed in accordance with the General Conditions and prior to the scheduling conference.
- B. The preliminary schedule shall outline the Contractor's sequencing of tasks, activities, milestones, and all critical path items within the contract time.

2.02 CONSTRUCTION SCHEDULE

- A. The Contractor's submission of the construction schedule will not change the contract completion date, whether reviewed by the Owner and Engineer or not. The Contractor shall incorporate all approved change orders that have resulted in a contract time extension.

- B. The Contractor shall require all subcontractors engaged in the work to submit to the Contractor construction schedules, as specified herein, for incorporation into the Contractor's construction schedule.
- C. The construction schedule shall include, but not limited to, the following dates:
 - 1. Notice to Proceed.
 - 2. Substantial Completion and Final Completion.
 - 3. Commencement of on-site operations.
 - 4. Milestones as specified, shown on the Drawings, and as directed.
 - 5. Ordering, submittals, fabrication, delivery, startup, and training time of major equipment items.
 - 6. Submittal schedule per the General Conditions.
- D. The Contractor shall incorporate into the construction schedule all constraints and work restrictions specified or otherwise required by the Contractor's operations, including, but not limited to, the following:
 - 1. Construction sequencing.
 - 2. Contractor's coordination of subcontractors.
 - 3. Coordination with the Owner's operations.
 - 4. Coordination with other Contractor's or other work.
 - 5. Project milestones.
 - 6. Owner's partial utilization.

2.03 UPDATING CONSTRUCTION SCHEDULE

- A. The Contractor shall keep the construction schedule current to the progress of the work continually through closeout of the project. The construction schedule shall be submitted monthly for the Engineer's review.

2.04 WEEKLY CONSTRUCTION SCHEDULE

- A. The Contractor shall submit a schedule of his work for each week. This schedule shall identify the foreman of each work crew and the location and type of work the crew will be doing each day. It shall be delivered no later than 4:00 p.m. of the next to last regular workday of the preceding week to the Resident Project Representative's office.

PART 3 EXECUTION

3.01 COORDINATION

- A. All phases of the Work requiring interference with normal operations of the existing facilities shall be scheduled in accordance with agreements among the Contractor, Owner, and Engineer. The Contractor shall notify the Owner at least one week before such work is to begin.

PART 4 SPECIAL PROVISIONS

4.01 Contractor shall use the following schedule for beginning and completing projects.

	Sanitary Sewer Relocation
Begin Construction	October 15, 2016
Complete Construction	November 30, 2016

4.02 SCHEDULED NON-WORK DAYS

A. The Contractor shall restrict work to 7AM – 7PM and consider the following list of holidays as mandatory non-work days, all of which shall be incorporated into the construction schedule:

1. New Year's day
2. Martin Luther King day
3. President's day
4. Good Friday
5. Memorial day
6. Fourth of July
7. Labor day
8. Columbus day
9. Veteran's day
10. Thanksgiving day
11. Day after Thanksgiving day
12. Christmas Eve day
13. Christmas day

END OF SECTION

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SECTION 01350

COMMON PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SCOPE

- A. This Section includes general requirements for all materials, equipment and systems furnished or installed under this project.
- B. Additional specific requirements included under a particular Section shall take precedence.
- C. This Section includes, but is not limited to, the following procedural and administrative requirements:
 - 1. Product Delivery Storage and Handling
 - 2. Warranties
 - 3. Quality Assurance and Control

1.02 SUBMITTALS

- A. Submittals shall be in accordance with section 01300 and related specification sections.
- B. The specification Sections and Drawings contain the specific submittal requirements.

1.03 QUALITY ASSURANCE

- A. Where Contractor is required to provide design services or certification of the design, the specified product, equipment or system shall comply with the specified criteria.
 - 1. Contractor shall submit a written request for clarification when specified criteria is incomplete or insufficient.
- B. Manufacturer's name, make, model number and other designations provided in the contract documents are to establish the significant characteristics, including but not limited to, type, function, dimensions and physical properties, performance, and appearance for the purpose of evaluating comparable products. Contractor shall verify product, equipment or system proposed meets or exceeds the requirements as specified or shown on the Drawings.

1.04 PRODUCT HANDLING

- A. Schedule delivery to minimize the time goods are kept in storage.
- B. Deliver goods to project site in manufacturer's original packaging.
- C. Inspect the goods to determine if there is visible damage to the packaging.
 - 1. The packaging shall be removed in a manner that will allow resealing for storage.
 - 2. If packaging can not be removed and reused, the goods shall be repackaged per the manufacturer's recommendations.
- D. Goods that are susceptible to damage by the environmental or project conditions, including but not limited to, switchgear, motor control centers, panelboards, instrument control panels, fixtures shall be stored in a controlled environment per the manufacturer's recommendations. If no such area is available at the time such equipment is received, such space shall be provided by the Contractor at no expense to the Owner.
- E. Where construction is in roads or streets, that portion of the right-of-way not required for public travel may be used for temporary storage purposes unless otherwise prohibited. Materials shall not be stored in areas where such storage creates a hazard. Any other

additional space required for construction or storage of materials and equipment shall be obtained by the Contractor at his expense.

- F. The Contractor shall confine his equipment, the storage of materials and equipment, and the operations of his workers to areas permitted by law, ordinances, permits, and the requirements of the Contract Documents, and shall not unreasonably encumber the premises with materials or equipment.

1.05 WARRANTY

- A. Manufacturer's warranty, extending beyond one-year after substantial completion for the specified product, equipment or system shall be provided to the Owner and endorsed by the manufacturer.
- B. Requirements for warranties extending beyond one-year after substantial completion are described in individual Sections of these specifications.
- C. Manufacturer's limitations and disclaimers shall not relieve the Contractor from warranty obligations under the Contract Documents.

PART 2 PRODUCTS

2.01 RESERVED.

2.02 RESERVED.

2.03 REGULATORY REQUIREMENTS

- A. Materials, equipment, coatings, and chemicals in contact with potable water or water being treated for potable water use shall comply with the applicable NSF Standards.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Products shall be installed in accordance with the manufacturer's instructions and Contract Documents.
- B. Required appurtenances including but not limited to, anchors, grout, and leveling shims, shall be provided.

PART 4 SPECIAL PROVISIONS

None.

END OF SECTION

SECTION 01410

LABORATORY SERVICES

PART 1 GENERAL

1.01 SCOPE

- A. The Contractor shall retain an independent laboratory.
- B. Testing, inspection(s) and quality control are required to certify compliance with the Contract Documents.
 - 1. The laboratory services do not relieve the Contractor from the responsibility of compliance with the Contract Documents
 - 2. Any test required by the Owner shall not relieve the Contractor from the responsibility of compliance with the Contract Documents.
 - 3. Any test required by the Owner shall not relieve the Contractor from the responsibility of supplying certificates from manufacturers or suppliers to demonstrate compliance with the Specifications.
- C. Specific testing, inspection(s) and quality control requirements are specified in the individual Sections of the specifications.
- D. Specific testing, inspection(s) and quality control requirements of any Federal, State or Local authorities are specified in the related sections of work.
- E. Testing of materials or equipment for compliance with various national or technical society standards and ordinarily performed by manufacturers, and shop and field tests of equipment are not included under this Section but shall be performed by the Contractor or his supplier as specified elsewhere.
- F. Contractor may conduct material or field test(s), inspection(s) and quality control as they deem necessary.
 - 1. Should the Contractor, at any time, desire the Owner to consider the results of such testing, inspection(s), and quality control, such results shall be certified by an independent testing laboratory acceptable to the Owner. Any testing of this nature shall be conducted at the Contractor's expense.

1.02 SUBMITTALS

- A. Submittals of all required field and laboratory test results shall be made by the independent laboratory as soon as they are available to the Owner and Engineer directly.
 - 1. Statement of Compliance per 1.03

1.03 QUALITY ASSURANCE

- A. The laboratory shall be a recognized and independent commercial laboratory with experience in conducting the required tests.
- B. Laboratory shall certify compliance with ASTM E 548, ASTM E 329, and ASTM C 1093 when masonry construction is part of the project scope. In lieu of ASTM certification, the laboratory may submit written documentation demonstrating experience and training relevant to the inspections to be performed. The documentation shall demonstrate experience with projects of similar complexity and quantity of inspections as the project herein.
- C. Testing, inspection(s) and quality control shall be certified by a professional engineer specialized in the related field and in the state where the project site is located.

PART 2 PRODUCTS

2.01 TESTS

- A. Aggregates, Bedding Material, and Special Backfill - For each type of material, the laboratory shall perform an ASTM C-136 sieve and screen analysis to determine compliance with the contract documents.
 - 1. Retests shall be performed until the Specifications are met.
 - 2. Retest shall be performed each time the source of material is changed.
- B. Selected Backfill - At the discretion of the Engineer, but in no case more than one test for each 1,000 cy or portion thereof, the laboratory shall perform an ASTM C-136 sieve and screen analysis to determine whether the material is suitable for backfilling purposes.
- C. Mix Designs:
 - 1. For each type of controlled density fill, concrete, and asphalt, the laboratory shall review, perform test(s).
 - 2. Review, perform test(s) and approve change in source of materials.
 - 3. The asphalt design shall be made in accordance with ASTM D-1559, the Marshall Method of Mix Design and as specified.
 - 4. Approved mix designs shall include sieve analyses and suppliers' certificates for materials incorporated in the mix.
- D. Compaction Tests:
 - 1. For each type of backfill material, the laboratory shall determine the moisture-density curve according to ASTM D-698.
 - 2. Using ASTM D-2922 test methods, the laboratory shall determine the density of placed backfill.
 - 3. Retests shall be performed if the compaction requirements stated in the individual Sections are not met.
 - 4. The Engineer may at his discretion require the sand cone (ASTM D-1556) or the balloon (ASTM D-2167) tests for density and compaction to verify questionable results of the ASTM D-2922 tests.
- E. Soil Bearing Capacity Tests:
 - 1. The independent testing laboratory shall test and report the soil bearing capacity under all foundations and slabs on grade. The testing shall be conducted at regular intervals in all directions. The independent testing laboratory shall immediately notify both the Contractor and Engineer of any such test not meeting the presumed soil bearing capacity contained in the Structural Design Data on the Drawings.
- F. Asphalt and Concrete Quality Control Testing - Perform tests as indicated in Sections 02600 and 03300.
- G. Miscellaneous Tests - Perform all other tests requested in the individual Sections of the Specifications.

2.02 PLANT INSPECTIONS

- A. Inspect and certify asphalt and concrete plants as indicated in Sections 02600 and 03300, respectively.

2.03 EQUIPMENT

- A. Provide all necessary equipment to extract and store samples and perform the required tests.

PART 3 EXECUTION

3.01 COORDINATION

- A. The Contractor shall provide the source of all materials requiring testing and shall arrange access for the independent laboratory to obtain representative samples and perform required tests at the material source. The information shall be supplied in advance to allow time for testing and reporting. Concrete information shall be supplied at least 45 days prior to the first concrete placement.
- B. Contractor shall coordinate activities to accommodate the required quality assurance/control.
 - 1. Contractor shall not compromise the requirement for quality assurance /control in order to maintain the schedule.
- C. The laboratory shall conduct tests on materials and in locations as directed by the Resident Project Representative.
- D. All tests shall be performed in accordance with the proper test methods mentioned above and in the individual Sections. Results shall be compared to the required values included in the individual Sections.

3.02 PREPARATION

- A. Contractor shall prepare all work to be tested in accordance with the testing procedures as directed and required by independent laboratory, regulatory agency, or Owner and Owner's representative.

3.03 PROTECTION

- A. Contractor shall at the completion of testing, repair damage to construction in accordance with these specifications.
- B. Contractor shall be responsible for the protection regardless of the responsibility for quality assurance/control.

PART 4 SPECIAL PROVISIONS

None.

END OF SECTION

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SECTION 01500

MAINTAINING TRAFFIC

PART 1 GENERAL

1.01 SCOPE

- A. This Section includes the furnishing of all labor, materials, equipment, and services necessary for maintaining and protecting vehicular and pedestrian traffic.

1.02 SUBMITTALS

- A. Submittals shall be in accordance with the requirements of Section 01300 and shall include:
 - 1. Information for the Record:
 - a. The Contractor shall submit the name, address, and telephone number of a local individual who will be responsible for maintaining traffic facilities when the Contractor is not working.
 - b. Traffic control or maintenance plans with govern authority(s) approval.
 - c. Detour routes with governing authority(s) approval.
 - d. Delivery and haul routes for contractor's activities outside the zone of influence.

1.03 QUALITY ASSURANCE

- A. The installation, maintenance, and operation of all traffic controls and traffic control devices shall conform to the requirements of the State Department of Transportation Manual of Uniform Traffic Control Devices for Streets and Highways, hereinafter called the MUTCD.
- B. If, in the opinion of the authority having jurisdiction over traffic in the affected thoroughfares, proper maintenance of traffic facilities and proper provisions for traffic control are not being provided by the Contractor, they may take the necessary steps to place them in proper condition, and the cost of such services will be deducted from any money which may be due or become due the Contractor.
- C. A traffic control conference, attended by Owner, Engineer, Contractor and governing authority, shall be held no later than 14 days prior to any traffic maintenance, placement of traffic control devices, lane closures, detouring of traffic or other activity that impedes the normal traffic flow.

PART 2 PRODUCTS

2.01 TRAFFIC CONTROL DEVICES

- A. Traffic control devices shall be provided with suitable supports of sufficient strength and stability.
- B. Faces of orange construction signs, barricades, vertical panels and drum bands shall be suitably reflectorized with sheeting.
- C. Traffic cones shall be a highly visible orange color.
- D. Pavement markings for traffic maintenance shall conform to the requirements of MDOT, the local authority and the MUTCD.

2.02 TEMPORARY TRAFFIC SIGNALS

- A. The Contractor shall furnish, erect, maintain, and subsequently remove signal and signal controller equipment of a proper type and capacity to provide the required operation, and shall meet the general requirements of MDOT and the MUTCD.
 - 1. Any malfunctions or failures shall be corrected without delay. Temporary traffic signals not in use shall be covered or removed.
- B. The Contractor shall be responsible for the procurement of and payment for electric power for temporary traffic signals.

PART 3 EXECUTION

3.01 COORDINATION

- A. The Contractor shall provide and maintain in safe condition such temporary facilities for vehicular and pedestrian traffic as may be necessary to provide safe vehicular and pedestrian ingress and egress for all property adjacent to the improvements. Such access shall be provided at all times unless workers or machinery are in the immediate area. Access shall be provided to all properties at the end of the work day.
- B. When the street or highway under construction is being used by vehicular traffic including periods of suspension of the work, the Contractor shall maintain that portion of the street or highway being used to ensure that it is smooth, free from holes, ruts, ridges, bumps, and dust.
- C. The Owner will enter upon that portion of a project, where the Contractor is responsible for maintaining through traffic on part or the entire project, to place abrasives at its own expense, as may be considered advisable.
 - 1. The Contractor shall be responsible for the removal of abrasives placed, for which no claim for additional compensation shall be allowed nor shall the Contractor be relieved in any way of his obligation for maintenance of traffic.
- D. The Owner will provide for the necessary maintenance of public streets or highways which are used as detour beyond the work limits of the contract.

3.02 TRAFFIC CONTROL

- A. Barricades, vertical panels, and cones shall be protected by adequate advance warning construction signs.
- B. Equipment and material stored on the highway shall be marked at all times. At night any such material or equipment stored within rights-of-way and easement(s) shall be clearly outlined with dependable lighted devices.
- C. Contractor shall provide any other lights, barricades, etc., that may be needed for the protection of pedestrian traffic in all areas where materials are stored.
- D. Road Closed - When a highway is permitted to be closed to traffic, the Contractor shall provide, erect, maintain, and subsequently remove approved traffic control devices, barricades, and suitable and sufficient red or yellow lights.

3.03 TRAFFIC MAINTAINED

- A. Where the street or highway under construction is being used by vehicular traffic, including periods of suspension of the work, the Contractor shall furnish and maintain pavement markings, lights, warning signs, road construction traffic maintained signs, and end construction signs, barricades, temporary guardrail, and such other traffic control devices, and flaggers as may be necessary to maintain safe traffic conditions within the work limits.

- B. Existing signs and traffic control devices within the work limits shall remain in use during the construction period. If the Contractor needs to relocate or modify permanent signs and other traffic control devices as a consequence of his work, he shall provide suitable supports and may modify the devices with prior approval of the Engineer and the concurrence of the maintaining agency. Routine maintenance of permanent traffic control devices will remain the responsibility of the maintaining agency.
- C. The function of existing Stop or Yield signs shall be retained at all times although their position may be adjusted. Existing signs that must be relocated laterally shall be placed in accordance with the MUTCD.
- D. When an existing signal operation must be interrupted for a period, the Contractor shall provide a temporary traffic control method.
- E. The Contractor shall obtain the approval of the Owner and Engineer before closing a traffic lane or establishing a one-way traffic operation.
- F. Flaggers:
 1. Whenever one-way traffic is established, at least two flaggers shall be used and signs, cones, barricades, and other traffic control devices shall be erected by the Contractor in accordance with the MUTCD. The Contractor shall maintain positive and quick means of communication between the flaggers at the opposite ends of the restricted area.
 2. Flaggers shall be equipped according to the standards for flagging traffic contained in the MUTCD. At night, flaggers' stations shall be adequately illuminated.
 3. The Contractor may, in lieu of flaggers, or supplementing them, furnish, install, and operate a temporary traffic signal or signals, for the purpose of regulating traffic.

3.04 SNOW AND ICE REMOVAL

- A. The state and local authority responsible for snow and ice removal will be responsible for removals during the construction provided the following:
 1. The project area is open to public access.
 2. In the opinion of the state and local authority the project area is accessible with their equipment.
 3. In the opinion of the state and local authority the street surface will not cause damage to their equipment or their equipment will not cause damage to the street.
- B. The Contractor shall be responsible for snow and ice removal during construction when:
 1. The project area is closed to public access.
 2. When Limited access is provided for local traffic but area is closed to through traffic.
 3. The project area pavement has removed or damaged to the extent that the state and local authority's equipment will no longer effectively remove snow and ice or will cause damage to project area.

PART 4 SPECIAL PROVISIONS

4.01 RESTORATION OF PAVEMENT SURFACES OUTSIDE THE ZONE OF INFLUENCE

- A. Contractor shall restore all damaged pavement surfaces in streets used by the Contractor for moving materials and equipment to and from the construction area and streets used for bypassing or detouring traffic around the construction area.

- B. Materials used in replacing damaged areas of the road shall be as specified in Section 02600 of these Specifications. .
- C. The pavement shall be restored with pavement of the same type and thickness as the existing pavement, in accordance with Section 02600 of these Specifications.

