Engineer's Estimate \$60,000

CITY OF SAGINAW 1315 S WASHINGTON AVE SAGINAW MICHIGAN 48601

C-1675

Fire Station Emergency Generator

BID OPENING TUESDAY, AUGUST 17, 2021 3:00 PM



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SEALED BID INSTRUCTIONS

SEALED BIDS MUST BE SUBMITTED ACCORDING TO THE FOLLOWING INSTRUCTIONS OR YOUR BID WILL BE DISQUALIFIED

- 1. Bids must be submitted on printed forms furnished by the City Purchasing Office. Voluntary alternates may be attached to bid form, if necessary.
- 2. Bids must be in ink or typewritten.
- 3. Bids must contain bidder's complete name, address and telephone number.
- 4. Bids must be signed in ink and dated.
- 5. Bids must include delivery or completion time.
- 6. If an addendum is issued by the City, it must be signed, dated and returned with bid.
- 7. An **original** bid bond, bank money order, certified check or cashier's check in the amount of five percent (5%) of the total amount bid must be submitted with any bid in excess of \$100,000. If agreement is for multiple years, each year should be combined to get your total cost. Facsimiles or copies of bid bond will not be accepted and bid will be disqualified if submitted.
- 8. All erasures or corrections to pricing information must be initialed in ink.
- 9. If this is a Davis-Bacon Prevailing Wage Project it will include a wage decision and Division 15. The City of Saginaw does not have a Prevailing Wage ordinance.
- 10. In case of a discrepancy between a unit price and its extension, the unit price will be considered correct and the bid will be recalculated to determine the amount bid. All addition errors will be corrected and the total bid will be adjusted to reflect the corrections.
- 11. All bids must be in the City Purchasing Office, 1315 S. Washington Ave. Saginaw, MI 48601 by the date and time specified on bid forms. The Purchasing Office is located at Saginaw City Hall in room #105.
- 12. Each bidders envelope, FED EX box/letter, UPS box/letter or any other method of sealed delivery must have the bid number or contract number on the outside of the container. **UNMARKED BIDS WILL BE DISQUALIFIED.**
- 13. EACH BID MUST BE ENCLOSED IN A SEPARATE SEALED ENVELOPE WITH **SEALED BID AND THE BID NUMBER** MARKED ON THE FRONT. A COPY OF THE ORIGINAL BID MUST ALSO BE INCLUDED IN THE BID.

RIGHT OF CITY TO ACCEPT OR REJECT BIDS

THE CITY RESERVES THE RIGHT TO ACCEPT OR REJECT ANY AND ALL BIDS, OR PARTS THEREOF, AND TO WAIVE ANY IRREGULARITIES WHICH DO NOT MATERIALLY AFFECT THE BID DOCUMENT OR OTHERWISE CONFLICT WITH STATUTE OR ORDINANCE. ANY REJECTION OF BIDS SHALL BE MADE ONLY IF THERE IS A SOUND DOCUMENTED REASON FOR SAME.

GENERAL INFORMATION

MAIL OR DELIVER ALL SEALED BIDS TO THE FOLLOWING ADDRESS BY THE DATE AND TIME SPECIFIED ON BID FORM

CITY OF SAGINAW PURCHASING OFFICE – ROOM #105 1315 S. WASHINGTON AVENUE, SAGINAW, MICHIGAN 48601

SEALED BID DOCUMENTS

EFFECTIVE IMMEDIATELY: All interested bidders may obtain bid document forms, proposal instructions, general specifications, and bid results from the City of Saginaw website (<u>www.saginaw-mi.com</u>). Use the "Look Up a Bid" tab and scroll down to the applicable document.

NO CONTRACT SHALL BE VALID UNLESS APPROVED BY CITY COUNCIL

Pursuant to the Charter of the City of Saginaw, written contracts involving the Expenditure of \$2,000 or more shall require the approval of City Council. No City Employee has the authority to bind the City to such a contract.

ALTERATION OF BID BY BIDDER

After bids have been opened, the bidder will not be allowed to withdraw, modify or correct any bid. Substitutions and Alternates: If a document is issued with the language "No Substitutions, then none will be considered. If a document does not include this language the respective bidder can include a substitution and/or alternate of which the City reserves the right to determine equivalent.

EVIDENCE OF BIDDER'S QUALIFICATIONS

Bidders may be required to give some satisfactory evidence that they have been regularly engaged in the business or are reasonably familiar therewith, and that they are fully prepared with the necessary capital, materials, and machinery to complete the work or to furnish the material contracted for the satisfaction of the city.

FAMILIARITY OF BIDDER WITH CONTRACT REQUIREMENTS

Bidders are warned that they must inform themselves of the character and amount of work, labor, or material to be furnished under the contract.

CONTRACT ASSIGNMENTS OR TRANSFERS PROHIBITED

The assignment or transfer of a contract or of interest in the contract are prohibited unless approved by the proper City department and City Council.

CITY INCOME TAX COMPLIANCE

Bidders are hereby notified that the City of Saginaw has an income tax. All successful bidders will be subject to income tax withholding and compliance is mandatory. Per section 14 of the City of Saginaw uniform income tax ordinance, the tax percentage is 1.5% on income earned from the City. The tax shall apply on the taxable net profits of a corporation doing business within the City, being levied on such part of the taxable net profits as is earned by the corporation as a result of work done, services rendered and other business activities conducted with the City as determined in accordance with this ordinance.

WITHHOLDING FROM PAYMENTS

As part of the consideration for any bid/contract, all bidders agree to have withheld from any payment due them, any amounts for taxes, fees, or other charges due the City of Saginaw.

GENERAL INFORMATION

CONTRACT COMPLIANCE ORDINANCE

The City of Saginaw has a Contract Compliance Ordinance, which requires bidders to submit documentation furnished by the City indicating compliance with the Ordinance. Contract compliance forms must be sent to the City Purchasing Office; 1315 S. Washington Avenue; Saginaw, Michigan 48601. Forms may be obtained by calling (989) 759-1430.

BID FORMS

A copy of the original bid form is to be enclosed in the bid envelope (original plus a complete copy). "<u>All</u> <u>or None</u>" means bidders are required to submit pricing for all years and/or all items requested. <u>Any proposal</u> <u>received that does not meet this requirement will be disqualified.</u> If said bid is not listed as "All or None" the City reserves the right to split said bid to our best benefit. If you receive a bid copy from our web site, and have never conducted business with us you can also complete a copy of our "Vendor Compliance Form" and return it to us or contact our Purchasing Office so you can be formally added to the respective bidders list for that good or service. (989) 759-1430

BID RESULTS

A bid tabulation sheet showing the initial results will be posted on our website within 48 hours of the bid opening date. Once the respective department reviews the bids they will make a recommendation on who our City Council should award the bid to. At that time, the recommendation will also be posted on the tabulation sheet as a secondary notice.

INSTRUCTIONS AS PART OF CONTRACT

These instructions are to be construed with and made part of the contract or purchase order.

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Rev: 4-2012

GENERAL INSTRUCTION TO BIDDERS

1. INTENT

It is the intent of the City, unless otherwise specified, that work on any contract awarded under the advertisement, to be started no later than Thirty (30) calendar days after award of the contract or the date specified in the contract documents, and that the work shall be carried on with due diligence, at such points and at such times and seasons, and with such force and in such manner as to secure its completion on or before the completion date as specified in the advertisement or as determined by the proposal or construction schedule, submitted by the Contractor.

2. INTERPRETATIONS OR ADDENDA

No oral interpretation will be made to any bidder *as* to the meaning of the contract documents or any part thereof. Every request for such an interpretation shall be made in writing to the City Engineer. Any inquiry received seven (7) or more days prior to the date fixed for the opening of bids will be given consideration. Every interpretation made to a bidder will be in the form of an addendum to the contract documents and when issued will be on file in the office of the City Purchasing Officer and the office of the City Engineer. In addition, it shall be *the* bidder's responsibility to make inquiry as to the addenda issued. All such addenda shall become part of the contract documents and all bidders shall be bound by such addenda, whether or not received by the bidder.

3. INSPECTION OF SITE

Each bidder should visit the site of the proposed work and fully acquaint himself with the existing conditions there relating to the work and should inform himself as to the facilities involved, the difficulties and the restrictions attending the performance of the contract. The bidder shall thoroughly examine and familiarize himself with the drawings, specifications and all other contract documents. The Contractor by the execution of the contract shall in no way be relieved of any obligation under it due to his failure to receive or examine any form or legal instrument or to visit the site and acquaint himself with the conditions there existing. The City of Saginaw will be justified in rejecting any claim based on facts regarding which he should have been on notice *as* a result thereof.

4. BIDS ON MORE THAN ONE CONTRACT

Any bidder may **submit** a proposal on any single contract, or on any number of contracts, or on all the contracts included in the advertisement. Bidders are cautioned to give full consideration to other commitments which might effect the starting date, schedule of progress, or completion date for any contracts awarded hereunder.

5. DEFINITIONS

The term "City Engineer" shall mean the Director of Public Service, or the City Engineer of the City of Saginaw.

The term "Department of Engineering" shall mean the Department of Public Services and Engineering of the City of Saginaw.

6. CORRECTIONS

All erasures or corrections to pricing information must be initialed in ink.

7. COLLUSIVE AGREEMENT (SEE PROPOSAL)

Each bidder submitting a bid to the City of Saginaw for any portion of the work contemplated by the documents on which bidding is based shall by signing the proposal form sheet agree that the bid is genuine and not sham or collusive or made in the interests or on behalf of any person not therein named. That the bidder has not directly or indirectly induced or solicited any bidder to put in a sham bid or any other person or corporation to refrain from bidding, and that the bidder has not in any manner sought by collusion to secure himself an advantage over other bidders.

8. STATEMENT OF BIDDER'S QUALIFICATIONS

Each bidder shall, upon request of the City of Saginaw, submit a statement of the bidder's qualifications, his construction experience, and his organization and equipment available for the work contemplated, and when specifically requested by the City of Saginaw, a detailed financial statement. The City of Saginaw shall have the right to take such steps as it deems necessary to determine the ability of the bidder to perform his obligations under the contract, and the bidder shall furnish the City of Saginaw all such information and data for this purpose as it may request. The right is reserved to reject any bid where an investigation of the available evidence or information does not satisfy the City of Saginaw that the bidder is qualified to carry out properly the terms of the contract.

9. ALTERNATIVE BIDS

No alternative bids will be considered unless specifically requested.

10. BIDS

a. Bidders are warned that they must inform themselves of the character and amount of work, labor, or material to be furnished under the contract. All bids must be submitted on forms supplied by the City of Saginaw and shall be subject to all requirements of the contract documents, including the drawings and these INSTRUCTIONS TO BIDDERS. All bids must be regular in every respect and no interlineations, excisions or special conditions shall be made or included in the Bid Form by the bidder. After bids have been opened, permission will not, in any case, be given for the withdrawal, modification or correction of any bid.

- b. Bid documents, which are mailed shall include the bid, the bid guaranty (when required), the noncollusion affidavit, and the statement of bidder's qualification (if requested) and shall be enclosed in envelopes (outer and inner) both of which shall be sealed and clearly labeled "Sealed Bid", (outer envelope properly addressed to "City of Saginaw Purchasing Office, 1315 S. Washington Avenue, Saginaw, Michigan 48601") project name and number, name of bidder, and date and time of bid opening, in order to guard against premature opening of the bid. All proposals must be either filled out in ink or typewritten; typewritten is preferred. Bids to include a copy along with the original.
- c. The City of Saginaw may consider as irregular any bid on which there is an alteration of the bid form hereto attached and at its option may reject the same.
- d. If the contract is awarded, it will be awarded by the City of Saginaw to a responsible bidder on the basis of the bid most favorable to the City of Saginaw. The contract will require the completion of work according to the contract documents. Transfer of contract or of interests in contract are prohibited unless approved by the proper City agency.
- e. Each bidder shall include in his bid the following information:
 - I. Bidder Name
 - II. Address
 - III. City, State, Zip Code
 - IV. Telephone Number
 - V. E-mail
 - VI. Status

11. BID GUARANTY (When Applicable) (Effective February 16, 1984)

- a. Bids of \$100,000 or more must be accompanied by a bid guaranty which shall not be less than five percent (5%) of the total contract cost of construction including all overhead items. The bid bond shall be secured by a guaranty or a surety company listed in the latest issue of U.S. Treasury Circular 570 and authorized to transact surety business in the State of Michigan. The amount of such bid bond shall be within the maximum amount specified for such company in said Circular 570. At the option of the bidder, the guaranty may be a certified check, cashier's check, bank money order or a bid bond in the amount specified. No bid will be considered unless it is accompanied by the required guaranty. The certified check, cashier's check, bank money order or a bid bond must be payable to the order of the City of Saginaw. The bid guaranty shall insure the execution of the agreement and the furnishing of the surety bond or bonds by the successful bidder, as required by the contract documents.
- b. Revised bids submitted before the opening of bids, representing an increase in excess of two percent (2%) of the original bid, must have the bid guaranty adjusted accordingly, otherwise the bid will not be considered.
- c. Certified checks or cashier's check, bid bonds and bank money orders of unsuccessful bidders, will be returned as soon as practicable after award of a contract.

12. UNIT PRICE BIDS

The unit price for each of the several items in the proposal of each bidder shall include its pro-rata share of overhead so that the sum of the products obtained by multiplying the quantity shown for each item by the unit price bid represents the total bid. In case of a discrepancy between a unit price and its extension, the unit price will be considered correct and the bid will be recalculated to determine the amount bid. All addition errors will be corrected and the total bid will be adjusted to reflect the corrections. Special attention of all bidders is called to this provision, should conditions make it necessary to revise the quantities. No limit will be fixed for such increased or decreased quantities nor extra compensation allowed, provided the net monetary value of all such additive and subtractive changes in quantities or such items or work shall not increase or decrease the original contract prices by more than twenty percent (20%) unless mutually agreed upon in writing by the City Engineer and Contractor, that extra work, that is work not covered in the drawings and specifications, shall not increase the original contract by more than twenty percent (20%).

13. PUBLIC ACT 524 OF 1980 (When Applicable)

Sec.2 (1) 1908 P.A. 524 states as follows:

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

Therefore, the Contractor shall state on "Bid Proposal" the name of the person who will be submitting request for progress payment and the request shall be made to the City Engineer.

14. TIME FOR RECEIVING BIDS

Bids received prior to the time of opening will be securely kept unopened. The Purchasing officer will decide when the specified time has arrived. No bid received thereafter will be considered, except that when a bid arrives by mail after the time fixed for opening, but before the reading of other bids is completed, and it is shown to the satisfaction of the City of Saginaw that the non-arrival on time was due solely to delay in the mails for which the bidder was not responsible, then such bid will be received and considered.

15. OPENING OF BIDS

At the time and place fixed for the opening of bids, the City of Saginaw open and publicly read aloud every bid received within the time set for receiving bids, irrespective of any irregularities therein. Bidders and other persons properly interested may be present, in person or by representative.

16. WITHDRAWAL OF BIDS

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

17. AWARD OF CONTRACTS: REJECTION OF BIDS

- a. The contract will be awarded to the lowest responsible bidder complying with the conditions of the SEALED BID INFORMATION, provided such bid is reasonable and it is to the interest of the City of Saginaw to accept it. The City of Saginaw, however, reserves the right to accept or reject any and all bids or parts thereof, and to waive any irregularities in a bid except those specific any mentioned in the "Sealed Bid Instructions".
- b. The City of Saginaw reserves the right to consider as unqualified to perform the contract, any bidder who does not habitually perform with his own forces, the major portions of the work involved.
- c. On contracts of \$50,000 or more, the bidder to whom the Purchasing Committee recommends for award will be required to provide bonds prior to award as outlined in Division 1, Section 121.

18. CONSTRUCTION SCHEDULE

In addition to the progress clause incorporated in the proposal, the successful bidder on any single contract, when so requested by the City Engineer, shall submit a schedule of the maximum number of calendar days required for the completion of the contract. The number of calendar days so stated, when approved by the City Engineer, shall be added to the starting date specified in Paragraph 1, and the date thus determined shall become the completion date of such contract unless otherwise specified in the contract.

The successful bidder on any two or more contracts, or the successful bidder on any single contract who also has uncompleted work on other City of Saginaw construction contracts previously awarded, shall prepare a Construction Schedule for submission to and approval by the City Engineer. When so requested by the City Engineer, the Construction Schedule shall be submitted immediately after the tabulation of bids in order that the information therein contained may be considered in the recommendation as to award of contracts. In any case, the Construction Schedule shall be submitted prior to the preparation of contract documents and not later than five (5) days after the tabulation of bids.

The Construction Schedule shall indicate the proposed sequence of operations, including any previously awarded City of Saginaw construction contracts not completed. The schedule shall show the total calendar days required for each contract and the date for starting and completion in each instance.

The schedule shall show whether or not the Contractor proposes to use more than one construction crew and, if requested, shall itemize the types and quantities of machinery and equipment available for the work.

19. SUBCONTRACTS

The Contractor's attention is directed to the requirements as outlined in Section 103, "SUBCONTRACTS", under Division 1, "General Conditions".

20. PRE-CONSTRUCTION MEETING

If so requested by the City Engineer, the Contractor shall make himself available for a preconstruction meeting. The time and place of the meeting to be designated by the City Engineer.

21. CONTRACT COMPLIANCE ORDINANCE

The Contract Compliance Ordinance of the City of Saginaw applies to all contracts, subcontractors or purchase orders except:

- a. When the contractors, sub-contractors or vender employs less that 5 employees;
- b. Those funded partially by any federal program subject to affirmative action pursuant to Presidential Executive Order #11246;
- c. Those funded partially or totally by any State of Michigan program and subject to the Michigan Civil Rights Act; or
- d. Those exempt by the City Council in the interest of the City.

22. CONTRACT COMPLIANCE DOCUMENTATION

The following documents are to be filled out "Contract Compliance Agreement" and the "City of Saginaw Vendor Information" which are provided by the Purchasing Department.

23. MICHIGAN CIVIL RIGHTS ACT, PUBLIC ACT 453 of 1976 (Effective 3-31-77)

All contracts in which the City of Saginaw is a party shall contain a covenant by the Contractor and his & Sub-contractors not to discriminate against an employee or applicant for employment with respect to hire, tenure, terms, conditions, or privileges of employment, or a matter directly or indirectly related to employment because of race, color, religion, national origin, age, sex, height, weight, or marital status. Breach of this covenant may be regarded as a material breach of the contract.

24. MICHIGAN HANDICAPPERS CIVIL RIGHTS ACT, PUBLIC ACT 220 of 1976

All contractors and sub-contractors shall be subject to the Michigan Handicappers Civil Rights Act which prohibits discriminatory practices, policies and customs in the exercise of the civil rights of individuals with handicaps. A violation of the act may be regarded as a material breach of the contract.

25. AMERICANS WITH DISABILITIES ACT (ADA) of 1990

All contractors and subcontractors shall be subject to all the provisions of the Americans with Disabilities Act (ADA) of 1990. A violation of the Act may be regarded as a material breach of this contract.

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101. DEFINITIONS

Wherever used in any of the Contract Documents, the following meanings shall be given to the terms herein defined:

- a. The term "Contract" means the Contract executed by the City of Saginaw and the Contractor, of which these Specifications and Divisions form a part.
- b. The term "Contractor" means the persons, Firm or corporation entering into the Contract with the City of Saginaw to construct and install the improvements embraced in this contract.
- c. The term "City Engineer" shall mean the City Engineer of the City of Saginaw acting personally or, in his absence, through the then-acting City Engineer. The term "Engineer" shall mean the City Engineer acting directly or indirectly through his authorized representatives acting within the limits of the respective authority delegated to them.
- d. The term "Contract Documents" means and shall include the following: Executed Agreement, Addenda (if any), Invitation for Bids, Instructions to Bidders, Signed Copy of Bid, Specifications, Divisions, Special Conditions, Technical Specifications and Drawings (as listed in the Schedule of Drawings).
- e. The term "Drawings" means the drawings listed in the SCHEDULE OF DRAWINGS.
- f. The term "Technical Specifications" means that part of the Contract Documents which described, outlines and stipulates, the quality of the materials to be furnished; the quality of the workmanship required; and the methods to be used in carrying out the construction work to be performed under this Contract.
- g. The term, "Addendum" or "Addenda" means any changes, revisions or clarifications of the Contract Documents which have been duly issued by the City of Saginaw to prospective Bidders prior to time of receiving Bids.

102. APPLICATIONS OF CONDITIONS

These conditions and the clauses of the following pages, printed as well as written, shall apply to all branches of the work with equal force, whether the work is done under one entire Contract or under several separate Contracts.

103. SUBCONTRACTS

The Contractor shall, as soon as practicable after signing the Contracts, but in any event prior to the performance of any work by any subcontractor, notify the City in writing of the names of Subcontractors proposed for the work designating the portions of work to be performed by each. Prior to the performance of any work, the contractor must receive the written approval of the City's Contractor Compliance Officer as to the satisfaction of any minority and woman-owned

business percentage requirements. The Contractor agrees that he is as fully responsible to the City for the acts and omissions of his Subcontractors and of persons either directly or indirectly employed by the, as he is for the acts and omissions of persons directly employed by him.

Nothing contained in the Contract Documents shall create any contractual relation between any Subcontractor and the City.

104. ASSIGNMENT OF CONTRACT

- a. It is agreed that the Contractor shall not assign or transfer this contract, or sublet any part of the work embraced in it, except with the written consent of the City to do so.
- b. It is further agreed that all parts of the work which may be performed by a subcontractor shall conform to the Plans and Specifications and be subject to all the provisions of this Agreement exactly as if performed by the Contractor and his immediate employees and workmen. No subletting of the work shall in any way diminish or weaken the responsibility of the Contractor for all parts of the work, or lessen his obligations and liabilities under this Agreement.
- c. It is likewise agreed that the Contractor shall not assign, either legally or equitably, any of the monies payable to him under this Agreement, or his claim thereto, except with the written consent of the City.

105. RESPONSIBILITIES OF CONTRACTOR

- a. The contractor shall be held to have examined the premises and line of work and shall take the whole responsibility of the work. Should any unforeseen difficulty or obstruction be encountered in the prosecution of the same, involving a greater expenditure of money than the Contractor expected at the time of bidding, he shall proceed, nevertheless, with the work, and no allowance will be made therefore.
- b. It shall not be incumbent upon the City to notify the Contractor when to begin, to cease or to resume work, nor in any way to superintend so as to release the Contractor of responsibility, or of any consequence of neglect or carelessness by him or his subordinates.
- c. The Contractor shall devote his time and personal superintendence to the fulfillment of this contract, and shall keep the same under his control. He shall not assign or sublet this contract, or any portion thereof, nor shall be sublet the work required hereunder, or any portion thereof, without the written consent of the City Engineer.
- d. The Contractor shall assume and have sole charge and possession of all work included in this contract, until the termination thereof, unless otherwise specified in this contract, and shall be solely liable for all damages to persons or property occasioned in any way by his act or neglect or that of his agents, employees, workmen, or any person or persons in and about the work embraced in this Contract.

e. Prior to the start of construction in the public right-of-way, it shall be the responsibility of the Contractor to notify the TRAFFIC ENGINEERING DIVISION of said work. In the case where complete street closure is necessary, it shall be the responsibility of the Contractor to notify the TRAFFIC ENGINEERING DIVISION. FIRE DEPARTMENT AND POLICE DEPARTMENT at least forty-eight (48) hours prior to the start of said work.

106. CITY ENGINEER'S POWER

- a. All work and material furnished under this contract shall be furnished under the direction of and to the satisfaction and approval of the City Engineer. Should any dispute arise as to quality or fitness of the materials or workmanship, the decision shall rest strictly with the City Engineer, and shall be based upon the requirements that all work done and materials furnished shall be first class in every respect, and what is useable and customary shall in no way enter into any consideration or decision whatsoever. He shall have power to condemn all work and reject all material, which in his opinion, is not done or furnished in accordance with this contract. But, this power and authority shall be confined to the direction or specification of what is to be done under this contract, and shall not extend to the actual execution of the work which shall be under the control of the Contractor, and for which the Contractor alone shall be responsible.
- b. Where the Contract Documents provide that the determinations, directions or approvals shall be made by the "Engineer", this shall mean by the City Engineer acting directly or through duly authorized representatives acting within the limit of authority delegated to them. Any determination, directions, or approval of such authorized representatives shall be subject to review by the City Engineer.

107. CONTRACTS FOR OTHER WORK

- a. In case any additional work shall be required in connection with the work contemplated under this contract, the City shall have the right to have such additional work done by any person other than the said contractor, and said contractor shall in no way interfere with or molest such person, and shall suspend such part of the work herein specified, or will carry on the same in such manner as he may be ordered by said City Engineer, so as to afford all reasonable facilities for doing such additional work, and said contractor shall make no claims for damages or for privileges or rights than expressed by this contract by reason of the suspension and the doing of such additional work, except for such extension of time to perform this contract as may be certified by the City Engineer.
- b. The City reserves the right to lay or relay, construct or repair any water mains, gas mains, sewers, conduits and all other pipes and any connections thereto, or to grant permits to those having franchise rights from the City to lay or relay, construct or repair such water mains, gas mains, sewers or conduit and other pipes and connection thereto at any time, and to do such other underground work in the street or streets along the line of work as shall be necessary, or grant permits therefore, at any time prior to the completion of the foundation for the paving material within the limits of this improvement, and to that end shall have the right to suspend the work on

the said improvement, or any part thereof, and the contractor shall not interfere with or place any obstruction in the way of any person or persons who may be engaged in doing any of the work herein specified, and shall not be entitled to damages because of such work or any delay caused thereby.

108. PROGRESS

In addition to the progress clause incorporated in the proposal, the contractor shall be required to submit, on demand of the City Engineer, an outline of his proposed order of work and to indicate the dates of completion of the major items of the work. This outline, when approved by the City Engineer, may, by incorporated in and become a part of the contract.