END OF SECTION

SECTION 01568

POLLUTION CONTROL

PART 1 GENERAL

1.01 SCOPE

- A. This Section includes the requirements for pollution control.

PART 2 PRODUCTS

2.01 GENERAL

- A. Dust palliatives shall conform to MDOT Item 922.08.

PART 3 EXECUTION

3.01 MICHIGAN GENERAL REQUIREMENTS

- A. The Contractor is responsible to obtain and pay for NPDES Permit for storm water discharge.
- B. The Contractor is responsible for following an erosion control plan in accordance with permits required under Act 451, Part 91, as amended (Soil Erosion and Sedimentation Control), Part 303 (Wetland Protection, formerly Act 203), Part 301 (Inland Lakes and Streams, formerly Act 346), Part 31, (Water Resources Protection, Floodplain Regulatory Authority, formerly Act 245 as amended by Act 167), and Part 31 (Water Resources Protection), National Pollutant Discharge Elimination System (NPDES). Secure Federal Section 404, Clean Water Act of 1972, permits, if required. Provide temporary and permanent erosion and sedimentation controls according to the permits.
- C. It shall be the responsibility of the Contractor to prevent or limit pollution of air and water resulting from his operations.
- D. The Contractor shall perform work required to prevent soil from eroding or otherwise entering onto all paved areas and into natural watercourses, ditches, and public sewer systems, and to prevent dust attributable to his operations from entering the atmosphere.
- E. Water containing suspended material from any part of the Contractor's operations shall be clarified before discharging to drains or streams.
- F. No fill, topsoil, or heavy equipment shall be stored within 200-feet of a stream bank or within the dripline of a treed area.
- G. Excess soil that is stockpiled shall be removed or regraded within 15 days of the completion of construction.

3.02 STREETS, SIDEWALKS, AND DRIVEWAYS

- A. Streets, haul roads, and detours and bypass roads shall be swept by automatic self-contained sweepers.
- B. Excessive dirt on pavements shall be removed by means of hand shoveling or appropriate mechanical equipment and the area swept as directed above.
- C. Sidewalks and driveways shall be cleaned by means of shovels and hand brooms or appropriate mechanical equipment.
- D. Dust on unsurfaced streets or parking areas and any remaining dust on surfaced streets shall be controlled with calcium chloride dust palliative.

- E. The Contractor shall comply with the above requirements on a daily basis. If the Contractor fails to perform the above work in a satisfactory manner, all work, except cleanup operations, shall be stopped until the Contractor has complied with the above requirement.

3.03 EROSION AND SEDIMENT CONTROL

- A. The Contractor shall initiate appropriate vegetative practices on all disturbed areas to remain dormant (undisturbed) for more than 45 days within seven days.
 - 1. Such practices may include: temporary seeding, permanent seeding, mulching, matting sod stabilization, vegetative buffer strips, phasing and protection of trees.
- B. Permanent or temporary soil stabilization shall be applied to disturbed areas within seven (7) days after final grade is reached on any portion of the site.
- C. When seasonal conditions prohibit the application of temporary or permanent seeding, non-vegetative soil stabilization practices, such as mulching and matting, shall be used.
- D. A stabilization construction entrance shall be provided to reduce vehicle tracking of sediment. The paved street adjacent to the site entrance shall be swept a minimum of daily, or as needed, to remove any excess mud, dirt, or rock being tracked from the site.
 - 1. Dust and sediment along any street due to construction on this site is to be swept a minimum of once at the end of the day or as necessary to prevent a build-up of dust and soil on the pavement surface.
- E. Dump trucks hauling from the construction site shall be covered with a tarpaulin.
- F. No more than 200-feet of trench shall be open at any given time. Trench opening, laying of pipe, and backfilling should occur so as to minimize the amount of disturbed area.
- G. The Contractor shall minimize the width of his work area.
- H. Existing trees, shrubs, and other ground cover vegetation shall be preserved where possible. Tree removal will be limited to that necessary for construction and will be limited further to the permanent easement wherever possible. No tree removal will be permitted outside the temporary easement.
- I. Storm water runoff and natural stream flow shall be intercepted or diverted when originating upgrade away from the construction site so as to minimize the amount of flow over the construction site.
- J. All dewatering flows are to be settled in siltation basins or directed through filters before discharge to stabilized sites, such as stream or storm sewers, and not onto exposed soils, stream banks, or any other sites where the flow could cause erosion.
- K. When construction occurs near storm sewer inlets, erosion control measures such as inlet filters or hay bales shall be used to prevent silt from entering the storm sewers.
- L. The clean-up and disposal of excess excavated material shall be done as soon as practical after laying of the pipe. However, clean-up work shall not fall behind the pipe laying more than 800-feet. Should the Contractor not keep his clean-up within the aforementioned distance, work shall stop until the clean-up work is accomplished.

3.04 MICHIGAN SEDIMENT CONTROL

- A. Contractor shall control erosion and trap sediment from all sites remaining disturbed for more than 14 days. Such practices shall include among others, sediment traps, sediment basins, silt fences, and storm drain inlet protection. Silt Fence Fabric shall be in accordance with MDOT Item 910.04 Silt Fence Geotextile.

- B. Timing - Sediment control structures shall be functional throughout earth-disturbing activity. Sediment ponds and perimeter sediment barriers shall be implemented as the first step of grading and within seven days from the start of grubbing. They shall continue to function until the upslope development area is restabilized.
- C. Settling Ponds - Concentrated storm water runoff from disturbed areas flowing at rates which exceed the design capacity of sediment barriers shall pass through a sediment settling pond. The facility's storage capacity shall be 67 cubic yards per acre of drainage area.
- D. Sediment Barriers - Sheet flow from runoff from denuded area shall be intercepted by sediment barriers. Sediment barriers, such as sediment fences or diversions directing runoff to settling facilities, shall protect adjacent properties and water resources from sediment transported by sheet flow.
- E. Other erosion and sediment control practices shall prevent sediment-laden water from entering drain systems. Unless the storm drain system drains to a settling pond. These practices shall divert runoff from distributed areas and steep slopes where practicable and stabilize channels and outfalls from erosive flows.

3.05 CONSTRUCTION ON SLOPES

- A. The Contractor shall comply with the following requirements when working on slopes exceeding 4:1.
 - 1. The pipeline shall be constructed during dry weather, low flow periods as determined by the Engineer. The construction time for this work shall be limited to the shortest time possible in order to minimize environmental impacts.
 - 2. Construction equipment shall be limited to trenching equipment or rubber tired backhoes in order to prevent soil erosion and maintain slope stabilization.
 - 3. Biodegradable mesh shall be used for slope stabilization. The mesh shall cover the entire width of disturbed ground.
 - 4. The trench shall be backfilled immediately after installation of the pipe. The disturbed areas shall be graded, seeded, and mulched within 24 hours after backfilling. The Contractor shall maintain all seeded and mulched areas in accordance with the specifications until final acceptance of the work.
 - 5. The Contractor shall place straw or hay bales at the base of the slopes for sedimentation control. The bales shall be placed prior to construction of the pipeline and shall remain until final seeding has germinated and become established.

3.06 RESERVED.

PART 4 SPECIAL PROVISIONS

None.

END OF SECTION

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SECTION 01800

CONSTRUCTION SURVEY WORK

PART 1 GENERAL

1.01 SCOPE

- A. This Section includes the furnishing of all labor, materials, equipment, and services necessary for the completion of Construction Survey Work in accordance with the Contract Documents.
- B. This Work consists of the layout of all lines and grades shown on the Drawings or as altered or modified by the Engineer, control survey and of miscellaneous survey work related to construction of the project.

1.02 PROJECTION

- A. The Contractor shall protect and preserve the established reference points and monuments.
- B. Whenever monuments are encountered in the line of work, whether shown on the Drawings or not, the Contractor shall notify the Engineer in writing at least 24 hours in advance of moving same, and under no circumstances is such a stone or other monument to be removed or disturbed by the Contractor or by any of his men without a written order of the Engineer and only when a registered surveyor representative of the Owner is present.

1.03 REPLACEMENT OF LOST SURVEY POINTS

- A. Whenever a reference point or monument is lost or destroyed or requires relocation, the Contractor shall, at his own expense, accurately relocate and replace all such points so lost, destroyed, and moved.

1.04 SUBMITTALS

- A. Submittals shall be in accordance with the requirements of Section 01300 and shall include:
 - 1. Information for the Record:
 - a. Layout Sheets including, but not limited to, Benchmarks both temporary and permanent and Pipeline layout staking.
 - b. Field Notes and survey log.
 - c. Profile over Proposed Tunneled, Jacked, or Bored Pipe.
 - d. Certified Survey of Tunneled, Jacked, or Bored Pipe.
- B. Contractor shall provide the Engineer and Resident Project Representative, no later than five working days prior to installation, all Logs, reports, field notes, drawings and documentation as specified shown on the Drawings or directed
- C. No pipeline or related work shall be considered for payment until all logs, reports field notes drawings and documentation as specified, shown on the Drawings or directed has been submitted to the Engineer or Engineers representative.

PART 2 PRODUCTS

2.01 CONSTRUCTION STAKING

- A. All construction points shall be marked with a wooden hub and nail or a PK nails in concrete and asphalt pavements and walks.

- B. All points located in areas of heavy underbrush, inaccessible or limited site distance shall be identified with a wood lath extending a minimum of 3 feet above the ground.
- C. All points located in paved surfaces shall be clearly marked with paint. Contractor shall obtain written permission from owner to use paint for marking.

PART 3 EXECUTION

3.01 COORDINATION

- A. The Contractor shall provide field forces necessary to lay out the location, alignment, elevation, and grade of the Work shown on the Drawings and in conformance with the control points and benchmarks shown on the Drawings.
- B. The Contractor shall use competent personnel and suitable equipment for the layout of the work required. If the layout work involves more than a few simple distance and elevations from established reference points, the Contractor shall employ a Registered Surveyor to supervise the layout work.
- C. Contractor shall furnish the necessary labor to assist the Engineer in checking the installation, if required.

3.02 EXISTING CONNECTION POINTS

- A. The Contractor shall verify critical elevation points of the existing utilities prior to commencing installation of work. Critical points shall include all points where new work connects to existing utilities and existing utilities that could be conflicts with work. All data shall be provided to the Engineer before commencing work.

3.03 RIGHTS-OF-WAY AND EASEMENTS

- A. Rights-of-way or easement(s) shall be staked at points along the boundaries so that at least two stakes can be seen distinctly from any point along the boundary line. The staking shall not exceed 200-feet in any direction. All points of change in width or direction of the rights-of-way or easement(s) boundary line shall be staked.
- B. When the Contractor performs construction and the zone of influence is within 10-feet of a rights-of-way or easement(s) boundary line, they shall place stakes properly identifying points of change in width or direction of the boundary line and at points along the boundary line not to exceed 25-feet.

3.04 PAVEMENT

- A. The Contractor shall establish a layout for location and grade on both sides of the road and 5-feet off the edge of the pavement or back of curb. Layout line shall consist of stakes set at station intervals necessary for the topography and environment to assure conformance to planned line and grade. As a minimum, stakes shall be set every 50-feet, at all vertical and horizontal points of curvature and points of tangent, and at all vertical high or low points.
- B. Stakes for line and grade of pavement and curb shall be set at station intervals necessary for the topography and environment, not to exceed 50-feet, and at low and high points of vertical curves to assure conformance to planned line and grade.

3.05 PIPE IN OPEN CUT

- A. The Contractor shall utilize a laser beam for establishing line and grade when installing pipeline in open-cut construction. In order to maintain control during pipeline installation and to obtain the required field data for the record documents (G.C. 6.19) the Contractor shall establish construction and layout stakes. These stakes shall be based on the contract documents and the survey control data as provided by the Engineer.
- B. The construction staking shall be placed along the pipeline route at 50-foot intervals or less, and at location of new manholes, valves, deflections both vertical and horizontal and

as specified, shown on the Drawings or as directed. All construction layout stakes shall be offset at a minimum of 10-feet and at a right angle to the pipe line route. Layout shall be referenced to the downstream manhole or valve, in addition it may reference survey of baseline stationing.

- C. Contractor shall provide to the Engineer, no later than five working days prior to the installation of the pipeline, all information of the completed construction layout staking. This information shall include but not be limited to stationing, elevations, control points, project coordinates, offset direction and distance for all deflections both horizontal and vertical, manholes and all other points as specified, shown on the Drawings and directed by the Engineer.
- D. The grade of pipe in open-cut, whether placed by laser beam or other approved methods, shall be checked using surveying equipment. The Contractor shall have a surveyor's level and level rod on the site at all times when pipeline and appurtenances are being installed. The level rod shall be equipped with an attached "shoe" extension on the bottom for placing on the pipe invert. The pipe invert elevation shall be checked at a maximum of 50-foot intervals or more often as directed by the Engineer. Checks will be performed by the Contractor and results, including but not limited to layout station shall be recorded in contractor's field log.
- E. The Contractor shall furnish all equipment and labor and check his alignment from the offset stakes at a maximum of 50-foot intervals. Contractor shall record all information in the log.
- F. Any inspection or checking of the Contractor's layout by the Engineer shall not relieve the Contractor of his responsibility to secure the proper dimensions, grades, and elevations of the work.

3.06 LOCATION OF STRUCTURES AND UNDERGROUND PIPING

- A. The location of new structures and underground utilities shall be based on the dimensions, coordinates, and requirements shown on the Drawings or specified.
- B. If it is stated on the Drawings or specified that the location and/or elevation of the new structure or underground piping shall depend on the location of existing underground or otherwise hidden facilities, those existing underground or hidden facilities shall be located by the Contractor prior to his determination of the location and/or elevation of the new facilities. This requirement shall override any other specific location dimensions or coordinates shown on the Drawings for that structure or piping.
- C. If the location or elevation determined by the Contractor, in accordance with the above requirements, appears to cause conflicts with existing structures or utilities or appears to potentially cause functional issues with either the existing or new structures or utilities, the Contractor shall notify the Engineer immediately.
- D. In no case shall coordinates or other location information be extracted or interpolated from the electronic CAD files that may be provided to the Contractor by the Owner or Engineer without the specific approval of the Engineer.

PART 4 SPECIAL PROVISIONS

4.01 REGISTERED SURVEYOR

- A. The Contractor shall employ the services of a registered surveyor for the initial layout and staking of the project. The Registered Surveyor shall be utilized at any time when reestablishing control points, elevations and on any redesign or extension of the work. All survey work shall be as specified, shown on the drawings or as directed.

END OF SECTION

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SECTION 01810

AUDIO-VIDEO RECORDING

PART 1 GENERAL

1.01 SCOPE

- A. Under this Section the Contractor shall furnish all personnel, transportation, recording equipment, power, and materials to produce color audio-video records of existing topography along all pipeline routes and designated haul roads, in designated residences, and as directed.

1.02 SCHEDULE OF WORK

- A. Unless otherwise directed in writing by the Engineer, video recording shall be scheduled in conformance with the following:
 - 1. No recording shall be started on any portion of the work until that portion of the work is under Contract unless otherwise directed by the Owner.
 - 2. Recording shall not precede excavation for construction by more than three months.
 - 3. Video recording shall be performed only when foliage is visible on trees, except as authorized by the Engineer.
 - 4. Video recording shall not be performed when more than 10 percent of the ground is covered with snow or leaves, unless authorized by the Owner.
- B. Before proceeding with the work the audio-video recording, Contractor shall consult with the Engineer concerning the following:
 - 1. Scheduling recording to precede construction.
 - 2. Scheduling reel coverage.
- C. All recording shall be completed on a section of Contract before the Contractor starts excavation or places material or equipment in that section.
- D. In areas where public utilities are to be relocated or replaced, a second audio-video recording shall be made after the public utility has concluded their work but before the Contractor commences operations.
- E. The Owner shall obtain permission for the recording crew to enter private property not included in an easement. The Contractor shall give the Owner sufficient prior notice to obtain the permission.

1.03 DEFINITIONS

- A. Audio-Video Recording - Zone of Influence - Shall include producing audio-video records as specified herein for the zone of influence. The zone of influence shall be defined as all surface area within street right-of-ways or easements in which sewers are to be installed or within areas 50 feet on each side of sewer centerline, whichever is greater, and additional features in contiguous areas as specified or directed.
- B. Audio-Video Recording of Buildings - Entering - Shall include moving audio-video equipment into buildings or residences (including attached or separate garages) designated by the Engineer for the purpose of recording existing conditions therein.
- C. Audio-Video Recording of Building - Panels - Shall include audio-video recording of designated panels of buildings. Panel as used herein shall mean the full surface of a room

wall, ceiling, or floor or the outer side of a building not viewable in any zone of influence recording.

1.04 SUBMITTALS

- A. The Contractor shall submit, prior to starting work, at his own expense, a sample color videotape and DVD meeting the contract requirements and upon request, must submit at least three letters of reference of the audio-video firm pertinent to the performance and satisfactory completion of color audio-video projects for various municipalities.

PART 2 PRODUCTS

2.01 AUDIO-VIDEO RECORDING

- A. Picture Quality - Video output from camera(s) used shall be capable of producing a minimum of 300 lines of horizontal resolution at center with minimum lag for color signal. Camera(s) shall also produce optimum color imagery with a minimum of 20-foot-candles of illumination. Geometric distortion shall not exceed 1.5 percent of picture height at any point in picture area.
- B. Displays - All video shall, by electronic means, display (visible on the playback viewer) continuously and simultaneously generated transparent digital information which shall include the date and time of recording, as well as the corresponding planned station numbers. The date information shall contain the month, day, and year. The time information shall consist of hours, minutes, and seconds, separated by colons or other marks. Below the stationing, periodic transparent alpha/numeric information shall appear. The information shall consist of the name of the project, name of area covered, direction of travel, viewing side, and any other pertinent data.

2.02 AUDIO-VIDEO OUTPUTTING

- A. Audio-video record shall be the following media, as Directed by the Owner.
 - 1. Output media shall be standard DVD-video format of current standards, as approved by the Owner and Engineer.

2.03 AUXILIARY LIGHTING

- A. Auxiliary lighting shall be used wherever necessary to ensure clarity of picture.

2.04 FILING SYSTEM

- A. The Contractor shall provide an Owner-approved index and filing system, complete with cabinet, for tapes or DVD's containing the information required under this Section. The system shall be so constructed to ensure that the record of any location in the taped area is readily available.

PART 3 EXECUTION

3.01 PERSONNEL

- A. The work shall be performed by competent personnel with knowledge of the procedures and methods to produce satisfactory records as specified herein.

3.02 PRODUCTION

- A. Recording shall be composed in such a manner that:
 - 1. Filming shall, in general, proceed in the direction of the sewer stationing.
 - 2. Where feasible, the length of areas recorded shall be complete on the same tape, i.e., both sides of a road shall be on the same tape.
 - 3. Length of runs shall be as long as possible consistent with the above.