109. CONTRACTOR'S EMPLOYEES

- a. The Contractor shall employ suitable superintendents and foremen, who, in the absence of the Contractor, shall be present while any work is being done under this contract, and who shall follow, without delay, all orders and instructions of the City Engineer. Any notice given to a Superintendent or Foreman relative to deviation from any of the requirements of this contract shall be equivalent to a notice to the Contractor.
- b. The foreman, employees, mechanics and other employed by the Contractor shall be skilled in the several parts, which are given them to do. Any employee of the Contractor who may use profane or abusive language to the Engineer or any Inspector, or otherwise impede or embarrass him in the performance of his duties, or who obstructs the progress of the work, shall upon the request of the City Engineer, be immediately discharged and not again employed without consent of the City Engineer.
- c. In doing any work contemplated by this contract, eight (8) hours shall constitute a legal day's work by any laborer or workman employed by said Contractor hereon.
- d. Residents of the City of Saginaw shall by employed upon the work of this contract as far as possible to do so.

110. DRAWINGS

a. These specifications and accompanying drawings are intended to be cooperative, and what is called for by either shall be as binding as if called for by both. Should it appear that the work hereby intended to be done, or any of the materials or matters relative thereto, are not sufficiently detailed or explained on the said drawings or in the said specifications, or should any error, discrepancy or inconsistency appear between any of the drawings and specifications, or between any of the several drawings, or should any doubt or misunderstanding arise as to the meaning of said drawings or the specifications, the City Engineer shall furnish such additional drawings, detail or explanation, and he shall have power to interpret, correct, adjust and explain all errors, omissions, discrepancies, doubts and misunderstandings between such drawings and specifications, or between several drawings, and the decision of the City Engineer therein shall be

final and conclusive. Explanations received from officers and employees other than the City Engineer will be considered of no avail in a case of dispute.

b. Preference shall be given to the figured dimensions on the drawings rather than to scale measurements. Figures, unless witnessed by lines and points, are approximate only, and shall not be taken to regulate the dimensions of the structure of improvement. The figures, when so witnessed, are intended to show the exact dimension for the construction of the structure or improvement, but the Contractor, without extra charge, shall make such slight alterations as may be necessary to make adaptable parts fit to fixed parts, leaving all complete and in proper shape when done. It shall be the duty of the Contractor to verify all dimensions given on the drawings, and to report any error or inconsistency to the said City Engineer before commencing work.

111. CHANGES IN THE WORK

- a. No deviation from the drawing and specifications shall be made in the execution of the work without the written order and approval of the City Engineer, nor shall any work in the nature of additional work, or any work not contemplated by the specifications or drawings, be performed, except on written order of the City Engineer, and if any extra work be proceeded with or executed by the Contractor without previous order given in writing under the hand of said City Engineer as herein provided, no compensation for the same will be allowed. Extra work shall be defined as work not contemplated in the original contract, not covered in the drawings and specifications and for which no unit prices have been stipulated.
- b. Should it be deemed expedient by the City Engineer, at any time previous to commencing work, or while the work is in progress, to increase or diminish the dimensions, quantities of material or work, or alter the situation or levels, or vary from the form or dimensions of any part of said work, or vary in any other way the work herein contracted for, the City Engineer shall have full power to do so and to order and direct any such increase, diminution, alteration, or extra work to be made or performed and without in any deviating or affecting this contract; and the Contractor hereby waives any claim or right to damages that he may be entitled to by reason of such changes. The Contractor shall, in pursuance of such order and directions as he may receive in writing from the City Engineer, execute the work thereby ordered and directed, and the difference in expense occasioned by such increase, diminution or alteration, so ordered and directed, shall be added to or deducted from the amount payable under this contract.
- c. The contractor shall perform any extra work (work in connection with the contract but not provided for herein as defined in paragraph a. of this section) when and as ordered in writing by the City Engineer, either (a) at the price agreed upon before such work is commenced and named in the written order for such work, or (b) if the City Engineer so elects, for the reasonable cost of such work, as determined by the contractor and approved by the City Engineer, plus a percentage of such cost, as set forth below. No extra work shall be paid for unless specifically ordered as such in writing by the City Engineer.

The cost of extra work done under (b) above shall include the reasonable cost to the contractor of

materials used and equipment installed, common and skilled labor, and foremen, and the fair rental for all machinery and equipment used on the extra work for the period of such use.

At the request of the Engineer, the contractor shall furnish itemized statements of the cost of the extra work ordered as above and give the Engineer access to all records, accounts, bills and vouchers and correspondence relating thereto.

The contractor may include in the cost of extra work the amounts of additional premiums, if any, (other than premiums on bonds) paid on the required insurance on account of such extra work, of Social Security or other direct assessments upon the contractor's payroll by Federal or other properly authorized public agencies, and of other approved assessments when such assessments are not normally included in payments made by the contractor directly to his employees, but in fact are, and are customarily recognized as, part of the cost of doing work.

The fair rental of all machinery and equipment shall be based upon the most recent edition of "Compilation of Rental Rates for Construction Equipment", published by the Associated Equipment Distributors, or a similar publication approved by the City Engineer. Rental for machinery and equipment shall be based upon an appropriate fraction of the approved monthly rate schedule. If said extra work requires the use of machinery or equipment not already on the site of the work the cost of transportation, not exceeding a distance of 100 miles, of such machinery or equipment to and from the work shall be added to the fair monthly rental; provided, however, that this shall not apply to machinery or equipment already required to be furnished under the terms of the contract.

The contractor shall not include in the cost of extra work any cost or rental of small tools, buildings or any portion of the time of the contractor, his superintendent, or his office and engineering staff.

To the cost of extra work done by the contractor's own forces under (b) above (determined as stated above), the contractor shall add 15 percent to cover his overhead, use of capital, the premium on the bonds as assessed upon the amount of this extra work, and profit.

In the case of extra work done under (b) above by the subcontractor, the subcontractor shall compute, as above, his cost for the extra work, to which he shall add 15 percent as in the case of the contractor, and the contractor shall be allowed an additional 15 percent of the subcontractor's cost for the extra work to cover the costs of the contractor's overhead, use of capital, the premium on the bonds as assess upon the amount of this extra work, and profit. Said subcontractor's cost must be reasonable and approved by the Engineer.

If extra work is done under (b) above, the contractor and/or subcontractor shall keep daily records of such extra work. The daily record shall include the names of men employed; the nature of the work performed, and hours worked, materials and equipment incorporated, and machinery or equipment used, if any, in the prosecution of such extra work. This daily record, to constitute verification that the work was done, must be signed both by the contractor's authorized representative and by the Engineer. A separate daily records shall be submitted for each extra work

order.

d. The City Engineer may order the contractor to proceed with desired changes in work provided that the net value of all such changes does not increase or decrease the original total amount shown in the agreement by more than twenty percent (20%) unless mutually agreed upon in writing by the City Engineer and the contractor and further, that "extra work" shall not increase the original contract by more than twenty percent (20%) in accordance with the section entitled UNIT PRICES under INSTRUCTIONS TO BIDDERS.

112. RIGHT OF CITY TO TAKE OVER CONTRACT

If the work to be done under this agreement shall be abandoned, or if said contractor shall become insolvent, or shall assign this contract or sublet the work hereunder without the written consent of the City Engineer, or if at any time the City Engineer shall be convinced that the work is unnecessarily or unreasonably delayed, or that the contractor is not making such progress in the execution of the work as to indicate its completion within the required time, or that the conditions or agreements of the contract are being willfully violated, or executed carelessly, or in bad faith, he shall promptly notify the Contractor, in writing, and, if this notification be without effect within TWENTY-FOUR (24) hours after the delivery thereof to the contractor, the City engineer shall then have the power and right to place additional men and equipment on said work and supply additional material, if necessary, and do such work as he may deem advisable for the completion of this contract, and may use therefore any materials or implements belonging to said contractor, or he shall have the power and right to notify said contractor to discontinue all work, or any part thereof, under this contract, and upon such notifications, said contractor shall discontinue said work, or such parts thereof, as the City Engineer may designate, and the City shall thereupon have the right and power to re-let this contract, or any part thereof, or to employ, by contract or otherwise, and in such manner and at such prices as it may determine, any person or persons, and obtain any animals, vehicles, appliances, machinery, tools, and other means of construction. And to procure all proper materials which it may deem necessary to work at and to be used to complete the work herein described; also the power to use such appliances, tools, and materials and means of construction of every description as may be found upon the line of work, both such as enter into the completed work and such as are necessarily used in and about the same in the course of construction, and to procure other proper materials for the completion of the same; and it shall charge the expense of all such labor, materials, animals, vehicles, appliances, machinery, tools and other means of construction, and all expense of inspection and engineering and all other expenses, to said contractor, and thereupon the Contractor shall be liable to the city for the amount of the whole cost of accomplishing the object contemplated by this contract in excess, if any, of the amount herein agreed upon, together with such other elements of damage as may have been sustained by the City by reason of said Contractor's failure to complete and perform this contract. In determining the liability of the Contractor hereunder, the City shall not be required to obtain the lowest figures for the work of completing the contract, but all sums actually paid for such completion shall be credited to the City, together with other elements of damage above mentioned, and the certificate of the City Engineer as to the amount of such liability shall be final and conclusive.

113. EXTENSION OF TIME

- a. An extension of time for completion of the work under the contract may be granted by the City Engineer, subject to the conditions of this paragraph, but only upon the written application of the contractor. In general, an extension of time will be granted by the City Engineer only if the delay is unavoidable and substantial, not the fault of the Contractor, and could not be reasonably anticipated or adequately guarded against. The Contractor will not be liable for liquidated damages during the period for which time of completion is extended by the City. The contractor shall be entitled to a reasonable extension of time for unavoidable delay in completion caused solely by the following:
 - I. Any act or omissions of the City, its officers or employees;
 - II. Any act of other public authorities;
 - III. Causes not reasonably foreseeable by the parties at the time of the execution of this contract and which are entirely beyond the control and without the fault or negligence of the Contractor, including, but not limited to, act of God, or the public enemy, war or other national emergency making performance temporarily impossible or illegal, acts or omission of other contractors, strikes and labor disputes not brought on by any act or omission of the Contractor, fires, floods, epidemics, quarantine restrictions, freight embargoes, weather of unusual severity such as cyclones or tornadoes, or excessively abnormal weather.
- b. The City Engineer will make a determination, based on the ascertained facts and the terms of this contract, if an extension of time is justified, and, if so, will extend the time for completing the work for a period commensurate with the period of excusable delay. The determination made by the City Engineer shall be binding and conclusive on the Contractor.

114. LIQUIDATED DAMAGES

In the event of delay in the completion of the entire work beyond the period herein prescribed or beyond the period to which such time may be extended by the City, the City of Saginaw shall be paid the sum of one hundred DOLLARS (\$100.00) for each and every calendar day that the time consumed in said performance and completion extends beyond the final date herein specified and this sum will be considered liquidated damages that the City will suffer by reason of said delay and default. This General Condition for liquidated damages shall, on occasion, be amended by a "Special Provision For Liquidated Damages". The conditions and provisions set forth by this special provision shall supersede the conditions stated herein. In other words the conditions set forth by the "Special Provision For Liquidated Damages" shall prevail. As indicated in Article 6 of this contract, this provision for liquidated damages applies separately to each proposal contained in the contract.

115. DISPUTES

- a. All disputes arising under this Contract or its interpretation, whether involving law or fact or both, or extra work, and all claims for alleged breach of contract shall within ten (10) days of commencement of the dispute, be presented by the Contractor to the City Engineer for decision. All papers pertaining to claims shall be filed in quadruplicate. Such notice need not detail the amount of the claim but shall state the facts surrounding the claim in sufficient detail to identify the claim, together with its character and scope. In the meantime, the Contractor shall proceed with the work as directed. Any claim not presented within the time limit specified within this paragraph shall be deemed to have been waived, except that if the claim is of a continuing character and notice of the claim is not given within ten (10) days of its commencement, the claim with be considered only for a period commencing ten (10) days prior to the receipt by the City Engineer of notice thereof.
- b. The Contractor shall submit in detail his claim and his proof thereof. Each decision by the City Engineer will be in writing and will be mailed to the Contractor by certified mail, return receipt requested.
- c. If the Contractor does not agree with any decision of the City Engineer, he shall in no case allow the dispute to delay the work, but shall notify the City Engineer promptly that he is proceeding with the work under protest and he may then accept the manner in question from final release.

116. SERVICE OF NOTICE

Service of notice by the City upon the Contractor may be made by service upon him personally or by certified mail, return receipt requested, sent by the City Engineer to the Contractor, his superintendent, foreman, agent or representative, and the receipt of such notice by said Contractor, his superintendent, foreman, agent or representative, shall constitute full and legal notice within the meaning of this contract.

117. QUALIFICATIONS OF CONTRACTOR

The Contractor must be capable of performing the various items of work bid upon. He shall furnish on demand of the City Engineer, a list of his qualifications, covering experience on similar work, a list of machinery, plant and other equipment available for the proposed work and such statements of his financial resources as may be deemed necessary.

118. INDEMNITY

The contractor shall indemnify and save harmless said City of and from all loss or damage caused to any person or property by reason of any carelessness or negligence in the doing or making of the improvement, or furnishing of material, and by reason of failure to pay all laborers, mechanics, subcontractors and material men, and all persons who shall supply said Contractor with materials, provisions and supplies for the performance and completion of said contract, and to promptly pay all just debts, dues and demands incurred in the performance of said contract, and of

and from all expense of inspection and engineering, or of whatsoever other kind or nature, which shall be caused by delay or failure in the performance and completion of this contract, and further to indemnify and save harmless of and from all suits and actions against said City, including all attorney's fees, costs and expenses arising from the defense against such suits and actions on account of any injuries or damages sustained by any person or persons by reason of any act, omission or by the use of improper or defective material on the part of said Contractor, or contractor's subcontractors or agents, in the performance of any part of this contract, and further to indemnify and protect and save said City harmless against any and all demands, fees or royalties for any patented invention, materials, articles, methods, arrangement or process of manufacture or any infringements thereon, that may be used on or be in any manner connected with the construction, erection or maintenance of the work, material, or any part thereof, embraced in this contract.