4. Contents of any one tape or DVD shall be from no more than one Contract Division.
 5. Use of less than one-half of a tape or DVD is to be avoided when possible.
- B. Recorded Contents:
1. Video recordings shall be supported by appropriate audio description simultaneous with the visual coverage.
 2. All houses or buildings and other readily recognizable objects as required shall be identified visually and audibly in such a manner that they can be referenced to the stationing of the proposed sewer. Objects selected shall be at intervals not exceeding 100 lineal feet and shall include all houses and buildings identified by house numbers.
 3. Within the zone of influence, the recording shall include but not be limited to all sidewalks, driveways, ditches, parkways, lawns, inlets, culvert pipe ends, trees, shrubs, fences, houses, and buildings that could conceivably be affected by the Contractor's operations. The audio shall call attention to existing cracks or uneven areas in walks and driveways, damaged lawns, trees or shrubbery, broken or missing inlet castings, deteriorated fences, and, where feasible, broken or plugged culvert pipes.
 4. Within street right-of-ways, the recording shall include but not be limited to all pavement, curbs and inlets, mailboxes, traffic signs, and street signs. The audio shall call attention to damaged mailboxes, signs, curbs and inlet castings. Damaged areas in pavements over proposed sewer construction or in pavements scheduled for resurfacing need not be referred to in the audio.
 5. Audio-video recording for designated residences shall include documentation of surface conditions inside and outside of the building prior to starting sewer construction.
- C. Control of Picture Quality - The camera carrier shall travel at a low speed to ensure against blur or distortion of the recorded pictures. A maximum rate of 48-feet per minute is recommended.

3.03 OWNER REVIEW

- A. As the audio-video recording work progresses, the Contractor shall deliver completed sections to the Owner. The Owner shall review the recordings and determine if they are acceptable for clarity and coverage. Tapes or DVD's may be rejected if the picture is of poor quality (i.e., blurred, distorted, too light, too dark, improper color), insufficient coverage, poor audio, or does not meet specified requirements.
- B. The area of rejected recording shall be rerecorded by the Contractor and reinserted in the tapes or DVD in proper sequence.

PART 4 SPECIAL PROVISIONS

None.

END OF SECTION

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SECTION 02110

REMOVAL OF STRUCTURES AND OBSTRUCTIONS

PART 1 GENERAL

1.01 SCOPE

- A. This Section includes demolition of existing structures and removal of pavement, piping, and equipment necessary to clear space for new construction and/or to rehabilitate existing construction.

1.02 SUBMITTALS

- A. Submittals shall be in accordance with all requirements of Section 01300 and shall include:
 - 1. Information for the record:
 - a. The Contractor shall submit, as specified, a copy of a signed permit from the owner of the property upon which the debris, removed under this Section, will be disposed.
 - b. Dust and noise control measures
 - c. Record documents, in accordance with the General Conditions, and photograph or video recording indicates the location of, but not limited to, the following existing, new, and abandoned:
 - 1) Utilities
 - 2) Mechanical
 - 3) Electrical
 - 4) Structural
 - 5) Any embedded items
 - d. Inventory and documentation list for removed and salvaged materials for the Owner.

1.03 QUALITY ASSURANCE

- A. Contractor shall execute the work in compliance with all federal, state, and local codes. Any removal or demolition shall not leave the Owner in violation of any such regulations or codes unless approved by the Owner and Engineer.

1.04 PROTECTION

- A. Structures shall be removed in such a manner as not to damage any portions of the existing structure which are to remain in place.

PART 2 PRODUCTS

2.01 FILL MATERIAL

- A. Fill material shall be in accordance with Section 02200.

PART 3 EXECUTION

3.01 COORDINATION

- A. Demolition work extending beyond the limits as specified, shown on the Drawings, or as required, will be considered unauthorized. The Contractor, at no additional cost to the Owner, shall repair said damage to a condition equal to or better than existed prior to commencement of the Work.
- B. Existing structures and equipment which are damaged in appearance or function by performance of demolition work shall be replaced or repaired, at Owner's discretion and to an approved condition, by the Contractor at no increase in Contract Price.

3.02 PAVEMENTS, SIDEWALKS, CURBING, AND SIMILAR STRUCTURES

- A. Removal of existing pavements, sidewalks, curbing, and similar structures shall end at an existing joint or a sawed joint. Sawed joints shall be straight, neat, and free from chipped or damaged edges.
- B. For removal of non-reinforced concrete, the minimum depth of saw cut shall be 3 inches.
- C. For removal of reinforced concrete, the depth of saw cut shall be sufficient to cut the steel unless specified otherwise.
- D. If the concrete is coated with a bituminous surface or other material, the depth shall be sufficient to cut into the concrete, not including the coating depth, as specified above.

3.03 EXCAVATION OF RIGID PAVEMENT

- A. The Contractor shall excavate rigid pavement, consisting of concrete or concrete base with a wearing surface of brick or bituminous concrete, wherever such excavation is required for the purposes of this Contract.
- B. Pavement shall be excavated to neat lines and, unless otherwise specified in Part 4 of this Section, only to widths required for trenches for pipe laying and for construction of structures. Adequate provision shall be made to prevent settlement and breakage of pavement beyond the approved limits of excavation. Concrete pavement and sub-base shall be cut with a concrete saw in conformance with Subsection 3.02.

3.04 MANHOLES, CATCH BASINS, INLETS, AND SIMILAR STRUCTURES

- A. Existing manholes, catch basins, inlets, and similar structures designated to be removed shall be completely removed.
- B. Manholes, catch basins, inlets, and similar structures designated to be abandoned shall be removed to an elevation of at least 3 feet below the finished subgrade or ground surface. The remaining void shall be filled with special backfill material compacted to 100 percent optimum density per ASTM D-698 or controlled density fill, CDF if permitted by the Engineer. All sewer openings in manholes located on sewer lines that are not to be filled, shall be plugged with 8 inch minimum thickness masonry plug.
- C. Sewers designated to remain in service and connected to structures indicated to be removed or abandoned shall be rebuilt through the area with new pipe. Sewer flow shall be maintained between removal and replacement operations. Abandoned sewers shall be sealed and made watertight with approved precast stoppers or masonry bulkheads.
- D. All castings or hydrants salvaged from abandoned or removed structures shall remain the property of the Owner, if requested by the Owner, and shall be cleaned and transported by the Contractor to a site designated by the Owner or incorporated in the work where called for on the Drawings, scheduled, or so directed. If Owner decides salvaged

materials are not wanted, the Contractor shall dispose of them at no additional cost to the Owner.

3.05 GROUT-FILLED ABANDONMENT OF PIPE, CONDUIT, AND SIMILAR STRUCTURES

- A. Ends of sewer designated to be abandoned shall be sealed with approved masonry bulkheads or factory caps and plugs.
- B. Contractor shall determine and modify, as necessary, the mix of the flowable fill material to satisfactorily fill the entire abandoned sewers and structures. ACI 229R-99 Table 5.1 provides examples of acceptable mix designs.
- C. Contractor may need to include fill holes and vent pipes to assure thorough filling. The locations of grout tubes, vents and inspection ports for grout filling pipes to be abandoned shown on the Drawing shall be considered the minimum number. The Contractor may choose to provide more grout tubes, vents, and inspection ports at no additional cost.
- D. Quantities of flowable fill material used to fill the conduits shall be monitored continuously during the placement.
- E. Bulkheads shall be installed as shown on plans and as needed by the Contractor's method to completely fill the abandoned sewers.
- F. Sites disturbed by the grout-filled abandonment work shall be restored as part of this work.

3.06 GUARDRAIL AND FENCE

- A. Where so required by the Drawings, existing guardrail and fence shall be carefully dismantled and stored for reuse or for salvage by the Owner.
- B. Wood posts and other materials not considered salvageable by the Owner shall be disposed of by the Contractor.

3.07 SUPERSTRUCTURES, TANKS, CHAMBERS, AND SIMILAR STRUCTURES

- A. Care shall be used in demolishing structural elements which are continuous with structural elements remaining in service. Unless otherwise permitted by the Owner, concrete and masonry shall be cut through entirely with a masonry or concrete saw before removing the unwanted portions.
- B. Methods and equipment used in demolition work shall be chosen so the structural integrity and water tightness of both new construction and existing plant structures remain unimpaired by the performance of the demolition work.
- C. Portions of underground structures which are in the way of new sewers, piping, and structures shall be removed from the area of conflict to a distance not less than 6 inches from any point of the new construction.
- D. Care shall be used when removing existing concrete from around reinforcing steel which must be used for securing new concrete. If this reinforcing steel is damaged, the Contractor shall remove additional existing concrete until sufficient existing reinforcing steel is exposed to provide adequate embedment length in the new concrete, as approved by the Engineer.

3.08 PRIVATE SIGNS

- A. Private and commercial signs shall be carefully removed and relocated as directed by the Owner.

3.09 DISPOSAL OF DEBRIS

- A. All debris resulting from demolition operations; i.e., broken concrete, masonry, pipe, miscellaneous metal, trees and brush, equipment, etc., shall be trucked from the work site

by the Contractor and disposed of at spoil sites in a legal manner, in full compliance with applicable codes and ordinances.

- B. The Contractor shall police the hauling of debris to ensure that all spillage from haul trucks is promptly and completely cleaned up.

3.10 BACKFILLING

- A. All trenches, holes, and pits resulting from the removal and abandonment of any structure or obstruction shall be backfilled and compacted in accordance with the requirements of Section 02200, Excavation and Backfill.

3.11 USE OF EXPLOSIVES

- A. The use of explosives for the work of removal of structures and obstructions is PROHIBITED.

3.12 PIPING REMOVAL

- A. At the location where pipe removal stops, the remaining pipe end shall be capped. The cap must be pressure tight and restrained from movement due to pressures inside the pipe.
- B. Piping removal includes, but not limited to, all hangers, stands, and anchoring devices.

3.13 OPENINGS AND PATCHING

- A. The Contractor shall fill all openings created by equipment, piping, and conduit removals.
- B. The Contractor shall patch any marred surfaces created by equipment and piping removals.
- C. All filling and patching work shall be performed in accordance with the specifications.
- D. All anchor bolts shall be removed and holes filled or cut off flush.

PART 4 SPECIAL PROVISIONS

4.01 SCHEDULE OF REMOVALS

- A. The following list of items once removed shall remain the property of the Owner and shall be delivered to the Owner-designated location.
 - 1.

4.02 BURIED SANITARY SEWER AND WATER MAIN REMOVAL

- A. As shown on the Drawings, existing water main or sanitary sewer main piping, accessories, and appurtenances shall be removed within limits shown on the Drawings or as specified.
- B. The removal shall include removal and disposal or aggregate backfill, pipe bedding and control density backfill.
- C. Existing pipe removed shall become the property of the Contractor and shall be properly disposed of in accordance with the requirements of this Section.
- D. At locations where the pipe removal is terminated, a water-tight sewer plug shall be placed in the end of the pipe to remain.
- E. Manholes shall be removed to a minimum of 5 feet below ground surface.

END OF SECTION

SECTION 02200

EXCAVATION AND BACKFILL

PART 1 GENERAL

1.01 SCOPE

- A. This Section includes all excavations and related work for the construction of the designated structures, pipelines, and other incidental work.
- B. Excavation includes the work of making all necessary excavations for the construction of all Contract Work; of furnishing, placing, and use of sheeting, shoring, and sheet piling necessary in excavating for and protecting the Work and workers; of doing all pumping and fluming necessary to keep the excavation free from water; of providing for uninterrupted flow of existing streams, treatment plant processes, drains and sewers; of damming and cofferdamming where necessary; of supporting and protecting existing structures, pipes, conduits, sewers, culverts of all types of materials of construction, of supporting and protecting railroad tracks, posts, poles, wires, fences, buildings, and other public and private property adjacent to the work; of removing and replacing existing sewers, culverts, pipelines, and bulkheads where necessary; of removing after completion of the work all sheeting and shoring not necessary to support the sides of excavations; of removing and disposing of all surplus excavated material or material under structures that does not meet the soil design bearing capacities; of doing all backfilling, of compacting backfill to limits specified or ordered by the Engineer; and restoring all property damaged as a result of the work involved in this Contract.
- C. The Work includes obtaining and transporting suitable fill material from off-site when on-site material is not available.
- D. The Work includes transporting surplus excavated material not needed for backfill at the location where the excavation is made, to other parts of the work where filling is required, or disposal of all surplus on other sites selected by the Owner.

1.02 SUBMITTALS

- A. Submittals shall be in accordance with the requirements of Section 01300 and shall include:
 - 1. Shop Drawings for Review:
 - a. Sieve Analysis (ASTM C-136) - One test for each material source.
 - b. Submit a moisture density curve (ASTM D-698) for each type of material used for backfill. Test shall be referenced to appropriate sieve analysis test. The maximum dry weight and optimum moisture content shall be indicated.
 - c. Controlled Density Fill Material - Design Mix and Certified Test Results.
 - d. Test results for conformance with specified "Compaction Requirements":
 - 1) Retests shall be referenced to the corresponding failing test.
 - e. Stripped soil and topsoil test per .
 - 2. Information for the Record:

- a. When excess excavated material is disposed at locations off the project site, the Contractor shall obtain and submit written permission from the Owner of the property upon which the material is to be placed.
- b. Dimensional drawings of shaft and shaft liner construction, layout and related appurtenances and description of shaft construction and removal sequence.
- c. Design certifications and calculations for shaft and shaft liner systems sealed by a Professional Engineer in the State where the project is located.
- d. Manufacturer's product literature and details of shaft construction and shaft liners and accessories.
- e. Shaft information provided as indicated in this Section shall be provided.

PART 2 PRODUCTS

2.01 TOPSOIL

- A. Soil stripped from the site shall consist of loose, friable, loamy topsoil without admixture of subsoil or refuse. It shall be reasonably free from peat, muck, roots, hard clay, coarse gravel, stones, weeds, tall grass, brush, sticks, litter, ground debris and wood products. The stockpiled soil shall be subject to the approval of the Engineer.
- B. Topsoil provided shall be in accordance with and be loose, friable, loamy soil without admixture of subsoil or refuse. In order for the topsoil to be considered loamy the fraction of topsoil, passing a No. 10 sieve, shall contain not more than 40 percent clay. Topsoil shall contain not less than 4 percent nor more than 20 percent organic matter as determined by loss on ignition of oven-dried samples to constant weight at 212 degrees F.
- C. Excess material shall be removed from site, unless directed otherwise by Owner or Engineer.

2.02 SELECTED BACKFILL

- A. Selected backfill shall be clean excavated soil. It shall be free of rock and foreign debris of any kind and shall be tested in accordance with ASTM C-136 sieve screen analysis and ASTM D-2487 soil classification. The material's use as selected backfill shall be approved by the Engineer.
- B. Engineer may waive material testing of selected backfill. Such waiver shall apply only to the designated location and the source of the selected backfill. Such waiver shall not apply to excavated soil from locations not so designated.

2.03 SPECIAL BACKFILL MATERIAL

- A. Special backfill material shall conform to .

2.04 AGGREGATE BEDDING MATERIAL

- A. Aggregate bedding material shall be well-graded durable crushed gravel, crushed stone or meeting the gradation requirements of .
- B. Aggregate bedding material shall be as follows:
 - 1. For pipe diameters 10 inches and less, bedding material shall be No. 8 (nominal size 3/8-inch to sieve No. 8).
 - 2. For pipe diameters over 10 inches, bedding material shall be No. 67 (nominal size 3/4-inch to sieve No. 4) or No. 8 (nominal size 3/8-inch to sieve No. 8).
 - 3. No. 57 (nominal size 1-inch to sieve No. 4) shall not be used for bedding plastic pipes.

2.05 CONTROLLED DENSITY FILL (CDF) MATERIAL

- A. Controlled density fill material shall be a cement base fill material that can be deposited in a fluid state. It shall be composed of portland cement and approved filler material, sand and water. The mixture shall have a compressive strength of 100 psi minimum and 500 psi maximum:
- B. Filler material shall consist of mineral aggregates, slag, or fly ash. Metals, soil, or organic material will not be permitted.

2.06 SLOPE AND CHANNEL PROTECTION

- A.

PART 3 EXECUTION

3.01 COORDINATION

- A. Construction Through Highways:
 - 1. Permits - The Owner will obtain permits required for open cut construction through highways. Contractor shall be responsible for compliance with and furnishing any item required by permit such as Bond Security.
 - 2. Notification - The Contractor shall give written notice to appropriate officials of the affected Department of Transportation, City, or County at least five days, not including weekends and holidays, before starting construction under highways and as required under other roadways.
 - 3. Contractor shall comply with standard permit conditions of controlling authority and special provisions noted in Part 4 of this Section.
- B. Test Pits:
 - 1. The Contractor shall perform exploratory test pits as may be necessary or ordered by Engineer in advance of excavation to determine the exact location and elevation of subsurface structures, pipelines, and conduits which are likely to be encountered and shall make acceptable provision for their protection, support, and maintenance in operation. Vacuum excavation (pot hole) may be used if adequate information can be obtained by such method. No additional payment shall be made for test pits.
 - 2. Conflicts with existing utilities not located, as specified, far enough in advance of construction, shall not be considered as a basis for delay claims or additional payment.

3.02 REMOVING AND REPLACING TOPSOIL

- A. Removal
 - 1. Excavation for trenches in which pipelines, sewers, conduits and other utilities are to be installed: The Contractor may elect to strip soil and stockpile unless the Contract Documents direct stripping and stockpiling prior to excavation.
 - 2. General excavation, other than trench excavation: The Contractor shall remove, and stockpile the top 12 inches of the existing soils from all areas of construction including, but not limited to, excavation and embankment areas, stockpile sites, construction yard, storage areas, etc.
- B. Replacing stockpiled soil and topsoil
 - 1. Trench excavation areas disturbed as a result of trenching operations and which are to be restored with grass or other plantings shall be free of peat, muck, roots,

hard clay, coarse gravel, stones, weeds, tall grass, brush, sticks, litter, ground debris and wood products. The surface shall be mechanically conditioned after removal of debris. After surface is prepared, it shall be covered with topsoil or stockpiled soil material to a minimum depth of 4 inches. Topsoils and stockpiled soil material shall meet the requirements specified herein and be tested.

2. General excavation areas which are to be restored with grass or other plantings shall be free of peak, muck, roots, hard clay, coarse gravel, stones, weeds, tall grass, brush, sticks, litter, ground debris, wood products and construction debris including loose stone. The surface shall be mechanically conditioned after removal of debris. After surface is prepared it shall be covered with stockpiled soil and then have a minimum of 4 inches of topsoil placed.
- C. The work shall be in accordance with applicable portions of .

3.03 GENERAL EXCAVATION

- A. All necessary excavation shall be performed to accommodate the completion of all Contract Work.
- B. The Drawings show the horizontal and the lower limits of structures, pipelines, sewers and other utilities. The methods and equipment used by the Contractor when approaching the bottom limits of excavation and when trimming the bottom of the excavation to a smooth surface shall be selected to prevent disturbing the soil below the bottom limits of excavation.
- C. Excavation which is carried below the bottom limits shall be classified as Unauthorized Excavation, unless said excavation has been authorized by the Engineer prior to each occurrence.
- D. Unauthorized Excavation shall be filled with Class B concrete to the bottom limits. Under circumstances where structural integrity is not a factor, the Engineer may allow the filling of Unauthorized Excavation with pipe bedding material or special backfill material compacted to 100 percent density, as specified under compaction requirements.
- E. Sheeting, Shoring, and Bracing:
 1. The Contractor shall furnish and install adequate sheeting, shoring, and bracing to maintain safe working conditions, and to protect newly built work and all existing adjacent and neighboring structures and utilities from damage by settlement.
 2. Sheeting, shoring and bracing shall be arranged so as not to place a strain on portions of completed work until the construction has proceeded far enough to provide ample strength. Sheeting and bracing may be withdrawn and removed at the time of backfilling, but the Contractor shall be responsible for all damage to newly built work and adjacent and neighboring structures and utilities.
 3. Sheeting, shoring and bracing shall be removed or cut-off at the time of backfilling to avoid problems with finish grade or future excavation.
- F. Construction Sheeting Left in Place:
 1. The Contractor shall furnish, install, and leave in place, construction sheeting and bracing when specified or when indicated or shown on the Drawings.
 2. Construction sheeting and bracing, placed by the Contractor to protect adjacent and neighboring structures and utilities, may be left in place if desired by the Contractor. All such sheeting and bracing left in place, shall be included in the cost for excavation.
 3. Any construction sheeting and bracing which the Contractor has placed to facilitate his work may be ordered, in writing by the Engineer, to be left in place.

The right of the Engineer to order sheeting and bracing left in place shall not be construed as creating an obligation on his part to issue such orders. Failure of the Engineer to order sheeting and bracing left in place shall not relieve the Contractor of his responsibility under the Contract.

G. Removal of Water:

1. The Contractor shall at all times during construction provide and maintain ample means and devices with which to remove promptly and dispose of properly all water entering the excavations or other parts of the work and shall keep said excavations dry until the structures to be built or pipelines to be placed therein are completed. No water shall be allowed to rise over or come in contact with concrete or masonry until the concrete and mortar has attained a satisfactory set, except in cases where the concrete has been tremied into place with the approval of the Engineer. Water shall not be allowed to rise above the bottom of the bedding stone prior to placing pipe. In waterbearing sand, well points and/or sheeting shall be supplied, together with pumps and other appurtenances of ample capacity to keep the excavation free of water and in compliance with government regulations.
2. The Contractor shall dispose of water from the Work in a suitable manner without damage to adjacent property or structures and in compliance with all regulations.

3.04 TRENCH EXCAVATION

- A. Excavation for trenches in which pipelines, sewers, conduits and other utilities are to be installed shall provide adequate space for workers to place and joint the pipe properly. The trench shall be kept to a minimum width. The width of trench at the top of the pipe shall comply with the limits specified or shown on the Drawings.
- B. Excavation shall be to the depth necessary for placing aggregate bedding material under the pipeline, sewer, conduits and other utilities as shown on the Drawings. If over excavation occurs, the trench bottom shall be filled to grade with compacted aggregate bedding material.
- C. The amount of trench open at any one time in advance of completed work shall be limited to the minimum necessary for conducting laying operations.
- D. In general, backfilling shall begin as soon as the pipeline, sewer, conduits and other utilities are in a condition to receive it and shall be carried to completion as rapidly as possible. New trenching shall not be started when earlier trenches need backfilling or the surfaces of streets or other areas need to be restored to a safe condition.

3.05 EXCAVATION OF UNSUITABLE MATERIAL

- A. Unsuitable materials existing below the Contract bottom limits for excavation shall be removed as required by the Engineer. The Engineer may rely upon the independent laboratory retained on this Project when determining unsuitable soil conditions, removal and backfill. Such excavation shall be conducted at a time when the Engineer and independent laboratory are present and shall not exceed the vertical and lateral limits prescribed by both.
- B. The voids left by removal of unsuitable material shall be filled with special backfill, pipe bedding material, or Class B concrete as listed in Part 4 or as prescribed by the independent laboratory and as approved and ordered by the Engineer. Special backfill or pipe bedding shall be installed as described in this Section and in general shall be compacted to 100 percent density as specified under compaction requirements.

3.06 DISPOSAL OF UNSUITABLE AND SURPLUS MATERIAL

- A. All excavated materials which are unsuitable for use in backfilling trenches or around structures, and materials excavated that are in excess of that required for backfilling and for constructing fills and embankments as shown on the Drawings, shall be disposed of by the Contractor at his expense and at sites provided by him as may be required, except that the Owner reserves the right to require the Contractor to deposit such surplus at locations designated by the Owner within a five-mile radius of the Work.
- B. No surplus excavated material of any class shall be deposited in any stream or watercourse or be dumped on public property without the consent of the Owner. All spoil areas shall be left smooth, level, with drainage to a water course and proper erosion and runoff control shall be used.

3.07 BACKFILL AND COMPACTION

- A. Pipe and Conduit Bedding - Unless otherwise directed, pipe, conduits and other utilities shall be installed in specified aggregate bedding material as shown on the Drawings and as specified.
- B. Backfilling Under Existing Pipeline, Sewer, Conduits and Other Utilities - Where it is necessary to undercut or replace existing utility conduits and/or service lines, the excavation beneath such lines shall be backfilled the entire length with aggregate bedding material tamped in place in 6-inch layers to the required density. The aggregate bedding shall extend outward from the spring line of the conduit a distance of 2-feet on all sides and thence downward at its natural slope.
- C. Backfilling With Selected Backfill - Unless otherwise specified or directed, material excavated in connection with the work may be used for backfilling and other filling purposes, if it meets all requirements given elsewhere in this specification for selected backfill. No material shall be used for backfilling that contains stones, rock, or pieces of masonry greater than 12 inches, frozen earth, debris, earth with an exceptionally high void content, organic material, or marl. No large pieces of rock or masonry shall be deposited closer than 24 inches from the completed outside surface of any structure or pipe.
- D. Backfill Immediately - All trenches and excavations shall be backfilled immediately after completion of construction therein, unless otherwise directed by the Engineer. Under no circumstances shall water be permitted to rise in unbackfilled excavation during construction or after pipe has been placed.
- E.
- F. Backfilling around and over structures, pipelines, conduits and other utilities comprising the work shall be carefully done by hand and tamped with suitable tools of approved weight when within 2 feet of structures, pipeline, conduit and other utilities. Selected backfill or, where specified, shown on Drawings, or ordered by the Engineer, special backfill material shall be used in this area. The material shall be placed in uniform layers not exceeding 6 inches in depth up each side. Each layer shall be placed, then carefully and uniformly tamped to the specified density so as to eliminate the possibility of lateral displacement of pipe or structure.
- G. Backfilling may be done by machinery after the backfill has been placed and compacted beyond 2 feet horizontally of structures, pipelines, conduits and other utilities and to a minimum depth of 1 foot above the tops of any buried structures, pipelines, conduits, and other utilities. The backfill material shall be deposited in horizontal layers, not thicker than one foot, and each layer shall be thoroughly compacted to the specified density by approved methods before a succeeding layer is placed. In no case will backfill material from a bucket be allowed to fall directly on a structure or pipe and in all cases the bucket must be lowered so that the shock of the falling material will not cause damage.

- H. Backfilling Under Pavement and Walks - Where existing or new pavement, driveway, parking lot, curb and gutter, or walk is over an excavation, special backfill material shall be used to backfill the entire excavation from the bedding to surface. The material shall be placed and compacted to the required density in accordance with one of the following methods:
 - 1. The backfill material shall be deposited in 6-inch horizontal layers and each layer shall be thoroughly compacted to the proper density by approved compaction method before a succeeding layer is placed.
 - 2. No method of compaction which alters the gradation of the special backfill material or prevents compaction testing by standard testing methods shall be used.
- I. Backfilling with Controlled Density Fill Material (CDF) - Where called for on the Drawings, specified, or ordered, CDF material shall be used in lieu of special backfill or bedding material specified herein. Before placing CDF material, the Contractor shall take required measures to protect the work against flotation.
- J. Backfilling Under Structures - Where structural slabs, mats or footings are to be placed on a backfilled area, special backfill material shall be used unless otherwise noted on the Drawings. The backfill material shall be placed in 6-inch horizontal layers and each layer shall be thoroughly compacted to the specified density by approved methods before a succeeding layer is placed. Where backfill is to be placed on undisturbed side slopes steeper than one vertical to six horizontal, steps shall be formed into the slope before each layer of the backfill is placed. These steps shall be cut vertically at no more than 2-foot intervals and shall have a horizontal dimension of not less than 3-feet.

K.

3.08 COMPACTION REQUIREMENTS

- A. In areas to be filled, after the top 12-inches of soil is stripped, then the undisturbed subgrade shall be compacted to not less than 100 percent of maximum dry density per ASTM D-698 (Standard Proctor) prior to placing of fill.
- B. Backfill placed under areas receiving concrete slabs, mats, footings, or within the interior of buildings shall be compacted to not less than 100 percent of maximum dry density per ASTM D-698.
- C. Backfill placed around structures where other structures, pipelines, or slabs are to be constructed shall be compacted to not less than 100 percent of maximum dry density per ASTM D-698.
- D. The material used to construct embankments and fills in locations other than under pavements, walks, structures, or slabs and around and over pipelines, shall be compacted to not less than 95 percent of maximum dry density per ASTM D-698.
- E. All other backfill, including backfill around and over pipelines, and backfill around structures not covered in Paragraphs B. and C. above, shall be compacted to not less than 95 percent of maximum dry density per ASTM D-698.
- F. The bottom of excavations upon which concrete slabs or structures are to be placed shall be compacted to obtain 100 percent maximum dry density per ASTM D-698 in the top 12 inches.
- G. All soil subgrade which will provide bearing support for pavements or curbs, shall be compacted to a width of 6 inches beyond the back of curb and to a depth of 12 inches below the bottom of excavation to a density of not less than 100 percent of maximum dry density per ASTM D-698. All fill below the subgrade shall be compacted to not less than 98 percent of maximum dry density, unless specified otherwise.

- H. Subgrade under the driveways and walks shall be compacted to a depth of 6 inches below the subgrade surface to density of not less than 100 percent of the maximum dry density determined by ASTM D-698.
- I. Subgrade under structures shall be compacted to a depth of 12 inches below bottom of excavation surface to a density of not less than 100 percent of the maximum dry density determined by ASTM D-698.

3.09 COMPACTION TESTS

- A. Trenches and excavation around structures shall be backfilled and consolidated in layers, as specified, to the existing ground surface. Initial test series for each type of backfill material shall be continued until the method of consolidation employed has proven to attain the required compaction. Any change in the proven method of consolidations will require additional testing and field verification of compaction.
- B. Subgrade below pavements, curbs, sidewalks, and structures shall be consolidated as specified. Compaction tests shall be performed to verify specified consolidation.
- C. Subsequent tests or series of tests shall be in locations and at depths ordered by the Engineer.

3.10 STREAM CROSSINGS

- A. Construction of public utilities under streams shall be in accordance with applicable sections of the local, state, and federal regulations and agencies (Clean Water Act, Corps of Engineers, Department of Natural Resources, etc.) the specific permit requirements for the crossing, and as specified herein.
- B. Excavation shall be only as required for installing the work by the approved permits.
- C. Excavated material to be used for backfill shall be stockpiled upland, out of the floodplain, and in a manner that it will not be washed into streams or drains.
- D. Immediately following installation of the work, the stream shall be restored to its original cross section using only the material excavated in constructing the crossing.
- E. Excavated material not used for backfill shall be disposed of as specified in this Section.
- F. To minimize erosion occurring from wind and precipitation, the work of clearing, scalping, grading, slope erosion protection, ditching, backfilling, and final cleanup within 50 feet of streams shall be performed immediately following installation of the work within the stream.
- G. The stream banks and stream bottom shall be surveyed in accordance with Section 01800 before and after construction at 10 foot intervals and major grade breaks.

3.11 STREAM BANK PROTECTION

- A. Following the installation of the pipeline or other structures, all work areas along or crossing streams shall be restored immediately in accordance with procedures outlined below and in accordance with applicable permits.
- B. Excavated areas shall be backfilled and compacted as specified herein and in no case shall the density be less than the surrounding area.
- C. Permanent riprap shall be placed 12 inches thick over disturbed areas of the stream's bank as shown on the Drawings or required. Excavated areas to be riprapped shall be backfilled and consolidated as specified for pavement and sidewalks. Installation of and materials for riprap shall conform to .
- D. All soil exposed above the permanent riprap protection line shall be either sodded or seeded, fertilized, and mulched. Temporary jute matting or synthetic matting shall be used

to protect slopes until climatic conditions permit seeding or sodding. Exposed banks shall not remain unprotected over five days unless permitted by the Engineer in writing.

- E. Seeding and sodding shall be as specified in Section 02800.

PART 4 SPECIAL PROVISIONS

4.01 FIELD TESTING (MINIMUM REQUIREMENTS)

- A. The laboratory shall perform the following field tests:

1. Trench Backfill - One test for every 200 cubic yards of backfill material.
2. Subgrade Compaction - One test for every 300 square yards of subgrade.
3. If directed by the Engineer, additional tests shall be performed for any of the above.

4.02 PERMITS

- A. Part 14 Permit Application Submitted to MDEQ.

END OF SECTION

SECTION 02550

SANITARY SEWERS AND STORM SEWERS

PART 1 GENERAL

1.01 SCOPE

- A. This Section includes furnishing and installing sanitary sewers and storm sewers.
- B. Reconstruction of existing sewers, house connections, and catch basin leads shall be in conformance with requirements of this Section.
- C. This Section shall include furnishing and installing all required pipe, bends or beveled pipe, tees, wyes, tee manhole base pipes, bulkheads and stoppers, jointing material, granular material for pipe bedding, concrete used for encasement or bedding, making watertight connections to existing and new sewers and existing manholes, catch basins and inlets, cleaning and testing sewers, removing temporary bulkheads, and other work incidental to the sewer installation unless specifically included under other Items.
- D. Additional product requirements are specified in Section 01350.

1.02 SUBMITTALS

- A. Submittals shall be in accordance with the requirements of Section 01300 and shall include:
 - 1. Shop Drawings for Review:
 - a. Manufacturer's Shop Drawings indicating pipe and joint materials, physical dimensions, and joint details for each size, type, and class of pipe, fittings and specials furnished for the project compliance with specified standards.
 - b. Manufacturer's concrete design strength and reinforcing steel for RCP.
 - 2. Information for the Record:
 - a. Manufacturer's certification indicating that the pipe and joints meet specifications for each production run for each size, type, and class of pipe furnished. The Engineer may request test results to verify certification. Certification documents shall be according to the Source Quality Control of this Section.
 - b. Manufacturer's design calculations to verify basis of design.
 - c. Manufacturer's installation instructions.
 - d. The laboratory shall submit test certifications of pipe ordered tested under "Field Quality Control," of this Section.

PART 2 PRODUCTS

2.01 SOLID WALLED PIPES

- A. Vitrified Clay Pipe:
 - 1. Vitrified clay pipe and fittings shall meet requirements of ASTM C-700 ES, except that pipe shall be furnished with full inside diameter.
 - 2. Vitrified clay pipe joints shall meet the requirements of ASTM C-425.
- B. Polyvinyl Chloride (PVC) Sewer Pipe Specifications:

1. For pipe 15-inch diameter and smaller: Pipe, fittings, and jointing systems shall conform to ASTM D-3034, except that the standard dimension ratio of the outside diameter of the pipe to wall thickness shall not exceed 35.
 2. For pipe 18 inch thru 24-inch diameter: Pipe, fittings, and jointing systems shall conform to ASTM F-679 with a SDR 26 or PS 115 wall thickness.
 3. Joint systems shall be elastomeric seal (gasket) type. Seals shall conform to ASTM F-477 requirements. Joint materials and testing shall conform to ASTM D-3212 requirements.
 4. All service connections shall be made using a wye and a bend. Tees shall be used only as directed by the Engineer. Tees and wyes shall be die cast or factory fabricated. All service pipe shall be SDR 35.
- C. Acrylonitrile-Butadrene-Styrene (ABS) Pipe 6 inch and Smaller:
1. All pipe and fittings shall conform to ASTM D-2751, except that wyes and tees shall be die cast or fabricated using saddle adapters.

2.02 COMPOSITE AND PROFILE WALLED PIPES

- A. High Density Polyethylene Drainage Tile - (HDPE):
1. High density polyethylene pipe, fittings, and jointing systems shall meet the requirements of ASTM F-667 and shall have a smooth interior.
 2. Joints shall be watertight and gasketed.
 3. This pipe is only permitted for storm drainage installations.
- B. ABS Composite Sewer Pipe:
1. All pipe and fittings shall conform to ASTM D-2680.
 2. Joints shall be of the chemically welded type using a solid ABS coupling on the exterior of the joint. Joints shall provide a watertight seal and shall be made in accordance with the manufacturer's recommendations.
 3. Fittings for use with truss pipe shall include couplings, tees, wyes, elbows, plugs, and adapters. They shall be formed from the same material as the pipe, except that caps and adapters shall be intrusion molded from rubber, polyurethane, or other suitable compounds. Tees and wyes may be formed or they may be fabricated using saddle adapters.
 4. Primer for chemical welding shall be MEK (Methyl-Ethyl-Ketone) and the cement shall be MEK containing a minimum 20 percent of dissolved ABS.
 5. Service connections shall be made using a wye and a bend. Tees shall be used only as directed by the Engineer.
- C. Polyvinyl Chloride (PVC) Profile Sewer Pipe:
1. Pipe shall have a smooth interior with a solid concentric exterior rib. Pipe, fittings, and jointing systems shall conform to ASTM F-794. Pipe stiffness shall be 46 psi minimum, when measured in accordance with ASTM D-2412.
 2. Joint systems shall be elastomeric seal (gasket) type. Seals shall conform to ASTM F-477 requirements. Joint materials and testing shall conform to ASTM D-3212 requirements.
 3. Fittings shall include couplings, tees, wyes, elbows, plugs, and adapters. Tees and wyes shall be die cast or factory-fabricated.
 4. Manhole adapters shall have a smooth exterior surface to ensure a watertight joint with "Flexible Joints" as specified in Section 02552.