119. INSURANCE

a. During the life of the contract, the Contractor shall effect and maintain the following types of insurance:
Contractor's Liability (cgl)
Automobile
Workman's Compensation
Umbrella Liability
Contractor's & Owner's Protective Liability (ocp)
*Builder's Risk (when applicable)
*Pollution Coverage (when applicable)
*The City will specify when such coverage is applicable.

Such insurance shall be furnished by a financially responsible company, satisfactory to the City, which is an "Admitted Carrier" in the State of Michigan, or is on the "Non-Admitted Approved List" for the State of Michigan. The City of Saginaw, its officers and employees, shall be named as "Additional Insured" on the contractors general liability policy and be the "Additional Insured" on the umbrella policy. The language on the certificate shall read:

The City of Saginaw, its officers and employees, are additional insureds. This coverage is primary to the City and not contributing or pro rata with any other insurance or similar protection, which is or may be available to or carried by the City.

The City of Saginaw shall be the insured on the contractor and owner's general liability policy.

The Contractor shall not commence work under this contract until he has obtained all required insurance and evidence of such insurance has been reviewed and approved by the City Engineer.

- b. All certificates of insurance issued for this contract shall contain the following information in addition to stating the type of insurance and the amount of coverage.
 - I. The Contract number and description of work covered by the insurance.

- II. The insurance must be in a form acceptable to the City and the deductible shall not exceed \$1,000.00.
- III. Thirty (30) days' notice in writing of any cancellation, termination or change of condition of the policy.
- c. Insurance policies covering operations under this contract, which expire before final acceptance of the work shall be renewed, and the new policies submitted to the City Engineer for review and approval. All policies shall be endorsed to provide that the Engineer will be given thirty (30) days' notice in writing of any cancellation, termination or change of condition of the policy.
- d. Contractor's Liability and Contractor's and Owner's Protective Liability. The Contractor shall procure and shall maintain during the life of this contract Contractor's Liability and Contractor's and Owner's Protective Liability insurance in the amounts listed on the following page 12a.
- e. Automobile Insurance: The Contractor shall procure and maintain during the life of this contract Automobile Insurance in the amount listed on the following page 12a.
- f. Workman's Compensation: The Contractor shall procure and maintain during the life of his contract Workman Compensation Insurance as mandated by applicable State and Federal Statute without exclusions, as listed on the following page 12a.
- g. Umbrella Liability: The Contractor shall procure and maintain during the life of this contract Excess Liability in the amounts listed on the following page 12a.
- h. Builder's Risk: (when applicable). The Contractor shall procure and maintain during the life of this contract Builder's Risk Insurance equal to one hundred percent of the completed value of the structures.
- i. Pollution Coverage: The Contractor or the Subcontractor who actually performs the work shall carry pollution insurance in the amount of \$1,000,000.00 where the project involves Asbestos, Environmental or Lead abatement or such other work where the City specifies that pollution insurance is necessary.

"CONTRACTOR'S LIABILITY (C.G.L.) AND CONTRACTOR'S & OWNER'S PROTECTIVE LIABILITY (O.C.P.)"

Amount of Contract				
Less than \$25,000	\$25,000 - 300,000	over \$300,000		
1,000,000 per occurrence 2,000,000 aggregate	1,000,000 per occurrence 2,000,000 aggregate	1,000,000 per occurrence 2,000,000 aggregate		

"UMBRELLA LIABILITY"

Amount of Contract				
Less than \$25,000	\$25,000 - \$300,000	over \$300,000		
1,000,000 per occurrence 1,000,000 aggregate	3,000,000 per occurrence 3,000,000 aggregate	5,000,000 per occurrence 5,000,000 aggregate		

Automobile	500,000
Builder's Risk (When Applicable)	Cost of Completed Value of Structures
Workman's Compensation	 A) State Statutory, No Exclusions. B) Federal Statutory, No Exclusions. C) Employees Liability \$ 100,000.00 each employee \$ 100,000.00 each accident \$ 500,000.00 each policy limit

120. PATENTS, ROYALTIES, TRADEMARKS, ETC.

All fees for claims and royalties for any patented inventions, materials, articles, methods, arrangements or process of manufacture that may be used on or in any way connected with the construction, erection or maintenance of this work, or any part thereof, embraced in this contract, shall be included in the price stipulated and mentioned in the proposal to contract for said work.

121. PERFORMANCE BONDS AND LABOR AND MATERIAL (PAYMENT) BONDS

- a. Prior to the award and within ten (10) days after the prescribed forms are presented for signature, the successful bidder shall execute and deliver to the City of Saginaw an Agreement in the form included in the contract documents in such number of copies as the City of Saginaw may require.
- b. Unless otherwise specified in the notice to bidders, the contractor shall furnish a performance bond. A payment bond shall be required as provided by Act 213, Public Acts 1963. Performance bonds and payment bonds shall be on the City's standard forms, copies of which are on file in the office of the City Engineer, shall be in an amount not less than 100 percent (100%) of the total amount of the contract, shall be executed by a corporate surety prior to award of contract, and shall be subject to approval by the City Manager as to substance and by the City Attorney as to form and execution. Irrespective of the provisions of Article 2 of this contract, the contractor shall not commence work hereunder until policies of the insurance required by Section 119 of GENERAL CONDITIONS shall have been furnished and approved by the City. Upon failure of the contract to furnish said insurance policies within ten (10) days from the award of the contract by the Council, all of the contractor's rights hereunder shall terminate unless the time for furnishing any of said instruments shall have been extended by the City Manager. Such termination shall not relieve the contractor of his liability under his bid bond, and failure to provide the necessary surety bonds and insurance policies shall be treated as the failure of the contractor to enter into the contract pursuant to his bid.

Bid Bonds, Performance Bonds and Payment Bonds will be written with companies named in the Federal Register as published by the Department of the Treasury or acceptable to the City. Surety shall have a rating of no lower than an A- as rated by A.M. Best Key Rating Guide or acceptable to the City.

c. The failure of the successful bidder to execute such agreement and to supply the required bond or bonds within ten (10) days after the prescribed forms are presented for signature, or within such extended period as the City of Saginaw may grant, based upon reasons determined sufficient by the City of Saginaw, shall constitute a default, and the City of Saginaw may either award the contract to the next best responsible bidder or re-advertise for bids, and may charge against the bidder the difference between the amount for which a contract for the work is subsequently executed, irrespective of whether the amount thus due exceeds the amount of the bid bond. If a more favorable bid is received by re-advertising the defaulting bidder shall have no claim against the City of Saginaw for a refund.

122. FACILITIES AND NOTICES FOR INSPECTION

The City Engineer and duly authorized inspectors shall at all times have the right to enter upon the premises upon which said work is being done, or upon which material is manufactured, prepared or stored, for work under this contract, and to inspect the said work and materials, and to ascertain whether or not the construction is carried out in accordance with this contract; and the Contractor shall render all necessary assistance and provide all reasonable facilities and give ample time for such inspection. When any work or material is being executed or prepared away from the line of work, the City Engineer shall be notified in reasonable time where such work is being executed and such material prepared and when it will be ready for inspection so that inspection may be made from time to time before delivery. Failure or neglect on the part of the City Engineer or any inspector to condemn any material at the time of its being supplied or furnished shall not be construed to imply an acceptance thereof.

The Contractor shall notify the Engineer sufficiently in advance of backfilling or concealing any facilities to permit proper inspection. If any facilities are concealed without approval or consent of the Engineer, the Contractor shall uncover for inspection and recover such facilities at his own expense, when so requested by the Engineer.

123. MATERIALS AND WORKMANSHIP

- a. Unless otherwise specifically provided for in the Technical Specifications, all workmanship, equipment, materials and articles incorporated in the work shall be new and the best grade of the respective kinds for the purpose. Where equipment, materials, articles or workmanship are referred to in the Technical Specifications as "equal to" any particular standard, the City Engineer shall decide to the question of equality.
- b. The Contractor shall furnish to the City Engineer for approval, the manufacturer's detailed specifications for all machinery, mechanical and other special equipment which he contemplates installing, together with full information as to type, performance characteristics, and all other pertinent information as required, and shall likewise submit for approval as required full information concerning all other materials or articles which he proposes to incorporate in the work (see paragraph 124: "SAMPLES CERTIFICATES AND TESTS", of Division 1, General Conditions).
- c. Machinery, mechanical and other equipment, materials or articles installed or used without such prior approval shall bear the risk of subsequent rejection.
- d. Materials specified by reference to the number of symbol of a specific standard, such as an ASTM Standard, a Federal Specification or other similar standard, shall comply with requirements in the latest revision thereof and any amendment or supplement thereto in effect on the date of the NOTICE INVITING SEALED PROPOSALS, except as limited to type, class or grade, or modified in such reference. The standards referred to, except as modified in the Technical Specifications, shall have full force and effect as though printed therein.
- e. When any material has been furnished by the City, the Contractor, or his authorized agent, shall sign a receipt therefore, stating that the material has been received in good condition; and, after

receiving such material, the Contractor shall be responsible for the material and shall protect it from the weather and from all other causes which might damage the same, in order to keep the material in as good condition as when he received it. All material broken, damaged or stolen when in the care of the Contractor shall be charge against him and the value thereof deducted from any monies that may become due him. All materials furnished by the City shall be loaded and hauled by the Contractor from the Water and Sewer Maintenance Yard, Department of Public Utilities, at Jefferson and Garey streets, during the regular working hours of the Water and Sewer Maintenance Division.

124. SAMPLES, CERTIFICATES AND TESTS

a. The Contractor shall submit all material and equipment samples, certificates, affidavits, etc., as called for in the contract documents or required by the Engineer. No such material or equipment shall be manufactured or delivered to the site except at the Contractor's own risk, until the Engineer has approved the required samples or certificates. Any delay in the work caused by late or improper submission of samples or certificates for approval shall not be considered just cause for an extension of the contract time.

Each sample submitted by the Contractor shall carry a label giving the name of the Contractor, the project for which it is intended, and the name of the Producer. The accompanying certificates or letters from the Contractor shall state that the sample complies with contract requirements, shall give the name and brand of the product, its place of origin, the name and address of the producer, and all specifications or other detailed information which will assist the Engineer in passing upon the acceptability of the sample promptly. It shall also include the statement that all materials or equipment furnished for use in the project will comply with the samples and/or certified statements.

- b. Approval of any materials shall be general only and shall not constitute a waiver of the City of Saginaw's right to demand full compliance with contract requirements. After actual deliveries, the Engineer will have such check tests made, as he deems necessary in each instance, and may reject materials and equipment and accessories for cause, even though such materials and articles have been given general approval. If materials, equipment or accessories, which fail to meet check tests, have been incorporated in the work, the Engineer will have the right to cause their removal and replacement by proper materials or to demand and secure such reparation by the Contractor as is equitable.
- c. Except as otherwise specifically stated in the contract, the costs of sampling and testing will be divided as follows:
 - I. The Contractor shall furnish, without extra cost, all samples required for testing purposes; furnishing shall include packing and delivery charges, except for those samples taken on the project by the Engineer;
 - II. The Contractor shall assume all costs of retesting materials which fail to meet contract

requirements;

- III. The Contractor shall assume all costs of testing materials offered in substitution for those found deficient; and
- IV. The City of Saginaw will pay all other expenses.

125. PERMITS AND CODES

The contractor shall keep himself fully informed of and shall at all times observe and comply with all existing or future acts of the Legislature, all requirements and provisions of the Charter of the City, and all municipal ordinances, prohibitions, rules, and regulations in any manner affecting the conduct of the work, and shall protect and indemnify the City against any and all claims arising from or based on any violations of such acts, charter, ordinances, prohibitions, rules, regulations, orders, or decrees and against all violations of law by the Contractor or his employees.

126. CARE OF WORK

- a. The Contractor shall be responsible for all damages to persons or property that occur as a result of his fault or negligence in connection with the prosecution of the work and shall be responsible for the proper care and protection of all work performed until completion and final acceptance, whether or not the same has been covered in whole or in part by payments made by the City of Saginaw.
- b. In an emergency affecting the safety of life or property on or adjoining the site, the Contractor shall act, either at his own discretion or as instructed by the City of Saginaw, to prevent such threatened loss or injury. Any compensation claimed by the Contractor on account of such emergency work will be determined by the City of Saginaw as provided in the section entitled "CHANGES IN THE WORK", in Section 111, Division I, General Conditions.
- c. The Contractor shall avoid damaging sidewalks, streets, curbs, pavements, utilities, structures or any other property (except that which is to be replaced or removed) either on or adjacent to the site. He shall repair, at his own expense and in manner satisfactory to the City of Saginaw, any damage thereto caused by his operations.
- d. All water and gas mains, all sewer and other pipes, and all conduits and other underground work of any nature, crossing or projecting into any trench or excavation and all appurtenances thereto, such as Cast Iron Valve Boxes, curb boxes, manhole casting, etc., shall be sufficiently and adequately shored and supported by timber and planking and protected by the Contractor from injury, and any damage or injury thereto shall be repaired by the Contractor at his own expense to the satisfaction of the City Engineer.
- e. The Contractor shall AT ALL TIMES keep excavated areas, trenches and holes free of water

during the progress of the work. All costs for the installing and operating of pumps and other necessary equipment to keep excavated areas, trenches and holes free of water shall be borne by the Contractor.