5. All service connections shall be made using a wye and a bend. Tees shall be used only as directed by the Engineer. All service pipes shall be SDR 35 pipe.
- D. High-Density Polyethylene (PE) Profile Wall Sewer Pipe:
1. Pipe shall have a smooth interior with a profile wall. Pipe, fittings, and jointing systems shall conform to ASTM F-894. Pipe and fittings shall be made of high density, high molecular weight polyethylene material meeting the requirements of Type III, Class C, Category 5, Grade P34, as defined in ASTM D-1248.
 2. Joint systems shall be elastomeric seal (gasket) type. Seals shall conform to ASTM F-477 requirements. Joint materials and testing shall conform to ASTM D-3212 requirements. Joints shall be able to pass an ASTM D-3212 test at 10.8 psi for 10 minutes with no leakage.
 3. Fittings shall include couplings, tees, wyes, elbows, plugs, and adapters. Tees and wyes shall be die cast or factory-fabricated.
 4. Manhole adapters shall have a smooth exterior surface to ensure a watertight joint with "Flexible Joints" as specified in Section 02552.
 5. All service connections shall be made using a wye and a bend. Tees shall be used only as directed by the Engineer. All service pipes shall be SDR 35 pipe.

2.03 ACCESSORIES

- A. Nonshrinking Mortar Material:
1. Material for nonshrinking mortar used in pointing joints shall be Sauereisen F-100 Grout as manufactured by Sauereisen Cements Co., Pittsburgh, Pennsylvania; Five-Star Grout as manufactured by U.S. Grout Corp., Old Greenwich, Connecticut; or equal.
- B. Flexible Pipe Repair Couplings:
1. Flexible repair couplings shall be made of elastomeric polyvinyl chloride boot with series 300 stainless steel shield and clamps. Couplings shall be Strong Back RC series as manufactured by Fernco Joint Sealer Co., Ferndale, Michigan; Logan Clay Pipe Co., Logan, Ohio; Mission Clay Products Corp., or equal.
- C. Flexible Watertight Joints:
1. Flexible watertight joints used in connecting to existing sewers shall be a "boot" type sealed to the pipe wall with an internal expanding band and around the connecting pipe with an external adjustable band. Other types of applicable flexible joints may be submitted for approval.
- D. Granular Pipe Bedding Material:
1. Granular pipe bedding material shall be as specified in Section 02200.

2.04 REPLACEMENT DRAINS, SEWERS, AND APPURTENANCES

- A. Vitrified clay pipe sanitary sewers removed or damaged in completed the Work shall be replaced using pipe and joints as specified in this section. Connections to existing sewers shall be as specified in this section.
- B. Reinforced concrete pipe sanitary sewers removed or damaged in completing the Work shall be replaced using pipe meeting ASTM C-76, Cl. IV, unless otherwise indicated and joints meeting ASTM C-361. Reinforced concrete pipe storm sewers shall also be replaced with ASTM C-76 Cl. IV RCP with joints equal to those of the pipe removed.
- C. Nonreinforced concrete pipe removed or damaged in completing the Work shall be replaced using pipe meeting ASTM C-14 "Extra Strength Nonreinforced Concrete Pipe." Joints shall be equal to those of the pipe removed. Class IV RCP may be used in lieu of nonreinforced pipe.

- D. Manholes, catch basins, and inlets removed or damaged under these Items shall be replaced in conformance with applicable Drawings and Specifications.
- E. Driveway culverts removed or damaged in completing the Work shall be replaced with existing pipe, if undamaged, or new pipe and joints matching the existing, unless specified otherwise.

2.05 SOURCE QUALITY CONTROL

A. Pipe Manufacturer's Certification:

- 1. The pipe manufacturer's certificate shall state that the materials have been sampled and tested in accordance with the provision for and meet the requirements of the designated specification and shall be signed by an authorized agent of the seller or the manufacturer.
- 2. A test results report shall accompany that manufacturer's certificate. The report shall compare test results to Specification requirements. Test specimens shall be selected in conformance with the designated specification, except that no less than two tests shall be made for each production run of each size, type, and class of pipe furnished, and further, that in case tests are unsatisfactory, additional tests shall be made to the maximum number in the referenced ASTM Specification.

B. Profile Wall Basis of Design:

- 1. In addition to the above certifications, and if required by the Engineer, for pipe 18 inch and larger, the manufacturers of plastic profile wall pipes shall provide a certification that shows the basis of design for each pipe class furnished and that they are satisfactory for use as shown on the Drawings. Basis of design limits provided shall include but are not limited to; crushing resistance of pipe wall, pipe deflection, and constrained buckling resistance.
- 2. The following constraints shall be used as minimum conditions for the basis of design:
Safety Factor = 2
Bedding Class = ASTM D-2321 Class 1A
Loads = Soil weight (120 lb/cft)+H2O
Depth of burial as shown of Drawings
Depth of submergence as indicated on soil borings or 4-feet minimum.
- 3. If more than one pipe class is proposed for any diameter of pipe a depth range shall be provided for each class in addition to the above. A sample for the pipe markings shall be provided for each class of pipe.

PART 3 EXECUTION

3.01 CONSTRUCTION IN HIGHWAY PROPERTIES

- A. Construction in Highway properties shall conform to the requirements of Section 02200.

3.02 PREPARATION OF TRENCH

- A. Trench excavation shall conform to requirements of Section 02200, Trenching.
- B. For rigid pipes the width of trench at the top of pipe shall be as shown in the Trench Detail on the Drawings.
- C. Unless otherwise indicated minimum trench widths for flexible pipes shall meet the requirements of ASTM D-2321 and the Trench Detail shown on the Drawings.

- D. Unless otherwise indicated all sewer trenches shall be excavated below the proposed pipe invert as required to accommodate the depths of bedding material as shown on the Drawings and specified herein.

3.03 RIGID PIPE INSTALLATION

- A. Pipe trenches shall be excavated to the depth indicated on details to provide adequate depth of bedding and the pipe shall be placed and supported on bedding material the full length of the barrel. Bedding material shall then be placed 4-inch maximum depth along both sides of the pipe and tamped firmly under the pipe haunches. Additional bedding material shall be placed and compacted in 6 inch layers to the height shown on the Drawings or as directed. Hand tampers shall be used for installing bedding material around pipes smaller than 36-inch diameter and mechanical hand tampers shall be used around pipes 36-inch diameter and larger unless otherwise directed by the Engineer. The remainder of the trench shall be backfilled as specified and called for on the Drawings.
- B. Concrete bedding and encasement in lieu of bedding material shall be installed as shown on the Drawings or specified.
- C. The laying of pipe in finished trenches shall be commenced at the lowest point, with the bell end or groove end laid upgrade. Pipe shall be laid with ends abutting and true to line and grade. They shall be carefully centered to form a sewer with a uniform invert of line and grade shown on the Drawings.
- D. Pipe shall be laid to lines and grades by use of a laser beam and checked in conformance with Section 01800. Pipes installed more than 0.04 feet above or below specified elevation shall be removed and reinstalled to grade.
- E. Where holes are cast in concrete pipe for handling, they shall be completely filled with nonshrinking mortar after the pipe is placed. A metal disc of proper size may be inserted near the bottom of the hole to retain the mortar until hardened. Wood plugs or rocks intended to plug the hole for retention of the mortar will not be permitted.

3.04 FLEXIBLE PIPE INSTALLATION

- A. Flexible pipe shall be installed in accordance with ASTM D-2321. Bedding, backfill, and compaction shall meet the requirements of this Section and Section 02200.
- B. Concrete bedding and encasement in lieu of bedding material shall be installed as shown on the Drawings or specified.
- C. The laying of pipe in finished trenches shall be commenced at the lowest point, with the bell end or groove end laid upgrade. Pipe shall be laid with ends abutting and true to line and grade. They shall be carefully centered to form a sewer with a uniform invert of line and grade shown on the Drawings.
- D. Pipe shall be laid to lines and grades and checked in conformance with Section 01800. Pipes installed more than 0.04-feet above or below specified elevation shall be removed and reinstalled to grade.
- E. Temporary internal supports shall be used as recommended by the pipe manufacturer. Pipes with 48 inches or larger diameter shall have, as a minimum, struts temporarily inserted at the ends of the pipes. Struts shall be in the vertical position when the pipe is installed in the trench. Struts shall remain in place until after the trench has been completely backfilled.

3.05 PIPE JOINTS

- A. O-Ring and Chemically Welded Joints - Pipe jointing surfaces shall be clean and dry when preparing surfaces for joining. Lubricants, primers, adhesives, etc., shall be used as recommended by the pipe or joint manufacturer's specifications. The jointing materials or factory fabricated joints shall then be placed, fitted, joined, and adjusted in such a manner as to obtain a watertight joint. Trenches shall be kept water-free and as dry as possible

during bedding, laying, and jointing. As soon as possible after the joint is made, sufficient backfill material shall be placed along each side of the pipe to prevent movement of the pipe from any cause.

- B. Flexible Plastic Gasket Joints - Materials used for gaskets shall be as specified in this Section. Cross section size of gaskets and method of installation shall conform to the manufacturer's recommendations.
- C. Nonshrinking Mortar Joints - Where specified or shown on the Drawings, joints of concrete pipe sewers shall be thoroughly pointed full inside circumference with a nonshrinking mortar in conformance with the material manufacturer's instructions. The mortar shall be tightly packed and the interior face of the joint shall be left smooth and continuous with the interior face of the pipe. Pointing shall not be done until the backfill over the pipe is placed and compacted.

3.06 CONNECTIONS TO EXISTING SEWERS

- A. Unless indicated otherwise new pipe connections through the side of existing sewers shall be made as follows:
 - 1. Vitrified clay pipe, plain concrete pipe, and asbestos cement pipe, 15-inch diameter and smaller, and larger diameter at the option of the Contractor, shall be connected by removing a section of the existing sewer and inserting connecting fittings using specified flexible repair couplings.
 - 2. Reinforced concrete pipe and larger sizes of asbestos cement pipe and plain concrete pipe, unless otherwise shown on the Drawings, shall be connected by coring the existing sewer pipe wall and inserting a flexible watertight joint to receive the new pipe.
 - 3. Polyvinyl chloride pipe, ABS pipe, and ABS truss pipe shall be connected in conformance with the manufacturer's recommendations as approved by the Engineer.
 - 4. Connections shall be made in conformance with the jointing materials manufacturer's recommendations and as directed by the Resident Project Representative.

3.07 FIELD QUALITY CONTROL

- A. The Resident Project Representative may select one sample of pipe on the job site of each production run of each size and type of pipe to be tested by the Contractor's laboratory. The Contractor shall furnish the first test piece or pipe core and any additional samples required because of failures. The Contractor shall pay for tests on the first sample. Should the sample fail to meet specifications, retests shall be conducted by the Contractor's laboratory in conformance with the specifications and shall be at no additional expense to Owner.
- B. Deflection of PVC, P.E. and ABS Composite Piping Sewers:
 - 1. Vertical Ring Deflection - Before final acceptance of sewer lines, all sections of sewer pipe 8 inches and larger specified diameter shall be measured for vertical ring deflection by the Contractor and witnessed by the Resident Project Representative. Maximum deflection under full load shall not exceed 5 percent of the ASTM designated average inside diameter as determined by the laboratory for the specified piping.
 - 2. Failures - Should a pipe exceed the allowable deflection, the Contractor shall replace those pipes and retest the section.
 - 3. Equipment used in testing shall be go-no-go pull through gauges of a type approved by the Engineer. A metal or plastic gauging ring of diameter equal to

95 percent of the specified average inside pipe diameter shall be furnished with each gauge.

4. The Contractor shall furnish testing equipment and personnel and perform the required tests. Tests must be witnessed by the Resident Project Representative.
5. Use of mechanical pulling devices is not permitted.
6. Deflection testing shall not be performed until the completed and accepted trench backfill has been in place for at least 30 days.

C. Field Inspection:

1. Individual sections of pipe may be rejected at any time because of defective joints, dimension variations, fractures, cracks, chips, or blisters exceeding the permissible tolerances.
2. Rejected pipe shall be so marked with a lumber crayon or paint and shall be removed from the job site before the end of the following work day.

3.08 TESTS FOR INFILTRATION AND EXFILTRATION

A. Preparation:

1. Before sections of sewers may be tested for infiltration or exfiltration, all house leads from it shall be constructed to limits called for and plugged or capped and all trenches backfilled and compacted to required minimum density.
2. Sewers to be tested shall be clean and free from construction debris. Sand, dirt, concrete, or other materials shall be completely removed in a manner that will not damage the sewer pipe.
3. Pipe joints shall be watertight. The Contractor shall repair manholes and pipe joints as required to stop leaks.
4. Where sewers are above the groundwater table, the Contractor may flood the trench or air test the sewer to find and repair leaks prior to exfiltration tests.
5. The materials and methods for repairing leaks shall be submitted to Engineer: for approval before beginning work. Chemical grouting of pipes is not acceptable.

B. Inspection:

1. After a sewer has been cleaned and all repairs made as specified, the sewer shall be inspected and approved by the Resident Project Representative before conducting infiltration or exfiltration tests. Sewers shall be approved before any connections are made to or final surface restoration can begin.
2. Sewers shall be inspected using audio-video recording in accordance with the requirements of Section 01820.
3. The Contractor shall furnish all lights, cameras, carts, television, and other equipment and labor required to audio-video record the new sewers or any repaired sewer.
4. The Resident Project Representative may require the Contractor to conduct a television inspection of smaller sewers that appear defective or do not pass infiltration tests.

C. Test Sections:

1. The maximum length of a sewer test for infiltration or exfiltration section shall be 900 lineal feet. Every manhole shall be included in one (minimum) test section.

2. The Contractor shall furnish and install bulkheads, sewer plugs, weirs, water level tubes, lighting, and other equipment required to conduct the tests in locations and as indicated by the Resident Project Representative.
3. Infiltration in accordance with ASTM C 969:
 - a. Where the groundwater level is above the top of the pipe, the sewer shall be tested for infiltration.
 - b. The Contractor shall plug or bulkhead the sewer to isolate the test section and install a weir in the pipe at the outlet manhole. The weir shall be direct reading of an approved design calibrated to read gallons per day.
 - c. Where the groundwater level is below the top of the sewer pipe and the trench can be flooded and the level maintained above the pipe for test period, the Contractor may test the pipe for infiltration.
4. Infiltration in accordance with ASTM C 1103 (Precast Concrete Pipe)
 - a. For precast concrete pipe with a diameter 27 inches and larger the joint acceptance test per ASTM C 1103 may be utilized.
 - b. This test is only acceptable if the ground water level (pressure) is equal to or less than the test pressure.
 - 1) If the ground water level (pressure) is above the test pressure and the joint is not leaking, then the joint is acceptable in accordance with ASTM C 969.
 - c. If ground water level is below the test pressure test the joints in accordance with ASTM C 1103. Air or water are acceptable in accordance with industry practices and the ASTM C 1103.
 - 1) The air pressure required for the test shall not exceed 5.0 psig.
 - d. Failed joints shall be repaired and retested until joint passes test.
5. Exfiltration in accordance with ASTM C 969:
 - a. Where the groundwater level is below the top of the pipe and cannot be maintained above it, the sewer shall be tested for exfiltration.
 - b. The Contractor shall bulkhead or plug each end of the designated test section and fill with water to the elevation indicated by the Resident Project Representative. Exfiltration will be computed from the loss of water as measured in the manholes.
6. Allowable Leakage:
 - a. The test in each section shall be continued for at least 24 hours and, if its measured leakage during that period exceeds 100 gallons per inch of diameter per mile of pipe, the Contractor shall locate the points of leakage and make necessary repairs, continuing the work until leakage is reduced to the permissible maximum as specified.
 - b. The amount of infiltration allowed for storm sewers shall be limited to reasonable seepage, except that, if specified, the total in any section shall not exceed the amounts allowed for sanitary sewers as hereinafter specified.
 - c. All visible leaks shall be repaired whether they are less than the allowable leakage. Moisture or visible beads of water on a joint will not be considered a visible leak.

3.09 LOW PRESSURE AIR ACCEPTANCE TESTS

- A. Where approved by the Engineer, the Contractor may perform low pressure air acceptance tests in lieu of infiltration or exfiltration tests for pipes 24 inches in diameter or smaller. Test shall be made in accordance with ASTM F-1417-Plastic Gravity Sewer Lines; ASTM C-924-Concrete (Circular) Sewer Pipe with Gasket.
 - 1. If the air pressure required for the test is greater than 5.0 psig, the low pressure air acceptance test shall not be used.
- B. The Contractor shall furnish all equipment, materials, and labor, and conduct the tests under observation of the Resident Project Representative.
- C. Safety:
 - 1. The air test may be dangerous if the line is improperly prepared. All plugs shall be installed and braced in such a manner to prevent blowouts. No one shall be allowed in manholes during testing.
 - 2. Pressurizing equipment shall include a regulator set at the maximum pressure.
- D. Line Preparation:
 - 1. Sewers to be air tested shall be prepared and inspected as specified herein for infiltration and exfiltration tests.
 - 2. Where porous pipe materials are used, the pipe walls may be wetted to temporarily reduce the porosity of the material.
 - 3. All pipe outlets shall be plugged, braced, and the joints restrained adequately to prevent blowouts.
- E. Test Procedure:
 - 1. Low pressure air shall be slowly introduced into the sealed line until the internal air pressure reaches 4.0 psig greater than the average back pressure of any ground water above the invert of the pipe.
 - 2. When a constant pressure of 4.0 psig greater than the average back pressure of any ground water above the pipe is reached, the air supply shall be throttled to maintain that internal pressure for at least 2 minutes to permit temperature equalization.
 - 3. When temperatures have been equalized and the pressure stabilized at 4.0 psig greater than the average back pressure of any ground water above the pipe, the air supply shall be shut off or disconnected.
 - 4. Decrease the pressure in the sealed line until the continuous monitoring pressure gauge reads 3.5 psig greater than the average back pressure of any ground water above the pipe. When this pressure is reached, timing shall commence with a stop watch.
 - 5. Determine the time, as shown on the stop watch, required for the pressure in the sealed line to drop 1.0 psig.
- F. Test Method ASTM F-1417-Plastic Gravity Sewer Line:
 - 1. Low pressure air test method shall be the Time-Pressure Drop Method.
 - 2. The pressure used in the test shall be the stated pressure plus the average back pressure of any groundwater above the pipe.
 - 3. The time required for the pressure in the test section to drop 1.0 psig shall be measured using a stop watch. If the time is less than the time determined from ASTM F-1417, the section fails. The table below has been reprinted from ASTM F-1417 for Contractor's information.

Pipe Diameter, Inches	Minimum Time, Min.: Sec.	Length for Minimum Time, Feet	Time for Longer Length, Sec. (L=Ft)
6	5:40	398	0.854 L
8	7:34	298	1.520 L
10	9:26	239	2.374 L
12	11:20	199	3.418 L
15	14:10	159	5.342 L
18	17:00	133	7.692 L
21	19:50	114	10.470L
24	22:40	99	13.674L

Note: Minimum time applied to all lengths less than or equal to the length shown. For more information, see ASTM F-1417, Table 1.

G. Test Method ASTM C-924-Concrete (Circular) Sewer Pipe with Gasket:

1. The pressure used in the test shall be the stated pressure plus the average back pressure of any groundwater above the pipe.
2. The time required for the pressure in the test to drop 1.0 psig shall be measured using a stop watch. If the time is less than the time determined from ASTM C-924, the section fails. The table below has been reprinted from ASTM C-924 for Contactor's information.

D Nominal Pipe Size, Inches	Minimum Time (minutes)/100 feet
4	0.3
6	0.7
8	1.2
10	1.5
12	1.8
15	2.1
18	2.4
21	3.0
24	3.6

H. Air Pressure Adjustment For Groundwater:

1. In areas where groundwater is known to exist, the Contractor shall install a one-half inch diameter capped pipe nipple, approximately, 10 inches long, through the manhole wall on top of one of the sewer lines entering the manhole. This shall be done at the time the sewer line is installed. Immediately prior to the performance of the line acceptance test, the groundwater level shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground to clear it, and then connecting a clear plastic tube to the pipe nipple. The hose shall be held vertically and a measurement of the height in feet of water shall be taken after the water stops rising in this plastic tube.
2. The air pressure correction, for the groundwater pressure above the pipe, shall be calculated as follows: Subtract the average invert elevation from the measured groundwater elevation. Multiply the elevation difference by 0.433 psi/feet to compute the pressure difference. Add the pressure difference to the test pressures stated in the test procedure.

PART 4 SPECIAL PROVISIONS

4.01 PIPE SCHEDULE

- A. The following letter designations are used in the Piping Schedule:

Material Designation:

DIP - Ductile Iron Pipe

- PVC - Polyvinyl Chloride
- CPP - Concrete Pressure Pipe

B. Sanitary Sewer Schedule

Size	Thickness Class	Material	Spec Section	Remarks
12"	SDR 35	PVC solid wall	2.01B	Alternate A
18"	SDR 35	PVC solid wall	2.01B	Alternate B

C. Storm Sewer Schedule

Size	Thickness Class	Material	Spec Section	Remarks

D. Schedules are not guaranteed to be complete. All piping shown on the Drawings or specified shall be furnished and installed by the Contractor whether or not listed in the above schedule.

END OF SECTION

SECTION 02552

PRECAST CONCRETE MANHOLES

PART 1 GENERAL

1.01 SCOPE

- A. This Section includes furnishing and installing precast concrete manholes, including drops and manhole stacks of types and at locations shown on the Drawings and scheduled.
- B. This Section includes removing existing structures, additional excavation to widen and deepen trenches for manhole construction, furnishing and installing concrete of classes called for, portland cement mortar, reinforcing steel, precast concrete pipe integral base sections, bottom riser sections, transition sections, and riser sections, eccentric cones, flat slab tops and grade rings, flexible manhole connections, pipe for drop connections, manhole steps, manhole frames and covers, plugging lifting holes, pointing joints, joint wrap installing, forming channels through manhole bottoms, making watertight connections to new and existing sewers, and other work incidental to manhole construction and testing.
- C. Additional product requirements are specified in Section 01350.

1.02 SUBMITTALS

- A. Submittals shall be in accordance with all requirements of Section 01300 and shall include:
 - 1. Shop drawings for review:
 - a. Manufacturer's Shop Drawings indicating physical dimensions, pipe openings, precast section arrangement, adjusting rings, castings, and joint details for each size and type of manhole components furnished for the project. Shop drawing shall incorporate the planned elevations and details.
 - b. Manufacturer's certification indicating that the manhole components and joints meet specifications for each production run for each size and type furnished.
 - 2. Information for the record:
 - a. The Engineer may request test results to verify certification. Certification documents shall be according to the Source Quality Control of this Section.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Type of Manhole Sections:
 - 1. Manhole Stacks - Manhole stacks shall mean 4-foot diameter manholes used for access to reinforced concrete manhole chambers and precast manhole riser tee sections.
 - 2. Type I Manholes - Type I manholes shall mean 4-foot diameter manholes with precast integral base sections for sanitary sewers and either precast integral base

sections or precast bottoms for storm sewers. Pipe connections to manholes shall be made with flexible water tight joints. Type I manholes are intended for installation of pipes 18-inch diameter and smaller unless noted otherwise.

3. Type II Manholes - Type II manholes shall mean manholes with 5-foot diameter precast integral base sections. Pipe connections to manholes shall be made with flexible water tight joints. Type II manholes are intended for installation of 21-inch through 30-inch diameter pipes unless noted otherwise.
 4. Type III Manholes - Type III manholes shall mean manholes with precast integral base sections or precast bottoms that are larger than 5-foot diameter. The diameter of the bottom riser sections shall be as shown on the Drawings. Pipe connections to manholes shall be made with flexible water tight joints. Type III manholes are intended for installation of pipes where the additional wall area is needed for installation on flexible joints and of 36-inch through 48-inch diameter pipes unless noted otherwise.
 5. Type IV Manholes - Type IV manholes shall mean manholes with cut-outs in the bottom riser sections installed on cast-in-place or precast concrete bases. The diameter of the bottom riser sections shall be as shown on the Drawings. Pipe connections above bottom riser section shall be made with flexible water tight joints. Type IV manholes are intended for installation on sewers 48-inch diameter and larger and on existing pipes where identified on Drawings.
 6. Type S Manholes - S following manhole type shall mean the designated type manhole constructed with a precast flat slab top in lieu of a precast cone.
- B. Precast concrete pipe manhole sections, integral base sections, transition sections, eccentric cones, flat slab tops, and adjusting rings shall conform to ASTM C-478. Reinforcing in transition sections shall be equal to that specified for wall sections of the larger diameter.
 - C. Joints shall be tongue and groove type with a gasketed seal type conforming to ASTM C-443.
 - D. The standard length of riser sections shall be 48-inch. Lengths of 32-inch or 16-inch shall be used to meet required dimensions and as specified.
 - E. Openings for connecting pipes in riser sections, bottom riser sections, and integral base sections, and for access in flat slabs shall be pre-formed or cored by the manufacturer, except "cut-out" openings may be made in bottom riser sections for Type IV manholes. Cut-out openings shall be made immediately after the pipe is removed from the casting form. All cored openings for sewer pipe connections shall have flexible joints.
 - F. Precast integral base sections shall be of monolithic construction. Base flat slab floors or integral floors shall have a minimum thickness of 6-inch for risers up to and including 48-inch in diameter and 8-inch for larger diameters. A layer of reinforcement shall be placed above the midpoint, and shall have a minimum area of 0.12 square inch/linear feet in both directions.
 - G. Manhole sections shall be constructed with no pipe connection within 6 inches of a joint in the structure.
 - H. Manhole sections shall be clearly marked and identified with the manhole number, section placement order, casting date, trademark, name of the manufacturer, and location of the production plant.

2.02 ACCESSORIES

- A. Manhole Steps - Manhole steps shall be of polypropylene plastic reinforced with a 1/2-inch No. 60 grade reinforcing rod. Steps shall be M. A. Industries Model PS-1, or equal.

1. Specified manhole steps shall be factory installed to provide a continuous ladder of 16-inch Center-to-Center rung spacing. Steps shall be placed in the forms and cast in pipe wall or placed immediately after the pipe is removed from casting and carefully mortared in place with nonshrink mortar to ensure a watertight joint. Manhole step installation shall be in compliance with OSHA regulations. If the outer surface of the pipe wall is pierced the patch shall be completely covered with a bituminous sealer.
- B. Manhole frames and covers shall be as shown on the Drawings and in conformance with requirements of Section 05540.
 1. Where pressure tight manhole frames and covers are called for, threaded inserts shall be cast in eccentric cones or flat slab tops and holes formed or cored in adjusting rings to match bolt size and spacing specified for manhole casting.
- C. Mortar:
 1. Mortar used for the structures herein specified shall conform to ASTM C-270 Type S, containing no masonry cement. The mortar shall be composed of one part portland cement to two parts sand by volume.
 2. Nonshrinking Mortar - Materials for nonshrinking mortar shall be Sauereisen F-100, Five-Star, or equal.
- D. Cast-in-Place Concrete:
 1. All cast-in-place concrete used for concrete bases and for forming channels in manhole bottoms shall be Class A as specified in Section .
 2. All concrete used for supporting precast concrete manhole bases shall be Class B as specified in Section .
- E. Reinforcing Steel - Reinforcing steel used in cast-in-place concrete shall meet the requirements of Section 03200.
- F. Flexible Joints - Joints for precast pipe openings shall be "A-LOK X-CEL" as manufactured by A-LOK Products, Inc., "Kor-n-seal" as manufactured by National Pollution Control Systems, Inc., or equal in accordance with ASTM C-923.
- G. Pipe for Manhole Drops - Pipe for manhole drops shall conform to specifications of Section 02550 for the required size and type shown on the Drawings.
- H. Joint Wrap - Polyolefin backed exterior joint wrap used to cover the exterior side of joints shall be ConSeal CS212; Riser Wrap by Pipeline Seal & Insulator, Inc. or equal. Minimum width shall be 12 inch. Joint wrap shall include the use of brush or roller applied adhesive surface primer formulated for use with joint wrap. Seal shall meet the requirements of ASTM E-1745, C-877, and ASTM C-990.
- I. Chimney seal shall be applied to the exterior of all manholes and shall cover the joint at iron casting, adjusting ring and lap over manhole riser/top section. Seal shall be HDPE heat shrink as manufactured by Pipeline Seal & Insulator, Inc. (Riser-Wrap) and CCI Pipeline System (Wrapid Seal), or equal.
- J. Chimney seals which are installed on the interior of manholes will not be acceptable.

PART 3 EXECUTION

3.01 COORDINATION

- A. Location and type of manholes installed shall be as shown on the Drawings or directed.

- B. Construction shall be in conformance with details shown on the Drawings and as specified.
- C. Excavation for manhole construction shall be prepared as directed in applicable paragraphs of Sections 02200.

3.02 INSTALLATION OF INTEGRAL BASE SECTIONS

- A. The manhole base may be placed on 6 inches compacted granular bedding material.

3.03 INSTALLATION OF BOTTOM RISER SECTIONS (WITHOUT INTEGRAL BASE)

- A. Unless otherwise called for on the Drawings or directed, precast bottom riser sections shall be placed with cast-in-place reinforced concrete bases.
- B. The base shall be of Class A concrete 12-inch thick minimum placed on undisturbed earth or a minimum 6-inch-thick aggregate stone cushion. Reinforcing shall be as shown on the Drawings.
- C. The cut-out riser section shall be blocked in place above the pipe and the concrete base poured in place. Concrete shall be extended above the lower rim of the riser wall as required to provide a watertight seal around the entire circumference of the riser section. The sewer pipe shall be bedded in concrete monolithic with the base to the first joint each way from the manholes.
- D. On straight runs the Contractor may carry the pipe through the manhole and break out the top half after the fill concrete has set. In all cases the pipe shall extend through the manhole wall to the inside face.

3.04 CHANNELING MANHOLE BOTTOMS

- A. The bottoms of all manholes shall be channeled to conduct flow in the planned direction. The channel walls shall be formed or shaped to the full height of the crown of the outlet sewer in such a manner to not obstruct maintenance of flow in the sewers and shall match inverts of connection pipe at the manhole wall.
- B. Manholes which do not have integral base or channels precast with base section, as approved by Engineer, shall have channels formed and placed in the field with Class A concrete.

3.05 PRECAST CONCRETE RISER SECTIONS

- A. The shortest length of riser section to be incorporated into the manhole shall be installed immediately below the eccentric cone section or the flat slab top.
- B. Riser section joints shall be pointed and lifting holes filled with nonshrinking mortar.
- C. Riser section exterior joints shall be wrapped and sealed with joint wrap as specified herein. Concrete shall be primed a minimum of two times. The first coat shall be allowed to fill concrete depressions and bug holes. Contractor shall follow manufacturer recommendations.
- D. Contractor shall protect joint wrap from damage during back filling and other related work.

3.06 INSTALLATION OF MANHOLE FRAMES

- A. Manhole frames and covers shall be installed to grades shown on the Drawings or as directed.
- B. Adjustment of manhole castings shall be made using specified precast grade rings and portland cement mortar joints or preferred bitumen seals.

- C. Each manhole casting shall be anchored in place using four 5/8-inch stainless steel bolts with nuts as detailed on the Drawings or directed.
- D. The maximum depth of adjustment below any manhole casting shall be 16 inches and the minimum depth of adjustment shall be 4 inches.
- E. In concrete pavement, separate frame from pavement with 1/2-inch thick premolded mastic joint material extending from the base of the frame to the top of the frame.
- F. Manhole castings located in pavement areas shall be installed with the top of the casting 1/4 inch below the finished grade of the adjacent pavement surface.

3.07 CHIMNEY SEAL

- A. Installation of chimney seal shall be after casting has been adjusted to final grade. Chimney seal shall cover all joints at manhole top including, but not limited to, iron casting, adjusting rings and manhole riser.
- B. Chimney seal shall be installed per manufacturer recommendations. Chimney seal shall provide a water tight seal.

3.08 MANHOLE TESTING

- A. Each manhole shall be tested in accordance with ASTM C-1244 'Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill.' in the presence of the Engineer
- B. All lift holes shall be plugged with an approved non-shrink grout before testing.
- C. All pipes entering the manhole shall be plugged and braced to prevent being drawn into the manhole.
- D. Testing shall be by drawing a vacuum on the manhole using equipment specifically designed for such testing. A test head with necessary gauges and connections shall be placed at the inside of the top of the cone section and sealed in accordance with the manufacturer's instructions. A vacuum of 10 inches of mercury shall then be drawn and the vacuum pump shut off. With valves closed, the time shall be measured for the vacuum to drop to 9 inches. The test shall be successful if the time measured is greater than the required time based on the following chart:

Depth (ft.)	Diameter (in)				
	48	60	72	84	96
<4	10	13	16	20	23
6	15	20	25	29	34
8	20	26	33	39	45
10	25	33	41	48	56
12	30	39	49	58	67
14	35	46	57	67	78
16	40	52	67	77	89
18	45	59	73	86	100
20	50	65	81	96	111
22	55	72	89	105	122
24	59	78	97	115	133
26	64	85	105	124	144
28	69	91	113	134	155
30	74	98	121	143	166

- E. If the test is unsuccessful, necessary repairs shall be made and retesting shall proceed until a satisfactory test is obtained.

- F. If a manhole is constructed of different diameters, the largest diameter shall be used to determine the time required for testing.
- G. The Contractor may perform testing after completely backfilling the manhole, and the following modification to the testing procedure shall be followed.
 - 1. Determine depth of water table and depth of manhole being tested.
 - 2. Using above depths, calculate the hydrostatic head above the lowest manhole connection.
 - 3. Adjust test pressure according to the following table:

Hydrostatic Head (ft)	≤12	13	14	15	16	17	18	19	20	21	22
Vacuum Pressure (in Hg)	10	9	8	7	6	5	4	3	2	1	0

- 4. If hydrostatic head above the lowest manhole connection is equal to or greater than 22 feet, vacuum testing must be completed before backfilling.

PART 4 SPECIAL PROVISIONS

4.01 XYPEX ADDITIVE

- A. Contractor to provide crystalline waterproofing additive to precast concrete manholes as indicated on the drawings and as specified herein (Xypex Admix C-500 or C-1000).
- B. Concrete waterproofing system shall be of the crystalline type that chemically controls and permanently fixes a non-soluble crystalline structure throughout the capillary voids of the concrete. The system shall cause the concrete to become sealed against the penetration of liquids from any direction, and shall protect the concrete from deterioration due to harsh environmental conditions.
- C. The manufacture of the crystalline water proofing shall provide the type of material and the dosage rate for the application. Admix must be added to concrete mix at time of batching. The actual dosage in the mix design shall be certified at the time of application.
- D. Manufacturer shall coordinate with the concrete batch facility and other admixture suppliers to ensure compatibility with the concrete mix design, other admixtures and concrete properties. The addition of the crystalline water proofing shall not reduce the concrete strength or compromise the ASTM specifications or other quality standards governing the concrete mix.
- E. Concrete containing Xypex Admix shall be moist cured in accordance with ACI Reference 308, "Standard Practice for Curing Concrete".

END OF SECTION

SECTION 02600

PAVEMENTS, CURBING, AND WALKS

PART 1 GENERAL

1.01 SCOPE

- A. This Section includes the construction of sidewalks, curbing, pavements, and berms of various designated types as shown or scheduled on the Drawings, specified or directed.
- B. This Section includes preparation of the base and subgrade construction of walks, curbs, pavements and base courses, adjustment of manhole castings, and valve boxes to conform to new pavement courses, and other work and materials incidental to the construction of pavements, curbing, and walks.
- C. Existing curbs and walks of stone or concrete shall be replaced using concrete.
- D. This Section includes temporary and restoration of permanent pavement markings as they exist at the time of bidding unless otherwise shown on the Drawings, specified or directed.

1.02 OWNER'S STANDARDS AND SPECIFICATIONS

- A. Submittals shall be in accordance with all requirements of Section 01300 and shall include:
 - 1. Shop drawings for review:
 - a. Manufacturers' and suppliers' material certificates.
 - b. A sieve analysis (ASTM C 136) shall be furnished for each material source.
 - 2. Information for the record:
 - a. Delivery tickets from the asphalt and aggregate suppliers shall be given to the inspector at the unloading site. Tickets shall include (as a minimum) name of source, date, type of material, and weight.
 - b. Test results and certificates.

PART 2 PRODUCTS

2.01 AGGREGATE BASE AND SURFACE

- A. The aggregate shall be crushed limestone meeting the requirements of MDOT Table 902-1, Class 21AA or 22A.

2.02 CHIP SEAL

- A. Chip seal shall meet the requirements of MDOT Section 505.
- B. Chip seal shall be placed in two applications with materials and rates of application in accordance with MDOT 505.03E. The initial application shall use Class 25A aggregate and the second application, Class 29A aggregate. Asphaltic material used with each application shall be HFRS-2 or CRS-2 meeting the requirements of MDOT Table 904-4 or 904-5.

2.03 ASPHALT EMULSIONS

- A. The bond coat material shall be SS-1h or CSS-1h, and shall meet the requirements of MDOT Table 904-4 and 904-5.
- B. The prime coat material, if required, shall be MS-Op and shall meet the requirements of MDOT Table 903-4.