127. REVIEW BY THE CITY OF SAGINAW

The City of Saginaw, its authorized representatives and agents, shall, at all times, have access to and be permitted to observe and review all work, materials, equipment, payrolls, personnel records, employment conditions, and other relevant data and records pertaining to this contract, provided, however, that all instructions and approvals with respect to the work will be given to the Contractor only be the City of Saginaw through its authorized representatives or agents.

128. SANITARY FACILITIES

The Contractor shall furnish, install and maintain ample sanitary facilities for the workmen. As the need arises, a sufficient number of enclosed temporary toilets shall be conveniently placed as required by the sanitary codes of the State and Local Government.

Drinking water shall be provided from an approved source, so piped or transported as to keep it safe and fresh and served from single service containers or satisfactory types of sanitary drinking stands or fountains. All such facilities and services shall be furnished in strict accordance with existing and governing health regulations.

129. WATER

Water for use on improvements may be procured from the nearest hydrant. Permission to open and use hydrants and water shall, however, first be obtained from the Department of Public Utilities, subject to rules and regulations of said Department, said Contractor shall furnish all necessary piping, hose and accessories and pay all water taxes, fees and charges incidental to the opening and closing of hydrants and the use of water. Before the allowance of the final estimates, the Contractor shall present to the City Engineer a receipt from the City Treasurer, showing that all water taxes and charges for the use of water under this contract have been paid.

130. STOPPAGE OF WORK AND CROSSINGS

Upon any stoppage of work, all materials are to be piled up neatly so as not to impede travel upon the sidewalks or roadway, or the use of fire hydrants, and all rubbish and surplus material shall be removed immediately Thereafter from the street or avenue by the Contractor. During rainy weather, the Contractor shall lay a temporary plank crosswalk across the street from sidewalk to sidewalk, such as will provide safe and dry footing for pedestrians. When so ordered by the City Engineer, the Contractor shall lay a temporary roadway or bridge SIXTEEN FEET in width across the entire intersection or excavation or trench such as will provide a safe and satisfactory roadway for vehicular travel. All the aforesaid work shall be done without cost to

the City other than the price paid for excavation.

131. PRIVILEGES OF CONTRACTOR IN THE STREET

- a. The Contractor may occupy the whole width of the roadway between the sidewalks or the street lines. He shall not close more than THREE (3) blocks at one time without permission from the City Engineer. Each block of pavement or improvement shall be finished and opened to public travel as soon as practicable after the commencement of work thereon, but the use of any portion of the pavement or improvement by the public shall not be construed as an acceptance of the work, nor shall the Contractor be entitled to any damages thereby. No more than two consecutive street intersections shall be closed to public traffic at the same time and each alternate intersection shall be opened for traffic, unless otherwise ordered by the City Engineer.
- b. All sidewalk approaches and the crossings at street intersections shall be kept open and made safe and passable at all times for both pedestrian and vehicular travel, except at such times as the Engineer may direct otherwise.
- c. The Contractor shall provide and maintain a safe and satisfactory roadway across all railway tracks at such places as required. Unless authority is otherwise given, the Contractor shall complete one side of the street before closing the other side, keeping the street open for travel and the fire department as much as possible.

132. EXCAVATIONS UNDER RAILROADS

In excavating under or adjacent to any railroad tracks, the running of trains or cars must not be interrupted or interfered with, and the Contractor shall so conduct this work as not to cause injury to such tracks. The Contractor shall in due season notify the railroad company owning said tracks to support and protect same, and shall arrange with such company for any construction and from any expense incurred thereby, without cost to the City.

133. BARRICADES AND TRAFFIC CONTROLS

All barricades and traffic controls for the work shall be in conformance with the 2011 MICHIGAN DEPARTMENT OF TRANSPORTATION MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (hereafter referred to as the Manual). The Contractor shall barricade or fence his work as outlined in the Manual or as directed by the Engineer.

In addition to the requirements of the manual, the Contractor shall maintain at all times a good and sufficient fence, railing or barrier around all exposed portions of said work in such a manner as to warn vehicular and pedestrian traffic of hazardous conditions. This shall apply to all construction projects either within street right-of-way or off street right-of-way.

It shall also be the duty of said Contractor to place upon such barriers, fence or railing, at evening twilight on each day, the required colored lights, and to keep them lighted during the night.

The Contractor shall put up and maintain barricades and traffic controls as required by the manual for any stored materials he may have placed in the street.

Should the Contractor fail to properly barricade his work or stored material sites in the manner outlined above, the City may have the necessary barricading done, and all cost incurred for said barricading shall be charged to the Contractor.

All costs incurred for barricading or fencing shall be incidental to the work items in the contract unless otherwise stated. In addition all costs incurred by the City for placing barricading or fencing on the work site when the Contractor has failed to do so or when he has failed to .• properly maintain those barricades or fencing he has placed shall be charged to the Contractor and he shall promptly pay all charges. Should the Contractor fail to pay for the barricading placed by the City, the City may deduct the amount owing from the final payment.

134. GRADE STAKES

Grade or line stakes will be given by the City and must be protected and preserved and strictly followed, but the Contractor shall note any irregularities in such stakes and have the same checked before proceeding. The Tops of all stakes must be uncovered and kept exposed by the Contractor at any and all times so as to be accessible to the Engineer on demand.

135. STREET MONUMENTS

The Contractor shall not disturb any street monuments unless authorized to do so by the City Engineer.

136. SUNDAY AND NIGHT WORK

No Sunday or night work shall be done except in case of emergency, and then only with the written consent of the Engineer. If, for any reason, it is necessary to do any work after twilight and permission is granted, the Contractor shall furnish suitable lighting without cost to the City other than the price paid for the work being done.

137. TEST BORINGS, TEST HOLES OR TEST PITS

All data on plans relative to test borings, test holes or test pits made by the City for the purpose of determining soil conditions in, alongside of, or in close proximity to the line of work, shall in no way be construed by the Contractor as a guarantee of soil conditions as will be encountered in the line of the work, but will be understood to be nothing more than data which the Contractor may or may not use in forecasting soil conditions.

138. CLEANING UP

Upon completion of the actual work of construction, the Contractor shall clean up and leave in a neat condition all the premises, which he has occupied during the construction period. Before

the time for the final estimate, the Contractor shall remove from the premises all surplus excavation, debris, rubbish and all unused materials, together with all tools and equipment.

139. CORRECTING WORK

Any unfaithful work or imperfect work or material that may be discovered before the final acceptance of the work shall be corrected and replaced immediately on the order of the City Engineer. In case any material is rejected, it shall be immediately removed from the line of work and not again brought thereon. In case the order for removal and replacing as specified above is not promptly complied with after written notice, the City Engineer shall be at liberty to remove and replace the same with proper materials, at the expense of the Contractor, and the cost thereof shall be deducted from the amount due him. Any omission to disapprove the work or material at the time of the inspection or at the time of any semi-monthly or other estimate shall not relieve the Contractor of any of his obligations. All work or material of whatever kind, which, during the progress of construction and before its final acceptance, may become damaged from any cause, shall be removed and replaced by the Contractor with good and satisfactory work or material. Should it become necessary to retain any faulty or imperfect work or material which, if corrected or replaced would cause undue risk, injury or delay, a sum to be adjusted by the City Engineer, not exceeding the whole value of such work or material if the same were correct, shall be deducted from the contract price.

140. ACCIDENT PREVENTION

- a. The contractor shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all damages to persons and property, either on or off the site, which occur as a result of his fault or negligence in connection with the prosecution of the work. The safety provisions of applicable laws and building and construction codes shall be observed and the contractor shall take or cause to be taken such additional safety and health measures as the City of Saginaw may determine to be reasonably necessary. Machinery, equipment and all hazards shall be guarded in accordance with the safety provisions of the "Manual of Accident Prevention in Construction" published by the Associated General Contractors of America, Inc., to the extent that such provisions are not in conflict with applicable local laws.
- b. The Contractor shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from work, arising out of and in the course of employment or work under the contract. The Contractor shall promptly furnish the City of Saginaw with reports concerning these matters.
- c. The Contractor shall indemnity and save harmless the City of Saginaw from any claims from damages resulting from personal injury and/or death suffered or alleged to have been suffered by any person as a result of any work conducted under this contract.

141. REQUESTS FOR SUPPLEMENTARY INFORMATION

It shall be the responsibility of the contractor to make timely requests of the City Engineer for any additional information not already in his possession which should be furnished by the City of Saginaw under the terms of this contract, and which he will require in the planning and execution of the work. Such requests may be submitted in writing from time to time as the need is approached, but each shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay. The contractor shall be fully responsible for any delay in his work or to others arising from his failure to comply fully with the provisions of this section.

142. WARRANTY OF TITLE

No material, supplies, or equipment for the work shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in any part thereof is retained by the seller or supplier. The contractor shall warrant good title to ail materials, supplies, and equipment installed or incorporated in the work and upon completion of all work, shall deliver the same together with all improvements and appurtenances constructed or placed thereon by him to the City of Saginaw free from any claims, liens, or charges. Neither the contractor nor any person, firm or corporation furnishing any material or labor for any work covered by this contract shall have any right to a lien upon any improvement of appurtenance thereon. Nothing contained in this paragraph, however, shall defeat or impair the right of persons furnishing materials or labor to recover under any bond given by the contractor for their protection or any rights under any law permitting such persons to look to funds due the contractor in the hands of the City of Saginaw. The provisions of this paragraph shall be inserted in all subcontracts and material contracts and notice of its provisions shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials.

143. FAIR EMPLOYMENT PRACTICES

- a. The contractor will not discriminate against any employee, or applicant for employment because of race, creed, color, sex, age or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, age or national origin. Such action shall include but not be limited to the following: employment, upgrading, demotion, termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the City setting forth the provisions of this nondiscrimination clause.
- b. The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, age or national origin.

- c. The contractor will send to each labor union or representative of workers with which the contractor has a collective bargaining agreement or other contract or understanding, a notice, to be provided, advising the labor union or worker's representative of the contractor's commitments under this section.
- d. The contractor will furnish all information and reports required by the City of Saginaw, and will permit access of his books, records, and accounts by the City of Saginaw for purposes of investigation to ascertain compliance with this section, (Fair Employment Practices).
- e. In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract, this contract may be cancelled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further contracts.
- f. The contractor will include the provisions of paragraphs (a) through (e) in every subcontract or purchase order over \$5,000, so that such provisions will be binding upon each such subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the City of Saginaw may direct as a means of enforcing such provisions, including sanctions for noncompliance.

144. ACCEPTANCE

No estimate given or payment made under the contract, or the occupancy of the work herein required, either partial or entire by the City, shall be evidence of the performance of the contract either in whole or in part, nor an acceptance of imperfect or faulty work or material.

145. GUARANTEE

The contractor shall be responsible for and must make good any defects arising or discovered in the work or material required hereunder within ONE (1) YEAR from the completion and final acceptance of such work and material, except for concrete sidewalks, new or repair, and paving between the curb and sidewalk (Driveway Approaches), which shall be guaranteed for a period of FIVE (5) YEARS from the completion and final acceptance of such work and material. No payment, final or otherwise, shall be construed to relieve the contractor from his obligation to make good any defect arising or discovered within such period, nor as a waiver of any specific obligation which the contractor may assume as to the durability of his work.

146. MICHIGAN SALES & USE TAX

The contractor shall include and be deemed to have included in his bid and contract price all Michigan Sales and Use Taxes currently imposed by legislative enactment and as administered by the Michigan Department of Revenue on the bid date.

If the contractor is not required to pay or bear the burden, or obtain a refund or drawback, in whole or in part, of any Michigan Sales or Use Tax, interest or penalty thereon, which was

required to be and was deemed to have been included in the bid and contract price, the contract price shall be reduced by the amount thereof and the amount of such reduction whether as a refund or otherwise shall ensure solely to the benefit of the City of Saginaw.

147. FINAL INSPECTION

When the improvements embraced in this contract are substantially completed, the contractor shall notify the City Engineer in writing that the work will be ready for final inspection on a definite date, which shall be stated in the notice. The notice will be given at least ten (10) days prior to the date stated for final inspection, and bear the signed concurrence of the representative of the City Engineer having charge of inspection. If the City Engineer determines that the status of the improvements is as represented, he will make the arrangements necessary to have final inspection commenced on the date stated in the notice, or as soon thereafter as is practicable.
NOTICE TO BIDDERS Consultants - Insurance - Bonds

In case of a conflict between the City's documents and the documents provided by the consultant the City's shall prevail,

The City of Saginaw shall not be a party to any arbitration proceeding.

The Provisions of this contract obligate the Contractor to provide insurance coverage and indemnification for the "owner". Therefore, the contractor shall provide the "City of Saginaw" with a certificate of insurance containing the following information:

- 1. Contract Number and description of work.
- 2. Name the City of Saginaw and Spicer Group as "Additionally Insured ".