2.04 BITUMINOUS AGGREGATE BASE AND ASPHALT CONCRETE

- A. Bituminous Material - The asphalt cement shall be PG 58-28 performance grade (Design Temperature) and shall meet the requirements of MDOT Table 904-2.
- B. Design Mix - Refer to MDOT Section 501.
 - 1. The base course shall meet the requirements of MDOT Mixture No. 2.
 - 2. The leveling course shall meet the requirements of MDOT Mixture No. 3.
 - 3. The wearing course shall meet the requirements of MDOT Mixture No. 5.

2.05 CONCRETE (CAST-IN-PLACE)

- A. .
- B. .
- C. Other materials required for placing concrete shall be as follows:
 - 1. Joint Sealer:
 - a. Hot Applied Sealer - MDOT Section 914.04A.
 - b. Backer Rod - MDOT Section 914.04B.
 - 2. Preformed Fiber Joint Filler - MDOT Section 914.03.
 - 3. Curing Materials:
 - a. Burlap Cloth - AASHTO M182, Class 2.
 - b. Sheet Materials - ASTM C-171.
 - c. White Membrane Curing Compound - .
 - d. Transparent Membrane Curing Compound - .

2.06 PAVEMENT MARKING

- A. Contractor shall provide temporary and permanent pavement markings equal to those markings that are removed from existing paved surfaces prior to commencement of the work unless scheduled on the drawings, specified, or as directed.
- B. Pavement markings shall be in accordance with the requirements of MDOT Item 811.
- C. Pavement markings shall match existing or adjoining pavement markings.

PART 3 EXECUTION

3.01 COORDINATION

- A. All soil subgrade under pavements, driveways, curbs, curb and gutter, and walks shall be compacted in accordance with Section 02200.
- B. All service boxes, manholes, inlets and other structures shall be adjusted or reconstructed to the required grades in both new and resurfacing pavement areas.

3.02 PAVEMENT INSTALLATION

- A. All construction shall be in conformance with applicable portions of MDOT Specifications, except as otherwise specified or called for herein.
- B. Unless otherwise directed by Engineer all aggregate bases which are to receive bituminous courses shall be primed at a minimum rate of 0.30 gallons per square yard.
- C. A tack coat at a rate of 0.05 to 0.8 gallon per square yard shall be applied to all existing pavements which are to be overlaid, and between subsequent courses when directed by the Engineer.

3.03 TRANSITION JOINTS FOR BITUMINOUS CONCRETE PAVEMENT OVERLAY

- A. Types of Transition Joints:
 - 1. Transition joints shall be either butt type or feathered type as directed by the Engineer.
 - 2. Butt joints shall be used on State and Federal roads and main thoroughfares and feathered joints used elsewhere unless otherwise specified.
 - 3. Butt Joints:
 - a. When a butt joint is called for on the Drawings or specified, the old surface shall be cut back for at least 3 feet to a depth of at least 1 inch for the full width of the joint and pavement installed.
 - b. A bituminous seal shall be placed on the finished surface at the junction of the new and old pavements.
 - 4. Feathered Joint:
 - a. Feathered joints shall be constructed by manually raking the paving material to a smooth transition from the full depth material to the existing pavement surface.
 - b. Existing pavement surface shall be bond-coated to include the transition area.
 - c. Feathering shall be done by a workman skilled in the operation and shall be approved by the Resident Project Representative.

3.04 CURBING

- A.
- B. Place 1-inch dowelled expansion joints at inlets and at spring lines of street and driveway returns. If intersecting streets and driveways are more than 300-feet apart, place expansion joints at 300-foot intervals.
- C. Contraction joints shall be placed at approximately 10-foot intervals.

3.05 CONCRETE SIDEWALK

- A.
- B. Unless otherwise indicated on the Drawings, concrete sidewalks shall be a minimum of 4-foot-0-inch wide and 4-inch thickness of concrete. Concrete walk removed and replaced shall be equal to the section removed.
- C. The surface of the walks shall be divided into equally spaced blocks at approximately 5-foot intervals. Expansion joint filler 1/2-inch thick shall be installed between the walk and any fixed structure, at all changes in direction or shape and at intervals of 20-foot maximum. The expansion joint filler shall be 1-inch thick where the walk is installed against the back of curb. The filler shall be recessed 1/2-inch from top of finished surface.

- D. Sidewalks shall be reinforced with WWF 6 by 6 - W 2.0 by W 2.0 reinforcing mesh.
- E. Surface of new sidewalks shall be broomed to slightly roughen surface. On sections of sidewalk to be replaced, the surface texture shall match the adjoining.

3.06 CONCRETE DRIVEWAYS

- A.
- B. Dowelled contraction joints shall be placed at a maximum spacing of 20-feet. Lesser spacing shall be used on irregular areas as directed by the Engineer.
- C. Expansion joint filler 1/2-inch thick shall be installed at intervals of 24-feet maximum. One-inch expansion joint filler shall be installed between the driveway and any fixed structure.

3.07 BITUMINOUS AND AGGREGATE DRIVEWAYS

- A.
- B.

3.08 MILLED ASPHALT BASE

- A.

3.09 INSPECTION

- A. Laboratory services shall be in accordance with the requirements of Section 01410 and shall include:
 - 1. A compaction test on the subgrade, aggregate base, and each layer of asphalt shall be performed for every 300 square yards of material placed.
 - 2. Asphalt Concrete:
 - a. Plant Certification - The laboratory shall certify or furnish recent certification (within one year) from MDOT that the plant meets State requirements.
 - b. Plant Inspection - For the first day of production and for every day when more than 100 cubic yard of material is being delivered to the project, the laboratory shall provide a representative at the plant who will inspect the plant, make mix design adjustments, check the temperature, and take the required samples.
 - c. Quality Control Testing - A sample of the mix shall be taken for each 200 cubic yard of bituminous material or fraction thereof delivered to the project. An extraction test AASHTO T164-70 and a mechanical analysis AASHTO T30-70 shall be performed on the mix samples.
 - 3. Cast-in-Place Concrete:
 - a. Concrete shall be tested in accordance with Section , Cast-in-Place Concrete.

3.10 PROTECTION

- A. No heavy construction vehicle shall operate on any pavement, curbing, or walk after it has been installed.
- B. Traffic shall be prohibited on newly installed asphalt pavement until it has cooled sufficiently to avoid marking.
- C. Asphalt Pavements:
 - 1.

D. Concrete Pavements, Curbing, and Walks:

1. .
2. The Contractor shall take such precautions as are necessary to protect the concrete from rain.
3. The Contractor shall protect the concrete from freezing for no less than seven days or until such time that specimen beams have attained a modulus of rupture of at least 600 psi.

PART 4 SPECIAL PROVISIONS

END OF SECTION

SECTION 03305

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SCOPE

- A. This Section includes cast-in-place concrete along with formwork, waterstops, joint systems, stair nosings, reinforcing, mix design, placement procedures, and finishes as indicated on the Drawings and as specified herein.

1.02 SUBMITTALS

- A. Submittals shall be in accordance with requirements of Section 01300 and shall include:
1. Shop Drawings for Review:
 - a. Concrete mix designs including substantiating data and test records.
 - b. Product literature for admixtures, curing compounds, and miscellaneous materials.
 - c. Locations of construction and control joints not shown on Drawings, and proposed changes in locations.
 - d. Material certifications.
 - e. Aggregate gradation and percentages of deleterious substances.
 - f. Batch plant certification.
 - g. Placing drawings shall indicate:
 - 1) Construction joints, splice locations, and splice lengths.
 - 2) Bending schedules.
 - 3) Accessories.
 2. Information for the Record:
 - a. Manufacturer's application instructions for miscellaneous materials.
 - b. Quality control test reports.
 - c. Slab profile report.
- B. Copy of concrete delivery ticket shall be presented to Resident Project Representative for each batch. Delivery ticket shall indicate:
1. Name of ready-mixed company and plant designation.
 2. Truck number.
 3. Concrete class.
 4. Quantity of concrete.
 5. Date.
 6. Time when batch was loaded.
 7. Type and name of admixtures.
 8. Actual batch weights of cement, fly ash, aggregates, and water.
 9. Location of pour and time of unloading shall be added to the ticket at site.

1.03 QUALITY ASSURANCE

- A. Concrete work shall comply with provisions of the current editions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified.
 - 1. ACI American Concrete Institute.
 - 2. CRSI "Manual of Standard Practice."
 - 3. AWS "Code for Welding in Building Construction."
- B. Concrete Manufacturer Qualifications - Manufacturer of ready-mixed concrete products complying with ASTM C94 requirements for production facilities and equipment.
- C. Concrete Testing Service - A qualified independent testing agency shall perform material evaluation tests and shall design concrete mixes.
- D. Maintain adequate supervision and control of dewatering operation to ensure that stability of excavated and constructed slopes are not adversely affected by water, erosion is controlled, and flooding of excavation or damage to structures does not occur.
- E. Batch Plant:
 - 1. Batch Plant shall be central batch plant with automatic or semi-automatic control. Concrete may be mixed using either central-mixed, shrink-mixed, or truck-mixed methods. If concrete is shrink-mixed or truck-mixed, the truck and concrete producer shall conform to ASTM C94.
 - 2. Batch plant shall be certified by the Department of Transportation, National Ready Mixed Concrete Association (NRMCA) or an independent certification using NRMCA "Check list for Certification of Ready Mixed Concrete Production Facilities" executed and certified by independent Professional Engineer registered in state of project site. Evidence of current certification shall be submitted.
- F. Pre-Installation Conferences:
 - 1. Before beginning concrete work, Contractor shall hold a meeting to review detailed requirements for preparing concrete mix designs and to determine proper procedures for concrete construction.
 - 2. A representative of Contractor, testing laboratory, concrete producer, and Engineer shall be in attendance.

1.04 DELIVERY AND HANDLING

- A. Concrete shall be delivered in accordance with ASTM C94, except concrete shall be completely discharged within one hour after introduction of mixing water to cement.
- B. Concrete shall be delivered in agitating trucks or in mixing trucks operating at agitating speed.

PART 2 PRODUCTS

2.01 MATERIALS - Materials used in concrete construction shall meet all the requirements of applicable ASTM and other industry standards.

- A. Portland cement - ASTM C150, Type I or II unless indicated otherwise.
- B. Air-entraining Agent - ASTM C260, chloride ion free.
- C. Chemical Admixtures (Water Reducing Agents, Superplasticizers, Accelerator) - ASTM C494, chloride ion free.

- D. Pozzolan (Fly ASN) (Fly Ash) (GGBF Slag) - ASTM C618, Class F. ASTM C989 grade 100 or low and shall contain less than 12 percent alumina (C34).
- E. Aggregates - ASTM C33.
- F. Reinforcing Steel - ASTM A615, Grade 60, deformed.
- G. Welded Wire Fabric; Plain - ASTM A185, (undeformed wires) with weld intersections not exceeding 12 inches.
- H. Water - ASTM C94, clean and potable.
- I. Membrane Curing Compound - ASTM C309, minimum 30 percent solids content, non-yellowing, moisture loss not to exceed .039 grams per square cm in 72 hours when applied at a coverage rate of 250 square feet per gallon, VOC compliant, water-based acrylic polymer resin. "Safe Cure & Seal - 30 percent by Dayton Superior or equal.
- J. Sheet Curing Compound - ASTM C171.
- K. Formwork - ACI 301 and ACI 347R.
- L. Form Coating - Non-staining.
- M. Preformed Expansion Joint Filler:
 - 1. Exterior Walks and Pavements - "Sealtight Fibre" by W. R. Meadows or equal; asphalt impregnated cellular fibers securely bonded together in conformance with ASTM D1751.
 - 2. Other Location - "Sealtight Self-Expanding Cork" by W. R. Meadows or equal; self-expanding cork type expansion joint filler in conformance to ASTM D1752, Type III.
 - 3. Isolation Joints - "Ceramar Flexible Foam" by W. R. Meadows or equal; flexible foam expansion joint filler.
- N. Joint Sealer, Vertical - ASTM C920, Type M, Cass 25, Grade NS, Dymeric, by Tremco or Asikaflex - 2C NS@ by Sika Corp. or equal.
- O. Joint Sealer, Horizontal - ASTM C920: THC-900, by Tremco or "Sikaflex - 2C SL" by Sika Corp. or equal.
- P. Vapor Barrier - ASTM D2103 - 6 mil polyethylene.
- Q. Waterstop -
 - 1. Type A Waterstop - PVC, Corps of Engineers, CRD-C 575, min. tensile strength 2000 psi equal to TAMMS/HORN Type 7D1 or Green Streak No. 735. Type A waterstop with split flange shall be Green Streak No. 727 or equal.
 - 2. Type B Waterstop - PVC, Corps of Engineers, CRD-C 575, min. tensile strength 2000 psi equal to TAMMS/HORN Type DB-2 or Green Streak No. 748. Type B waterstop with split flange shall be Green Streak No. 759 or equal. Waterstops shall have hog rings (factory installed) at maximum spacing of 12 inches.
 - 3. Type C Waterstop-bentonite/butyl rubber compound coiled strips with minimum bentonite content of 75 percent. For slabs and walls greater than 8 inches thick, waterstop strip shall be 1-1/4 inch by 1/2-inch trapezoidal shape with reinforcing scrim equal to American Colloid Company "Volclay" RX 101 T. For slabs or walls 8 inches thick or less but at least 5 inches thick, waterstop strip shall be 3/4 inch by 3/8 inch half circle shape equal to American Colloid Company "Volclay" RX 102.
- R. Miscellaneous Metals - ASTM A36
- S. Anchor Bolts - ASTM A307

- T. Expansion Bolts - Hilti Kwik Bolt II or equal.
- U. Anchor Bolt Sleeves - Sinco Products, Inc. or equal; high density polyethylene
- V. Stair Nosing - Alumogrit Type 116 by Wooster Products, Inc., or equal; abrasive cast aluminum with concealed integral steel anchors.
- W. Bonding Agent for New to Existing Concrete - "Sika Armatec 110 Epocem" by Sika or equal. (Epoxy modified cementitious product.)
- X. Dry Shake, Non-Metallic - "Surflex" by Euclid or "Mastercorn" by Master Builders, or equal.
- Y. Galvanizing - ASTM A123 or A153.
- Z. Epoxy Adhesive for Embedding Dowels into Existing Structures - 100 percent solids, 100 percent reactive epoxy conforming to ASTM C881, Type IV, Grade 3, Class B and C. The minimum bond strength per ASTM C-882 shall be 1800 psi at 7 days. The adhesive shall be formulated to withstand the maximum allowable published loads permanently without creep or failure. The adhesive shall be Hilti "HIT-RE-500" or equal. Power/Rawl "Power-Fast" epoxy with "Fast Set" formulation shall not be used.
- AA. Epoxy Coating for Protection of Exposed Reinforcing Steel Bars at Concrete Saw Cut and Removal Locations - EMACO P-24 by Master Builders, or equal. "Sika Asmatec 110 Epocem" by Sika Corp. or equal.
- BB. Joint Dowel Bars - Plain steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.
- CC. Include spacers, chairs, bolsters, ties, and other devices that conform to CRSI specifications necessary for properly placing, supporting and fastening reinforcement in place. Metal accessories shall be plastic coated, galvanized or stainless steel where legs will be exposed in finished concrete surfaces. For slabs-on-grade, use supports with sand plates or horizontal runners for any areas where the base material will not support chair legs. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).
- DD. Use one brand of cement throughout the entire project, unless otherwise approved by the Engineer.

2.02 CONCRETE MIX DESIGN

- A. .
- B. Contractor shall design and be responsible for the performance of all concrete mixes of specified quality, consistency, and workability to permit concrete to be worked readily into forms and around reinforcement without segregation or excessive bleeding. Hardened concrete shall develop all characteristics required by contract documents.
- C. Concrete mixes shall be proportioned to maximize durability and water tightness and to minimize shrinkage. To this end, total water content shall be kept to the lowest possible amount consistent with placing and consolidation methods. Water reducing and high range water reducing admixtures shall be used as required to maintain workability. Specified water/cementitious ratio shall not be exceeded.
- D. Concrete proportions shall be established on the basis of previous field experience, or laboratory trial batches in accordance with ACI 301, ACI 211.1 and ACI 318. Proposed mix design shall be accompanied by complete standard deviation analysis or trial mixture test data.
- E. Concrete proportions shall be subject to Engineer's approval. Substantiating data and test records shall be submitted.

PART 3 EXECUTION

3.01 COORDINATION

- A. Reinforcement, sleeves, inserts, anchors, waterstops, and other embedded items shall be accurately placed, supported, and tied prior to concrete placement. Other trades and contractors required to furnish embedded items shall be given ample notice of concrete placement. Reinforcement and embedded items shall be subject to review of Resident Project Representative prior to placing concrete.
- B. Contractor shall notify Resident Project Representative a minimum of 48 hours before placing concrete, excluding nonworking days.
- C. Concrete shall be placed only between hours of 8:00 a.m. and 6:00 p.m., unless otherwise permitted. Concreting shall not be placed after 12:00 noon on the last working day of the week.

3.02 PREPARATION

- A. Unless adequate protection is provided, concrete shall not be placed during rain, sleet, or snow, or when inclement weather is imminent.
- B. Cold Weather - When the average temperature of surrounding air is expected to be below 40 degrees F during placing or within 24 hours thereafter, cold weather concreting in accordance with ACI 306R "Standard Specification for Cold Weather Concreting" shall apply.
- C. Concrete shall be protected from extremes in temperature as specified. During periods not defined as cold weather, but when freezing outdoor temperatures are foreseen or occur, concrete surfaces shall be protected against freezing for the first 24 hours, minimum, after placement.
- D. Hot Weather- When the ambient temperature is 90 degrees F. or above, or when conditions of concrete temperature, air temperature, wind velocity, and relative humidity combine to cause flash set, excessively low slump, cold joints, plastic shrinkage cracking, or otherwise impair the quality of concrete, hot weather concreting procedures in accordance with "Hot Weather Concreting - ACI 305R," shall apply.
- E. When the evaporation rates of bleed water exceed 0.1 pounds per square feet per hour, steps shall be taken to prevent plastic shrinkage cracking. Evaporation rate shall be determined by method shown in "Hot Weather Concreting - ACI 305R."

3.03 INSPECTION, STARTUP, AND TESTING

- A. Notify Engineer 48 hours prior to placement of concrete.
- B. Engineer's approval is required for subgrade, formwork, and reinforcing prior to starting each placement.
- C. Submit proposed concrete mix design to Engineer for review prior to commencement of any work. Do not begin concrete production until the proposed mix design has been approved by the Engineer.
- D. The following tests shall be performed by an independent testing laboratory acceptable to the Engineer during progress of the work:
 - 1. Compression Tests Cylinders - Strength test shall consist of three cylinders molded and cured. Cast three cylinders for each 50 cubic yards, or fraction thereof, for each class of concrete placed on any one day, but at least three for each day. Test one cylinder at seven days and two at 28 days in accordance with ASTM C39.