See City of Saginaw Division 1, Section 119, pages 11, 12 & 12a.

All policies shall be endorsed to provide that the City Engineer will be given thirty (30) days' notice in writing of any cancellation, termination or change of condition of the policy.

Provide City Engineering with a copy of this endorsement with all other insurances and bonds.

REQUIRED/APPLICABLE INSURANCE – NO EXCEPTIONS –

See Division 1, Section 119, pages 11, 12 & 12a for Required Limit

CONTRACTOR'S LIABILITY (C.G.L.) CONTRACTOR'S & OWNER'S PROTECTIVE LIABILITY (O.C.P.) UMBRELLA LIABILITY AUTOMOBILE - WORKMAN'S COMPENSATION

REQUIRED BONDS – Over \$50,000 - NO EXCEPTIONS

LABOR & MATERIAL PERFORMANCE GUARANTEE – IF REQUIRED (SEE INDIVIDUAL CONTRACT)

NOTE:

The contractor must have all copies the Contract signed, insurances, bonds and all required documents returned and approved by City of Saginaw (Engineering & Attorney Review) prior to the contract going to Council for approval and award.

The contractor will not be allowed to start work until **all** City of Saginaw signatures are obtained. Contract Books are **not always** signed at the City Council Meeting when the contract is approved.

INSURANCES REQUIRED

INDEMNITY

The contractor shall indemnify and save harmless said City of and from all loss or damage caused to any person or property by reason of any act, omissions, carelessness or negligence in the doing or making of the improvement, or furnishing of material, or by reason of failure to pay all laborers, mechanics, subcontractors and material men, and all persons who shall supply said Contractor with materials, provisions and supplies for the performance and completion of said contract, and to promptly pay all just debts, dues and demands incurred in the performance of said contract, and of and from all expense of inspection and engineering, or of whatsoever other kind or nature, which shall be caused by delay or failure in the performance and completion of this contract, and further to indemnify and save harmless of and from all suits and actions against said City, including all attorney's fees, costs and expenses arising from the defense against such suits and actions on account of any injuries or damages sustained by any person or persons by reason of any act, omission or by the use of improper or defective material on the part of said Contractor in the performance of any part of this contract, and further to indemnify and protect and save said City harmless against any and all demands, fees or royalties for any patented invention, materials, articles, methods, arrangement or process of manufacture or any infringements thereon, that may be used on or be in any manner connected with the construction, erection or maintenance of the work, material, or any part thereof, embraced in this contract.

INSURANCE

a. During the life of the contract, the Contractor shall effect and maintain the following types of insurance:

Contractor's Liability (cgl) Automobile Workman's Compensation Umbrella Liability Contractor's & Owner's Protective Liability (ocp) *Builder's Risk (when applicable) *Pollution Coverage (when applicable) *The City will specify when such coverage is applicable.

Such insurance shall be furnished by a financially responsible company, satisfactory to the City, which is an "Admitted Carrier" in the State of Michigan, or is on the "Non-Admitted Approved List" for the State of Michigan. The City of Saginaw, its officers and employees, shall be named as "Additional Insured" on the contractors general liability policy and be the "Additional Insured" on the umbrella policy. The language on the certificate shall read:

The City of Saginaw, its officers and employees, are additional insureds. This coverage is primary to the City and not contributing or pro rata with any other insurance or similar protection, which is or may be available to or carried by the City.

The City of Saginaw shall be the insured on the contractor and owner's general liability policy.

The Contractor shall not commence work under this contract until he has obtained all required insurance and evidence of such insurance has been reviewed and approved by the City Engineer.

b. All certificates of insurance issued for this contract shall contain the following information in addition

to stating the type of insurance and the amount of coverage.

- I. The Contract number and description of work covered by the insurance.
- II. The insurance must be in a form acceptable to the City and the deductible shall not exceed \$1,000.00.
- III. Thirty (30) days' notice in writing of any cancellation, termination or change of condition of the policy.
- c. Insurance policies covering operations under this contract, which expire before final acceptance of the work shall be renewed, and the new policies submitted to the City Engineer for review and approval. All policies shall be endorsed to provide that the Engineer will be given thirty (30) days' notice in writing of any cancellation, termination or change of condition of the policy.
- d. Contractor's Liability and Contractor's and Owner's Protective Liability. The Contractor shall procure and shall maintain during the life of this contract Contractor's Liability and Contractor's and Owner's Protective Liability insurance in the amounts listed on the following page 12a.
- e. Automobile Insurance: The Contractor shall procure and maintain during the life of this contract Automobile Insurance in the amount listed on the following page 12a.
- f. Workman's Compensation: The Contractor shall procure and maintain during the life of his contract Workman Compensation Insurance as mandated by applicable State and Federal Statute without exclusions, as listed on the following page 12a.
- g. Umbrella Liability: The Contractor shall procure and maintain during the life of this contract Excess Liability in the amounts listed on the following page 12a.
- h. Builder's Risk: (when applicable). The Contractor shall procure and maintain during the life of this contract Builder's Risk Insurance equal to one hundred percent of the completed value of the structures.
- i. Pollution Coverage: The Contractor or the Subcontractor who actually performs the work shall carry pollution insurance in the amount of \$1,000,000.00 where the project involves Asbestos, Environmental or Lead abatement or such other work where the City specifies that pollution insurance is necessary.

"CONTRACTOR'S LIABILITY (C.G.L.) AND CONTRACTOR'S & OWNER'S PROTECTIVE LIABILITY (O.C.P.)"

Amount of Contract			
Less than \$25,000	\$25,000 - 300,000	over \$300,000	
1,000,000 per occurrence 2,000,000 aggregate	1,000,000 per occurrence 2,000,000 aggregate	1,000,000 per occurrence 2,000,000 aggregate	

"UMBRELLA LIABILITY"

Amount of Contract			
Less than \$25,000	\$25,000 - \$300,000	over \$300,000	
1,000,000 per occurrence 1,000,000 aggregate	3,000,000 per occurrence 3,000,000 aggregate	5,000,000 per occurrence 5,000,000 aggregate	

Automobile	500,000
Builder's Risk (When Applicable)	Cost of Completed Value of Structures
Workman's Compensation	 A) State Statutory, No Exclusions. B) Federal Statutory, No Exclusions. C) Employees Liability \$100,000.00 each employee \$100,000.00 each accident \$500,000.00 each policy limit

NOTICE TO BIDDERS

IRAN ECONOMIC SANCTIONS ACT:

The act provides that Iran linked businesses are ineligible from submitting a bid on the City's requests for proposals. The Act further provides that the City shall require all bidders to certify that they are not Iran linked businesses.

Definition: Iran linked businesses are those linked to the Iranian energy sector. An Iran linked business is specifically defined as:

- i. A person engaging in investment activities in the energy sector of Iran, including a person that provides oil or liquefied natural gas tankers or products used to construct or maintain pipelines used to transport oil or liquefied natural gas for the energy sector of Iran.
- ii. A financial institution that extends credit to another person, if that person will use the credit to engage in investment activities in the energy sector of Iran.

The provisions of the Act are only in effect if a country is a state sponsor of terror. A state sponsor of terror is defined as any country determined by the United States secretary of state to have repeatedly provided support for acts of international terrorism. Iran is currently on the US SOS state sponsor of terrorism list (<u>http://www.state.gov/j/ct/list/c14151.htm</u>), along with Cuba, Sudan, and Syria.

NOTICE TO BIDDERS

§ 14.36 PREFERENCE FOR LOCAL BIDDERS.

(A) (1) If the lowest bidder is not a Saginaw-based bidder, as defined above, any Saginaw-based bidder with a bid within 5% of the lowest bid shall be deemed the lowest bidder if it agrees to reduce its bid to match the bid of the lowest bidder. Such a bidder will remain bound to all terms of their original bid.

(2) A lowered bid by a Saginaw-based business which is premised upon, in whole or in part, changes to or variances to the bid specifications, contract requirements, or scope of work, shall be considered non-responsive and will not be considered.

(B) If such a Saginaw-based business refuses to reduce its bid to match the lowest bid, then the next lowest responsive and responsible Saginaw-based business with a bid within 5% of the lowest bid shall be deemed the lowest bidder, if it agrees to reduce its bid to match the bid of the lowest bidder. Such a bidder will remain bound to all other terms of their original bid.

(C) If no responsive and responsible Saginaw-based businesses within 5% of the lowest bid agree to reduce their bids, then the contract shall be awarded to the person or business with the lowest, most responsive and responsible bid.

(D) In the event of a tie between two or more Saginaw-based businesses, where all other factors are equal, the award of the bid shall be by coin toss conducted by the Purchasing Officer or his or her designee.

(E) No contract awarded pursuant to this ordinance shall be sublet in any manner that permits 50% or more of the dollar value of the contract to be performed by a subcontractor or subcontractors who do not meet the definition of "Saginaw-based."

(F) The section shall not waive or constrain, in any manner, the right and prerogative of the City to reject any and all bids or proposals from any Saginaw-based business which fails to meet the requirements of any other section of this ordinance, or to reject a bid which is in any way incomplete, irregular, not responsive or not responsible.

(G) Local preferences shall not be applied in cases of procurements funded, even in part, with federal dollars, unless such procurement is for architectural and engineering services. When contracting for architectural and engineering services, local preference may be a selection criterion provided its application leaves an appropriate number of qualified vendors, given the nature and size of the project, to complete the contract.

See Title 1: Administrative Code - Chapter 14: Finance and Purchasing

NOTICE INVITING SEALED BIDS Bid/Contract Number – C-1675 Fire Station Emergency Generator

FOR THE DEPARTMENT OF PUBLIC SERVICES & ENGINEERING, CITY OF SAGINAW, MICHIGAN. Sealed bids will be received by the City of Saginaw Purchasing Office, 1315 S. Washington Avenue, Saginaw, Michigan, 48601, <u>until 3:00 p.m., Tuesday, August 17, 2021</u> and then publicly opened for contract C-1675 Fire Station Emergency Generator.

Install diesel emergency generator at 2208 State Street (M-58) and furnish labor, tools, equipment, and materials as required to perform the work as specified in the contract documents.

Mandatory Walk-Thru on Tuesday August 10, 2021 @ 11 am at Fire Station #4, 2208 State Street (M-58), Saginaw MI 48602.

Questions to be directed to Brad Luczak, Spicer Group, (989) 754-4717.

Downloadable contract documents may be obtained at the City of Saginaw's website, scroll down to the Find a Bid icon or use this link, <u>https://www.saginaw-mi.com/departments/fiscal_services/bids.php</u> and scrolling to locate the corresponding documents. There is **NO CHARGE** for these downloadable documents. Persons desiring a hard copy of the contract documents shall call the City Engineer's office at 989-759-1410. The office is located in the lower level of the Public Works Service Center, 1435 S. Washington Avenue, Saginaw, Michigan 48601. There is a <u>\$125.00</u> **non-refundable** charge for the contract book and drawings. An additional charge of <u>\$25.00</u> will be added to cover the mailing. Checks must be made payable to Treasurer, City of Saginaw, and mailed to the City Engineer, 1315 South Washington Avenue, Saginaw, Michigan 48601.

All vendors must meet contract compliance provisions, Title I, Chapter 14, §14.30-14.45, of the Saginaw Code of Ordinances. If you are disabled and need accommodations to provide you with an opportunity to participate, Please call (989) 759-1410.

As part of the consideration for this bid, the vendor doing business with the City of Saginaw agrees to have withheld from any payments due them, any amounts for taxes, fees or other charges due the City of Saginaw.

The City of Saginaw has an income tax. All successful bidders will be subject to income tax withholdings and compliance is mandatory.

Contract amounts totaling \$100,000 or more will require a certified check, cashier's check or surety company bid bond in an amount of five percent (5%) of the total bid to be submitted with the bid as security for the acceptance and execution of the contract.

The successful bidder on a contract of \$50,000.00 or more will be required to furnish surety company bonds as follows:

First - A bond in the sum of one hundred percent (100%) of the contract price running to the City of Saginaw to insure the construction and completion of the entire work according to proposal and contract. **Second** - A bond in the sum of one hundred percent (100%) of the contract price running to the City of Saginaw for the protection of the subcontractors, labor and material men, according to the statute of the State of Michigan at that time in effect.

The City of Saginaw reserves the right to accept or reject any and all bids, or parts thereof, and to waive any irregularities in the bid except those specifically mentioned in the Sealed Bid Instructions. Bidders are reminded that the City of Saginaw has adopted a Contract Compliance Ordinance which requires that bidders submit documentation concerning their current work force, past employment practices and subscribe to a statement furnished by the City indicating compliance with the Ordinance.

Mary Hiser, Purchasing Officer

CITY OF SAGINAW, MICHIGAN BID FORM

C-1675 Fire Station Emergency Generator

To the City of Saginaw

Date:_____

In response to your notice, the undersigned, hereinafter called the Contractor, hereby declares that he has read the "General Instruction to Bidders", "Sealed Bid Instructions" and "General Information", has examined the plans, specifications and the location of the work described herein, and, is thus fully informed to the nature of the work and the conditions relating to its performance and further understands that the quantities shown hereon are approximate only and are subject to either increase or decrease.

The Contractor hereby proposes to furnish all the necessary equipment and tools, do all the work, furnish all the materials, except as otherwise specified and to complete the work herein described, all in accordance with the plans and specifications, of which this proposal is a part, for the unit prices named in the following itemized bid.

Prior to and contingent upon award of a contract of \$50,000.00 or more, the undersigned further agrees to enter into a contract and to furnish a surety company performance bond in the sum of not less than 100 percent (100%) of the total amount of the contract company to secure the faithful performance of the contract and, when required, a surety company labor and material bond in the sum of not less than 100 percent (100%) of the total amount of the contract for the protection of subcontractors, labor and material men, according to the statue of the State of Michigan at that time in effect. Said signed contracts and surety company bonds shall be furnished within ten (10) days from date of notification by the City Purchasing Officer of acceptance of the proposal submitted.

In compliance with the requirements of said notice, this proposal is accompanied by **original** bid bond, bank money order, certified check or cashier's check in the sum of five percent (5%) of total bid to guarantee that a contract will be entered into if the above proposal is accepted and the contract awarded to the undersigned.

PROPOSAL SHEET

The bidder certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any locations, under his control, where segregated facilities are maintained. The bidder certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location under his control where segregated facilities are maintained. The bidder agrees that a breach of this certification will be a violation of the Equal Opportunity clause in any contract resulting from acceptance of this bid. As used in this certifications, the term, "segregated facilities", means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. The bidder agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts which are not exempt from the provisions of the Equal Opportunity clause, and that he will retain such certifications in his files.

In accordance with the provisions of "Public Act 524 of 1980", I do hereby

designate ______(name of representative) to submit written request for progress payment during the duration of this contract.

Contractor shall start work as specified in the Progress Clause, or as directed by the City Engineer. In no case, shall any work commence prior to receipt of formal Notice to Proceed from the City.

The undersigned bidder does hereby declare that the bidder has the legal status checked below:

_____Individual

_____Co-Partnership

_____Corporation Incorporated under the laws

of the State of _____

The undersigned does hereby agree to honor this bid until June 30, 2022.

Michigan's Iran Economic Sanctions Act:

The signature below certifies your company is in compliance with the Michigan Iran Economic Sanctions Act as identified on page #39 of this document. Further information on this act can be viewed at (<u>http://www.state.gov/j/ct/list/c14151.htm</u>).

(Signature)

(Printed name)

(Title)

This sheet must be included or bid will be disqualified

By submitting a response to this request for proposal, the bidder agrees to the terms and conditions set forth herein. Any changes made to such terms and conditions by bidder in bidder's response may result, at the City's sole discretion, in the bidder's disqualification.

The successful bidder will conform to all specifications and requirements which are attached and incorporated as part of this bid. The City reserves the right to accept or reject any and all bids, or parts thereof, and to waive any irregularities in the bid except those specifically mentioned in the sealed bid instructions. Additionally, (if applicable) we reserve the right to add or delete any items(s) and/or service from this bid to the best benefit of The City of Saginaw.

By signature, the bidder acknowledges that the signer has complete authority to execute the bid on behalf of the bidder and that the bid is genuine and not collusive in any manner; and that no other bidders were improperly induced to refrain from bidding or induced to submit a sham bid; and that the bidder agrees to have withheld from any payment due them, any amounts owed for taxes or other charges due the City of Saginaw; and that successful bidders are subject to mandatory City of Saginaw income tax withholdings.

Signed	Addres	S
Name	City, S	tate, Zip
Title	Teleph	one No:
Company	Fax No)
E-mail	Date:	
Check List Iran Sanctions signed and included Bid Form signed and included Bid Form copy included	Yes Yes Yes	No No No
Addendum(s) if Issued #1 Cover Sheet signed and included #2 Cover Sheet signed and included #3 Cover Sheet signed and included	Yes Yes Yes	No No No

This sheet must be included or bid will be disqualified

CONTRACT

CITY OF SAGINAW, MICHIGAN

Contract of ______, with the City of Saginaw, for Fire Station Emergency Generator (C-1675). AGREEMENT, made and entered into this day of ______, 2021, by and between the CITY OF SAGINAW, MICHIGAN, of the first part, hereinafter called the CITY, and, ______, a _____ duly organized and doing business under the laws of the State of ______, of _____, of the second part, hereinafter referred to as "Contractor".

WHEREAS, said Contractor, at a regular meeting of the Council of the City of Saginaw, held on ______, 2021, was awarded the contract for furnishing the necessary equipment and materials, except those materials specified to be furnished by the City, labor and construction complete for **Fire Station Emergency Generator (C-1675)**.

NOW THIS AGREEMENT WITNESSETH:

That said Contractor, in consideration of the Agreement herein made by the City, agrees with the City as follows:

Article 1. SUBJECT MATTER. Said Contractor shall and will furnish all the materials except those specified to be furnished by the City and perform all the work for **Fire Station Emergency Generator (C-1675)**, as listed on the Schedule of Drawings, and as shown on the drawings prepared by the Department of Public Services and Engineering and described in the specifications and in accordance with the general conditions, the general instructions to bidders, the notice inviting sealed proposals and the proposal, which are hereby declared to be part of the specifications, and which drawings and specifications are hereby made a part of the contract as fully as if herein repeated and copy of which the Contractor acknowledges he has received.

Article 2. COMMENCEMENT OF WORK. The Contractor shall start work as specified in the Progress Clause, or as directed by the City Engineer and the work shall be carried on with due diligence, at such points and at such times and seasons, and with such force and in such manner as to secure the completion in accordance with the Progress Clause, the time of beginning, rate of progress and the time of completion being essential conditions of this contract.

Article 3. PAYMENT. It is hereby mutually agreed that the City shall pay, and the Contractor receive, the sum named on the attached Exhibit "A" - Copy of Original Proposal, (Use these if needed) Exhibit "B" - Copy of Original Addendum No.1, Exhibit "C" - Copy of Original Addendum No.2, Exhibit "D" - Copy of Original Addendum No.3 in the amount of..... \$???,????? (use as many as needed) same being the amount named in the proposal as full compensation for labor and materials required in executing all the work contemplated in this contract, subject to additions and deductions, as provided in the specifications.

Article 4. ESTIMATES. The City hereby agrees to make payment under the restrictions and limitations herein contained, from time to time, on account of performance of this contract, by orders drawn upon the proper fund of the City, paying NINETY PERCENT (90%) thereof on the basis of estimates made by the Department of Public Services & Engineering semi-monthly as the

work progresses, and approved by the City Engineer. Said estimates shall be made in writing and shall only include work done and material in place and shall not include completed work which, in the opinion of the City Engineer, it is not advisable, for the protection of the City, at that time to make payment on, and such estimates may be altogether withheld when, in the opinion of the City Engineer, work does not progress in accordance with the provisions of this contract; and the making and furnishing of such estimates shall not be deemed or construed as an acceptance of any part of the work under this contract. The City Engineer may authorize the reduction of the amount so withheld so that total payment equals NINETY-FIVE PERCENT (95%) of the estimate where he shall find that the retention of FIVE PERCENT (5%) of the estimate is sufficient to protect the City, but the total amount so retained shall not in any event be reduced to less than FIVE PERCENT (5%) of the contract price above stated.

Article 5. RETENTION OF MONEYS. In addition to the TEN PERCENT (10%) of contract price above retained, to insure the completion of the work, said City reserves the right to retain at all times from the estimates, an amount sufficient to pay and discharge all debts incurred by said Contractor, or subcontractor, for labor performed thereof in the progress of the work, and for material purchased and used therefor, and, at its discretion, to pay the same to the parties entitled thereto, and charge the same against the contract price.

Article 6. SEPARATE CONTRACTS. Where two or more separate proposals are grouped together herein, it is expressly agreed that each of said proposals shall constitute a separate contract and that all of the terms, conditions, and provisions of this contract shall apply to each of said proposals to the same extent and in the same manner as though each of said proposals had been the subject of a separate contract.

Article 7. PUBLIC ACT 524 of 1980. Notwithstanding any provision herein to the contrary, this agreement is subject to 1980 PA 524, which statute is incorporated herein and made a part hereof by reference. The contractor hereby agrees that the City may, at its option, submit the following matters to dispute resolution by an agent agreed to or selected in accordance with the procedures set forth in the statute:

- 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 ninety-four percent (94%) of work under the contract is in place, whether there has been an unacceptable delay by the contractor in performance of the remaining six percent (6%) of work under the contract. The agent shall consider the terms in the contract and procedures normally followed in the industry and shall determine whether the delay was for failure to follow reasonable improvement practices in the industry for completion of the project.

The agent shall have all the rights, powers and duties specified in the statute.

Article 8. ACCEPTANCE AND FINAL PAYMENT. The final payment, including any retainage previously withheld, shall be payable on the approval and acceptance of the work by the City Engineer.

The payment of the final amount due under this contract, and the adjustment and payment of all bills rendered for the work done in accordance with any alterations of the same, shall release the City from any and all claims or liability on account of work performed or materials furnished under said contract, or any alterations thereof.

The City of Saginaw has an income tax. All successful bidders will be subject to income tax withholdings and compliance is mandatory.

As part of the consideration for this contract, the undersigned does hereby agree to have withheld from any payments due them, any amounts for taxes, fees or other charges due the City of Saginaw.

IN WITNESS WHEREOF, The City of Saginaw has caused these presents to be signed by the Mayor, and the corporate seal of the City to be hereunto affixed, attested by the City Clerk, and the said party of the second part has hereunto set his/her hand and seal, as of the day and year first above written.

CONTRACTOR

CITY OF SAGINAW

By:_____

By:

Timothy Morales City Manager

LABOR BOND

KNOW ALL MEN BY THESE PRESENT, That (Contractor Name) a Corporation duly organized and doing business under the laws of the State of (Contractor), of (Contractor City), Michigan

as principal, and

as sureties, are held and firmly bound unto the CITY OF SAGINAW, MICHIGAN in the sum of **\$\$\$\$\$\$\$\$** written out and ??/100....... **\$?????** Dollars, lawful money of the United States of America, to be paid to the City of Saginaw, or to its certain attorney, successors or assigns, to which payment well and truly to be made, we bind ourselves, our heirs, executors, administrators, each and every one of them, firmly by these presents.

Sealed with our seals, dated this _____day of _____ in the year Two Thousand Twenty-One.

THE CONDITION OF THIS OBLIGATION IS SUCH, That whereas it is contemplated that a contract will be awarded to said principal by the City of Saginaw, for furnishing the necessary equipment and materials, except those materials specified to be furnished by the City, labor and construction complete Fire Station Emergency Generator (C-1675).

In said city.

AND WHEREAS, this bond is given in compliance with and subject to the provisions of Act No. 213 of the Public Acts of Michigan 1963, as amended, which provisions are by reference made a part hereof.

C-1675 FS Generator 8/5/2021 51 of 200

LABOR BOND

NOW THEREFORE, IF the said principal, shall pay as the same become due and payable, all indebtedness which may accrue to any person, firm or corporation, on account of any labor performed, or material furnished to said contractor, or any subcontractor, in and about the performance of said contract, then this obligation to be void, else to remain in full force and virtue.

NAME OF CONTRACTOR

	(L.S.)
	(L.S.)
	(L.S.
(Official Title)	
	(L.S.
(Surety Company)	
	(L.S.)
	(L.S.)
(Official Title)	
-	(Official Title) (Surety Company) (Official Title)

Approved as to substance:

City Manager

Timothy Morales

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENT, That (Contractor Name) a Corporation duly organized and doing business under the laws of the State of Michigan, of (Contractor City), Michigan

as principal, and

as surety, are held and firmly bound unto the CITY OF SAGINAW, MICHIGAN in the sum of ________, lawful money of the United States of America to be paid to the City of Saginaw, its successors or assigns, for which payment, 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, dated this _____ day of _____ in the year Two Thousand Twenty-One.

THE CONDITION OF THIS OBLIGATION IS SUCH, That whereas it is contemplated that a contract will be awarded to said principal by the City of Saginaw, for furnishing the necessary equipment and materials, except those materials specified to be furnished by the City, labor and construction complete for Fire Station Emergency Generator (C-1675).

In said city

NOW THEREFORE, IF the said principal shall well and truly keep and faithfully perform and complete all of the terms and conditions of said contract, and each and every part thereof, on principal's part to be kept and performed, and shall indemnify and save harmless the City of Saginaw of and from all expense of inspection and engineering, or of whatsoever other kind or nature, which shall be caused by delay or failure in the perform and protect and save said City harmless against any and all demands, fees or royalties for performance and completion of said contract, and each and every part thereof, and further shall indemnify patented invention, materials, articles, methods, arrangement or process of manufacture, or any infringement thereon that may be used on or be in any manner connected with the construction, erection or maintenance of the

PERFORMANCE BOND

work, material or any part thereof embraced in said contract, and each and every part thereof, and shall during the period of **(one) 1 years** after the completion and final acceptance of the work make good any defect therein, in accordance with the specifications therefore, then this obligation shall be void and of no effect, otherwise it shall remain in full force and virtue; and the said surety for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder or addition to the terms of the contract or to the work to be performed thereunder or the specifications accompanying the same shall in anywise 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 or to the terms of the contract or to the work or to the terms of the contract or to the work to be performed therewise accompanying the same shall in anywise 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 or to the specifications.