2. Slump Tests - ASTM C143. Slump shall be measured for first batch of each concrete class delivered in morning and afternoon, for each strength test, and whenever consistency of concrete appears to vary.
 3. Air Entrainment - ASTM C173 or C231. Perform one test for every second ready-mix truck load.
 4. Temperature ASTM C1064. Perform with each slump test.
- E. If the measured slump or air content fall outside the specified limits, make an additional test immediately and on each successive batch until the specified requirements are met by two consecutive batches.
- F. Materials and installed work may require testing and retesting at any time during progress of work. Tests, including retesting of rejected materials for installed work shall be done at Contractor's expense.
- G. Test Reports:
1. The testing laboratory shall submit test reports directly to the Contractor, the concrete supplier, and Engineer. Reports shall be identified by the project name and number, and the portion of the structure represented. Reports shall include the dates of casting and testing, air and concrete temperatures, specified strength and mix design, actual strength and mix design, slump, air content, and the name of individual making the test.
 2. The testing laboratory shall notify the Engineer immediately by telephone when a low strength break occurs or specifications are not met.

3.04 FORMWORK

- A. Formwork shall conform to ACI 347R.
- B. Formwork shall be designed to safely support vertical and lateral loads, until such loads can be safely supported by concrete structure. Loads shall be carried to ground by formwork and in-place construction of adequate strength.
- C. Formwork shall be designed for dead and live loads, weight of concrete, wind, construction loads including impact, and other loads which act or might act on formwork.
- D. Formwork shall be designed for pressure of concrete giving due consideration to rate of concrete placement, methods of placement, method of consolidation, concrete mix design, temperature, and other factors pertinent to formwork design.
- E. Forms shall have sufficient strength and rigidity to maintain specified tolerances.
- F. Formwork shall be securely braced and anchored against deflection and displacement.
- G. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood insets shall be used for forming keyways, reglets, recesses, and the like for easy removal.
- H. Form ties shall be adjustable in length to permit tightening of the forms and so made that no metal remains nearer than 1-1/2 inch to the concrete surface after the ends are removed. Spreader devices shall leave holes no greater than 7/8 inch in diameter. Washers or buttons leaving shallow depressions in the surface will not be permitted. Twist type ties may be used only for unexposed concrete.
- I. Provide holes in the form for insertion of vibrators to properly consolidate concrete.
- J. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace

temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.

- K. Chamfer exposed corners and edges using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- L. The maximum allowable tolerance in either the horizontal or vertical planes shall be 1/4 inch in 10 feet.
- M. Provisions for Other Trades - Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.
- N. Oil temporary forms with non-staining form oil.
- O. Cleaning and Tightening - Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.05 DOWELING TO EXISTING STRUCTURE

- A. Dowels shall be embedded into existing concrete where shown on Drawings. Unsound concrete shall be reported to Engineer.
- B. Hole shall be drilled 1/8 inch larger than nominal diameter of reinforcing bar using a rotary percussion hammer and carbide bit. Bar shall be embedded a distance equal to the lap splice length unless shown otherwise.
- C. Hole shall be cleaned of dust and residue by blasting with dry and oil-free compressed air. Air nozzle shall be inserted to bottom of hole.
- D. Standing water and frost shall be removed immediately prior to injecting adhesive.
- E. Adhesive shall be injected from bulk-loading caulking gun, disposable caulking tubes, or pneumatic dispenser. Adhesive shall be injected using extension on nozzle to reach bottom of hole. Adhesive shall be injected to pre-determined depth which will cause hole to be completely filled after bar is inserted. Adhesive shall be mixed in accordance with the manufacturer's instructions.
- F. Bar shall be inserted and slightly rotated to ensure adhesive completely surrounds bar.
- G. Adhesive displaced from hole shall be removed immediately.

3.06 REINFORCEMENT

- A. Place reinforcing to ACI recommended tolerances.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by the Engineer.
- D. Unless shown otherwise in drawings, place reinforcement to maintain minimum coverages conforming to ACI standard practice for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- E. Welding of reinforcement shall conform to AWS D1.4.
- F. Unless otherwise specified on Drawings, reinforcing steel splices shall be lapped conforming to ACI 318, Class B splices.

- G. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh plus 2 inches and lace splices with 16-gauge wire. Do not make end laps between supporting beams. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.07 INSERTS

- A. Metal inserts such as anchor bolts, sleeves, embedded metals, etc. shall be free of scale, loose rust, oil, grease and other coatings. Remove protective film from cast iron with flame.
- B. Ensure that items are accurately positioned and rigidly supported against displacement before placing concrete.
- C. The location of anchor and foundation bolts must not vary from the dimensions shown on the Contract Drawings by more than the following:
 - 1. 1/8-inch center to center of any two bolts within an anchor bolt group, where such group is defined as the set of anchor bolts which receives a single fabricated steel shipping piece.
 - 2. 1/4-inch center to center of adjacent bolt groups.
- D. Split rib types of waterstops are acceptable at construction joints and isolation (expansion) joints.
- E. Secure waterstops in place by wire ties to hog rings. Hog rings to be installed between last rib and edge and spaced at 12 inch on center.
- F. Field weld joints in waterstops using indirect heating element.

3.08 JOINTS

- A. Joints not shown on Drawings shall be made at locations that will least impair strength of structure, and shall be approved by the Engineer prior to construction.
- B. Construction Joints:
 - 1. Keyways at least 1-1/2-inch-deep by width, which is equal to 1/3-member thickness, shall be provided in all construction joints in walls, supported slabs, and between walls and foundation systems.
 - 2. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints. Do not continue reinforcement through sides of strip placements.
 - 3. Concrete slabs on grade shall be poured in strip pattern shown on the Drawings.
 - 4. Roughen surfaces of set concrete at all joints. Clean surfaces of laitance, coatings, loose particles, and foreign matter. Roughen surfaces in a manner to expose bonded aggregate uniformly. Apply approved bonding adhesive or cement grout. Bonding cement grout shall be evenly spread and shall consist of 1-part cement and two parts fine aggregate. Fresh concrete shall be placed before grout or bonding adhesive has obtained initial set. Grout shall be approximately 2-inch-thick in walls.
- C. Unless otherwise shown, provide isolation joints in slabs on grade at all points of contact between slabs on ground and vertical surfaces, such as column pedestals, foundation walls, grade beams, equipment bases and elsewhere as indicated.
- D. Expansion Joints:
 - 1. Provide preformed expansion joints as shown on Drawings or otherwise required.

2. Expansion joint material shall be 1/2 inch in thickness, unless otherwise indicated.
 3. Concrete edges at expansion joints subject to vehicular traffic shall be tooled to a 1/8-inch radius.
 4. When sealed expansion joints are called for on the Drawings, pourable approved joint sealants shall be placed along top edges of expansion joints per manufacturer's instructions.
- E. Control Joints for Slabs:
1. Control joints shall be located and constructed as shown on the Drawings.
 2. Within 24 hours of finishing concrete, cut joints to a depth of 1/4 slab thickness when it is firm enough to resist raveling, tearing, or dislodging of aggregates.
- F. Clean joints thoroughly with compressed air, wire brushing, or sandblasting.
- G. Fill joints with specified joint filler.

3.09 CONCRETE SCHEDULES

- A. Unless indicated otherwise, concrete shall be furnished as follows:
- Class A: Reinforced concrete structures and fill in manholes and chambers.
- Class B: Buried pipe, saddles, and cradles, pipe bedding, pipe encasements, and mudmats.

3.10 PLACING CONCRETE

- A. General - Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.
- B. Do not place concrete on frozen ground, mud, or debris. Dampen subgrade prior to placing concrete slabs on grade where vapor barrier is not required.
- C. Inspection - Before placing concrete, inspect, and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Where necessary, notify other trades to permit installation of their work.
- D. Convey concrete from the mixer to the place of final deposit by methods which will prevent the loss or separation of the materials:
1. When concrete placing is interrupted for more than 1/2 hour, place a construction joint.
- E. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Avoid unplanned cold joints. Alternate equipment shall be immediately available for use in the event that primary placing equipment or system breaks down.
- F. Use internal vibration to consolidate. Size at least one vibrator to work around closely spaced reinforcing. Provide a standby vibrator whenever working less than three vibrators in the pour. All equipment and procedures used to consolidate concrete shall comply with ACI 309R.
- G. Concrete shall be thoroughly consolidated by vibrating, spading, rodding, or forking so that concrete is thoroughly worked around reinforcement and embedded items, and into corners, angles of forms, eliminating air and stone pockets.
- H. Hot Weather:
- Concreting: Follow recommendations of ACI 305R for preparation, placing, protection and curing during hot weather.

- I. Cold Weather:
Concreting: Follow recommendations of ACI 306R for preparation, placing, protection and curing during cold weather.
- J. Contractor shall keep good thermometer at site for monitoring air or concrete surface temperature.
- K. Where saw cutting and removal of existing concrete walls, slabs, etc. exposes the ends of reinforcing steel bars, the Contractor shall coat the exposed concrete surface with the specified epoxy coating.
 - 1. Prior to application of the epoxy coating, the concrete surface to be coated shall be roughened and cleaned of all loose materials and dust.
 - 2. Epoxy coating shall be waterbased rebar coating agent, moisture insensitive, 3-component, epoxy-modified cementitious product.
 - 3. Application methods and thickness of coating shall be as recommended by the manufacturer.
- L. Apply the specified bonding agent per the manufacturer's instructions at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 1. Prior to application of the bonding agent, the existing concrete surfaces to be coated shall be roughened and cleaned of all loose materials and dust, thus exposing the aggregate to provide a mechanical bond in addition to the chemical bond provided by the bonding agent.
 - 2. Screed paved surfaces with a straightedge and strike off. Use bull floats or darbies to form a smooth surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces prior to beginning finishing operations.

3.11 DEFECTIVE CONCRETE

- A. Defective concrete is defined as concrete in place which does not conform to specified design strength, required percent air, shapes, alignments and elevations, as shown on the Drawings and/or which presents faulty surface areas. Evaluation and acceptance of concrete shall conform to ACI 318, ACI 301, and ACI 350 as applicable.
- B. All defective concrete shall be removed and replaced in a manner meeting with the Engineer's approval, or should surface imperfections only occur, may be patched at the discretion of, and in a manner satisfactory to the Engineer; however, permission to patch the Work shall not be considered as a waiver of the Engineer's right to require complete removal and replacement of such defective work should the patching fail to satisfactorily restore the required quality and appearance of the Work. All such work shall be performed at the Contractor's expense, without extension of time.
- C. If for any reason, in the opinion of the Engineer, the testing of any section of the completed structure is necessary, a superimposed load shall be applied by the Contractor and the test conducted in accordance with the current Building Code at the Contractor's expense irrespective of the results of the tests. In cases where failure is declared, the Engineer shall have the authority to order the defective construction removed. All expense of removing such defective construction and substituting new construction, including expense of removing and replacing the work of others, or protecting and repairing the work of others, shall be borne by the Contractor.

3.12 CURING

- A. General - Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations.

- B. Begin curing after finishing concrete but not before free water has disappeared from concrete surface in accordance with ACI 308 "Standard Practice for Curing Concrete" subject to the requirements specified in the following subsections.
- C. Cure concrete at least five days at concrete temperatures above 70 degrees F or at least seven days at concrete temperatures between 50 degree F and 70 degree F. Maintain concrete temperature above 50 degree F during the curing period. Tanks and other liquid retaining structures shall be cured for a minimum of 10 days.
- D. For exposed surfaces, utilize one of the following methods:
 - 1. Membrane Curing Compound - Apply in two coats at right angles to each other upon completion of the work - each one in accordance with the manufacturer's instructions. Compounds must not be used on surfaces when surface treatments, such as tile, additional concrete, paint, liquid hardeners, and adhesive coatings are specified unless the compound is known not to interfere with adhesion.
 - 2. Sheet Curing Materials - Place materials upon completion of the finishing work. Lap edges 6 inches and seal to create a moisture barrier that must remain intact for the duration of the curing period.
 - 3. Sprinkling, Soaking, or Ponding - Maintain surfaces continuously wet for the duration of the curing period as described above.
- E. If formed surface is exposed during the curing period, treat the surface as an exposed surface for the remaining duration of the curing period.

3.13 FINISHING SURFACES

- A. Roadway Repairs and Walkways:
 - 1. Float Finish - Begin floating when bleed water sheen has disappeared and the concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Finish surfaces to true planes within a tolerance of 1/4 inch in 10 feet as determined by a 10-foot-long straightedge placed anywhere on the surface in any direction. Cut down high spots and fill low spots. Refloat surface immediately to a uniform granular texture.
 - 2. Final Tooling - Tool edges of paving and joints formed in fresh concrete with a jointing tool to a radius of 1/4-inch Repeat tooling of edges and joints after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.14 REMOVING FORMS

- A. General - Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after curing at not less than 50 degrees F for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days or until concrete has attained at least 80 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimen's representative of concrete location or members. Construction loads shall not exceed 80 percent of design live load until 28 days after concrete placement.
- C. Form-facing material may be removed four days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

3.15 REUSING FORMS

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

3.16 CONCRETE REPAIRS AND REPLACEMENT

- A. Remove and replace, at Contractor's expense, any concrete that was part of the work and that is broken, damaged, or defective, or does not meet the requirements of this Section.
- B. Protect concrete from damage. Exclude traffic from slabs-on-grade and roadway/walkway paving for at least 14 days after placement. When construction traffic is permitted, maintain slabs and paving as clean as possible by removing surface stains and spillage of materials as they occur.
- C. Patching Defective Areas - Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to the Engineer.
- D. Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.
 - 1. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
 - 2. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- E. Repaired Formed Surfaces - Remove and replace concrete having defective surfaces if defects cannot be repaired to the satisfaction of the Engineer. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.
 - 1. Repair concealed formed surfaces containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.
- F. Repairing Unformed Surfaces - The Contractor shall test unformed surfaces such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.
 - 1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01-inch-wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.

2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
 3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- G. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

PART 4 SPECIAL PROVISIONS

4.01 HOUSEKEEPING PADS

- A. Unless otherwise specified or detailed on the Drawings, concrete housekeeping pads shall be installed under all floor-mounted items such as motor control centers, electrical panels, control panels, transformers, generators, pumps, blowers, drives, process equipment, and HVAC equipment. Housekeeping pads shall be Class A concrete 4 inches high with chamfered edges and a troweled finish.

END OF SECTION

SECTION 05540

IRON CASTINGS

PART 1 GENERAL

1.01 SCOPE

- A. This Section includes manhole covers and frames, inlet grates and frames, stop plank grooves, and other iron castings shown on Drawings.

1.02 SUBMITTALS

- A. Submittals shall be in accordance with requirements of Section 01300 and shall include:
 - 1. Shop Drawings for Review:
 - a. Product literature that shall be included; General Specifications, Surface Coating, Anchor Bolts, Machine Bearing Surface.
 - b. An independent Shop Drawings shall be submitted for the Frame and the Cover.
 - c. A Submittal of a casting schedule that clearly notes either the structure number or in what circumstances the casting is intended to be installed, shall be included, i.e., roadway.
 - d. All dimensions for both the Frame and the Cover/Grate shall be included.
 - 2. Information for the Record:
 - a. Material certification.
 - b. Proof-load test data.
 - c. Manufacturer's installation instructions.
 - d. Manufacturing Capabilities and Quality Control Measures.

1.03 PRODUCT HANDLING

- A. Castings shall be delivered in sufficient time to permit proper placement in pavement and slabs.
- B. Castings shall be stored in such a way as to prevent warping prior to installation.
- C. Additional product handling requirements are specified in Section 01350.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Castings shall be manufactured by EJ Inc., Neenah Foundry Company, or equal.

2.02 MANHOLE COVER AND FRAME

- A. Castings located in roadways, driveways, or other areas subject to vehicular traffic shall be suitable for heavy-duty service. Other castings shall be suitable for light-duty service.
- B. Unless indicated otherwise, sewer manhole shall have a minimum Clear Opening of 24 inches.
- C. Unless indicated otherwise, heavy duty manhole cover and frame shall be MDOT Cover Q.

D. Light duty manhole cover and frame shall be MDOT Cover A.

2.03 INLET GRATE AND FRAME

A. Castings shall be suitable for heavy duty service.

B. Unless indicated otherwise, inlet grate and frame shall be MDOT Cover K.

2.04 STOP PLANK GROOVES

A. Stop plank grooves shall be as specified, shown on Drawings or as directed.

2.05 PERFORMANCE REQUIREMENTS

A. Castings shall be gray iron conforming to ASTM A-48, Class 35.

2.06 FABRICATION

A. Castings shall be free from pouring faults, sponginess, cracks, blowholes, blisters, shrinkage strains, and other defects. Plugging of defective castings is not permitted.

B. Castings shall be true to pattern in form and dimension. Weight of castings shall not vary by more than 5 percent from published weight. Contractor shall submit invoices showing actual weight of casting as certified by manufacturer.

C. Castings shall have machined bearing surfaces.

D. All Castings shall be coated with a non-toxic, nonflammable, water-based, asphalt paint.

E. Lettering shall be cast on covers. Unless indicated otherwise, the manufacturer's name shall be cast in cover.

F. Covers for sanitary sewer manhole shall be solid lids and labeled "Sanitary Sewer."

G. Castings for Storm Sewer Structures shall include the phrases "DUMP NO WASTE" and "DRAINS TO WATERWAYS" with the "eco-fish" symbol. All storm sewer manhole covers shall be vented.

H. Covers shall be furnished with bolts, locks, hinges, perforations, lifting rings, and pick holes as specified, shown on Drawings, or as directed.

PART 3 EXECUTION

3.01 PREPARATION

A. Contractor shall examine surfaces to receive castings and shall report unacceptable conditions to Engineer before proceeding with the Work.

3.02 ERECTION & INSTALLATION

A. Castings shall be accurately set, aligned, and anchored as shown on Drawings.

B. Castings shall be installed in accordance with manufacturer's instructions or shown on the drawings. If any discrepancies exist, then the more stringent requirements shall take precedence.

C. Stop Plank Grooves shall be square, set plumb, and securely anchored as shown. Grooves that are buckled, twisted, or otherwise prevent free insertion of stop plank shall be removed and replaced.

PART 4 SPECIAL PROVISIONS

4.01 CASTING SCHEDULE

A.

4.02 CONCRETE COLLARS

- A. Concrete collars shall be provided for all manholes and valve boxes located in paved areas.

END OF SECTION