CONTRACTOR NAME

			(L.S.)
	BY:		(L.S.)
			(L.S.)
		(Official Title)	
			(L.S.)
		(Surety Company)	
Approved as to substance:	BY:		(L.S.)
City Manager			
Timothy Morales			(L.S.)
		(Official Title)	

CITY OF SAGINAW

PROGRESS CLAUSE

COS: TLLF

1 OF 1

AUGUST 2021

Start work on or after September 20, 2021 or as directed by City Engineer. All work must be completed on or before June 3, 2021, as shown on the Notice to proceed, with the exception of turf establishment which must be completed by June 30, 2021. In no case, shall any work commence prior to receipt of formal notice of award by the City.

Work is prohibited on City of Saginaw holidays as detailed below. Other holiday dates and shutdown periods will be as provided by the City of Saginaw during the pre-construction meeting. Unauthorized work performed during prohibited time shall not be paid for. The dates are outlined below:

Veterans Day (2021): November 11, 2021 (Shutdown period: No work from November 10, 2021 at 3 p.m. to November 12, 2021 at 7 a.m.)

Thanksgiving Day/Friday After (2021): November 25-26, 2021 (Shutdown period: No work from November 24, 2021 at 3 p.m. to November 29, 2021 at 7 a.m.)

Christmas Eve/Christmas Day (2021): December 24-25, 2021 (Shutdown period: No work from December 22, 2021 at 3 p.m. to December 27, 2021 at 7 a.m.)

New Year's Eve 2021/New Year's Day 2022: December 31, 2021-January 1, 2022 (Shutdown period: No work from December 29, 2021 at 3 p.m. to January 3, 2022 at 7 a.m.)

Martin Luther King, Jr. Day (2022): January 17, 2022 (Shutdown period: No work from January 17, 2022 at 3 p.m. to January 19, 2022 at 7 a.m.)

Good Friday (2022): April 15, 2022 (Shutdown period: No work from April 14, 2022 at 3 p.m. to April 18, 2022 at 7 a.m.)

Memorial Day (2022): May 30, 2022 (Shutdown period: No work from May 27, 2022 at 3 p.m. to May 31, 2022 at 7 a.m.)

Failure by the contractor to meet the above listed contract completion dates will result in the assessment of liquidated damages in accordance with the Special Provision for Liquidated Damages.

The approved low bidder for the work covered by this proposal will be required to participate in a preconstruction meeting with the City. The schedule for this meeting will be set within one week after the approved low bidder is determined. The City of Saginaw will arrange the time and place for the meeting.

The Progress Schedule shall be submitted to the City of Saginaw five (5) days prior to the meeting.

If the bidding proposal specifies other controlling dates, these shall also be included in the Progress Schedule.

Failure on the part of the contractor to carry out the provisions of the Progress Schedule, as established, may be considered sufficient cause to prevent bidding future projects until a satisfactory rate of progress is again established.

CITY OF SAGINAW

SPECIAL PROVISION

FOR

TECHNICAL SPECIFICATIONS

COS: TLLF

1 OF 1

AUGUST 2021

The technical specifications for this project shall be in accordance with the 2012 Standard Specifications for Construction of the Michigan Department of Transportation, hereinafter referred to as the "STANDARD SPECIFICATIONS", the latest MDOT standard road plans, and Traffic and Safety standard plans.

The placement of permanent and temporary pavement markings, and temporary signing for work zones shall be in accordance with the Michigan Manual of Uniform Traffic Control Devices, 2011 Edition.

In case of discrepancy, figured dimensions shall govern over scaled dimensions and the parts of the contract will prevail over all other parts in the following order:

- 1. City and MDOT Special provisions
- 2. MDOT Supplemental specifications
- 3. Project plans and drawings
- 4. MDOT Standard plans
- 5. MDOT Standard specifications

NOTICE TO BIDDERS

UTILITY COORDINATION

COS: TLLF

1 OF 1

AUGUST 2021

The contractor shall cooperate and coordinate construction activities with the owners of utilities as stated in Section 104.08 of the 2012 MDOT Standard Specifications for Construction. In addition, for the protection of underground utilities, the contractor shall follow the requirements in Section 107.12 of the 2012 MDOT Standard Specifications for Construction. Contractor delay claims, resulting from a utility, will be determined based upon Section 109.05.E of the 2012 MDOT Standards Specifications for Construction.

The following public utilities may have facilities located within the right-of-way:

UTILITY	OWNER	CONTACT PERSON	
Gas/Electric	Consumers Energy Co. 2400 Weiss Street Saginaw, MI 48602	Joseph Rodea (gas) (989) 791-586 Greg Squanda (electric) (989) 79 5353 Alan Lindquist (transmission) (517)78 0534	
Telephone	AT&T 309 S. Washington Ave. Saginaw, MI 48607	Chris Latty (98	89) 776-4031
Sewer & Water	City of Saginaw 1701 S. Jefferson Ave. Saginaw, MI 48601	Josh Hoffman (98	89) 759-1614
Traffic Signals, Signs, Street lights	City of Saginaw 1435 S. Washington Ave. Saginaw, MI 48601	Joe Nugent (98	89) 737-5583
Cable/ Television	Charter Communications 1480 S. Valley Center Drive Bay City, MI 48706	Mark Kelly (98	89) 667-0611
Fiber Optic	Windstream Corp. 3701 Communications Way Evansville, IN 47715	Douglas Clark (8 ⁷	12) 253-2168

For protection of underground utilities, the Contractor shall dial (800) 482-7171 or 811, a minimum of 3 working days prior to excavating. Members will thus be routinely notified. This does not relieve the Contractor of the responsibility of notifying utility owners who may not be a part of the 'Miss Dig' alert system.

CITY OF SAGINAW

SPECIAL PROVISION

FOR

LIQUIDATED DAMAGES

COS: TLLF

1 OF 1

AUGUST 2021

GENERAL REQUIREMENT

All work shall be accomplished in accordance with section 108 of the Michigan Department of Transportation 2012 Standard Specifications for Construction and as modified herein.

DESCRIPTION

Liquidated Damages per calendar day will be assessed at 100% of the amount indicated below:

SCHEDULE OF LIQUIDATED DAMAGES			
ORIGINAL CONTRACT AMOUNT	LIQUIDATED DAMAGES (per calendar day)		
\$ 0 to \$ 49,999	\$350		
\$ 50,000 to \$ 99,999	\$550		
\$ 100,000 to \$ 499,999	\$750		
\$ 500,000 to \$ 999,999	\$950		
\$1,000,000 to \$1,999,999	\$1,500		
\$2,000,000 to \$2,999,999	\$2,500		

ASSESSMENT OF LIQUIDATED DAMAGES

Sums assessed as Liquidated Damages shall not be considered penalties, but as damages due the City from the contractor for failure to complete the work within the specified time.

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Fire Station #4 Emergency Generator City of Saginaw 32 92 19 Seeding

SECTION 01 25 00 SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Quality assurance.
- B. Product options.
- C. Product substitution procedures.

1.2 QUALITY ASSURANCE

- A. Contract is based on products and standards established in Contract Documents without consideration of proposed substitutions.
- B. Products specified define standard of quality, type, function, dimension, appearance, and performance required.
- C. Substitution Proposals: Permitted for specified products except where specified otherwise. Do not substitute products unless substitution has been accepted and approved in writing by Owner.

1.3 PRODUCT OPTIONS

A. See Section 01 60 00 - Product Requirements.

1.4 PRODUCT SUBSTITUTION PROCEDURES

- A. Engineer will consider requests for substitutions only within **15** days after date of Owner-Contractor Agreement.
- B. Substitutions may be considered when a product becomes unavailable through no fault of Contractor.
- C. Document each request with complete data, substantiating compliance of proposed substitution with Contract Documents, including:
 - 1. Manufacturer's name and address, product, trade name, model, or catalog number, performance and test data, and reference standards.
 - 2. Itemized point-by-point comparison of proposed substitution with specified product, listing variations in quality, performance, and other pertinent characteristics.
 - 3. Reference to Article and Paragraph numbers in Specification Section.
 - 4. Cost data comparing proposed substitution with specified product and amount of net change to Contract Sum.
 - 5. Changes required in other Work.
 - 6. Availability of maintenance service and source of replacement parts as applicable.
 - 7. Certified test data to show compliance with performance characteristics specified.

- 8. Samples when applicable or requested.
- 9. Other information as necessary to assist Engineer's evaluation.
- D. A request constitutes a representation that Contractor:
 - 1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
 - 2. Will provide same warranty for substitution as for specified product.
 - 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 5. Will coordinate installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.
 - 6. Will reimburse Owner for review or redesign services associated with reapproval by authorities having jurisdiction.
- E. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals without separate written request or when acceptance will require revision to Contract Documents.
- F. Substitution Submittal Procedure:
 - 1. Submit requests for substitutions.
 - 2. Submit three copies of Request for Substitution for consideration. Limit each request to one proposed substitution.
 - 3. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
 - 4. Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 30 00 ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination and Project conditions.
- B. Field Engineering
- C. Preconstruction meeting.
- D. Closeout meeting.

1.2 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of various Sections of Owner Contract Agreement to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify that utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate Work of various Sections having interdependent responsibilities for installing, connecting to, and placing operating equipment in service.
- C. Coordination Meetings: In addition to other meetings specified in this Section, hold coordination meetings with personnel and Subcontractors to ensure coordination of Work.
- D. Coordinate completion and clean-up of Work of separate Sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.
- E. After Owner's occupancy of premises, coordinate access to Site for correction of defective Work and Work not complying with Contract Documents, to minimize disruption of Owner's activities.

1.3 FIELD ENGINEERING

- A. Contractor to locate and protect survey control and reference points, land monuments, and property corner.
- B. Control datum for survey is that established by Owner provided survey shown on Drawings.
- C. Engineer will provide construction staking. Call the Engineer to request staking at least 3 working days in advance of the time needed for the work.
- D. Construction stakes removed or damaged by Contractor shall be replaced at Contractor's expense.

- E. When finished surfaces are cut so that a smoother transition and new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Engineer.
- F. Where a change of plane of 1/4 inch or more occurs, submit recommendation for providing a smooth transition for Engineer review and request instructions from Engineer.
- G. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.
- H. Finish surfaces as specified in individual product sections.
- I. Where there are changes in open drain cross sections, excavate a 20-foot smooth transition between sections.

1.4 PRECONSTRUCTION MEETING

- A. Engineer will schedule and preside over meeting after Notice of Award.
- B. Attendance Required: Engineer, Owner, appropriate governmental agency representatives, applicable public and private utility companies and Contractor, subcontractors to be utilized on the project.

C. Minimum Agenda:

- 1. Execution of Owner-Contractor Agreement.
- 2. Submission of executed bonds and insurance certificates.
- 3. Distribution of Contract Documents.
- 4. Submission of list of Subcontractors, list of products, schedule of values, and Progress Schedule.
- 5. Designation of personnel representing parties in Contract, along with contact phone number and Engineer.
- 6. Communication procedures.
- 7. Procedures and processing of requests for interpretations, field decisions field orders, submittals, substitutions, Applications for Payments, proposal request, Change Orders, and Contract closeout procedures.
- 8. Scheduling.
- 9. Critical Work sequencing.
- 10. Scheduling activities.
- 11. Utility Representatives comments and requirements.
- D. Record minutes and distribute copies to participants within three (3) days after meeting, with two copies each to Engineer, Owner, and those affected by decisions made.

1.5 CLOSEOUT MEETING

A. Schedule Project closeout meeting with sufficient time to prepare for requesting Substantial Completion. Preside over meeting and be responsible for minutes.

- B. Attendance Required: Contractor, Subcontractors, Engineer, Owner, and others appropriate to agenda.
- C. Notify Engineer four days in advance of meeting date.
- D. Minimum Agenda:
 - 1. Start-up of facilities and systems.
 - 2. Operations and maintenance manuals.
 - 3. Testing, adjusting, and balancing.
 - 4. System demonstration and observation.
 - 5. Operation and maintenance instructions for Owner's personnel.
 - 6. Contractor's inspection of Work.
 - 7. Contractor's preparation of an initial "punch list."
 - 8. Procedure to request Engineer inspection to determine date of Substantial Completion.
 - 9. Completion time for correcting deficiencies.
 - 10. Inspections by authorities having jurisdiction.
 - 11. Certificate of Occupancy and transfer of insurance responsibilities.
 - 12. Partial release of retainage.
 - 13. Final cleaning.
 - 14. Preparation for final inspection.
 - 15. Closeout Submittals:
 - a. Project record documents.
 - b. Operating and maintenance documents.
 - c. Operating and maintenance materials.
 - d. Affidavits.
 - 16. Final Application for Payment.
 - 17. Contractor's demobilization of Site.
 - 18. Maintenance.
- E. Record minutes and distribute copies to participants within three (3) days after meeting, with two copies each to Engineer, Owner, and those affected by decisions made.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 33 00 SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Definitions.
- B. Submittal procedures.
- C. Construction progress schedules.
- D. Proposed product list.
- E. Product data.
- F. Shop Drawings.
- G. Samples.
- H. Other submittals.
- I. Certificates.
- J. Manufacturer's instructions.
- K. Manufacturer's field reports.
- L. Contractor review.
- M. Engineer review.

1.2 **DEFINITIONS**

- A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action.
- B. Informational Submittals: Written and graphic information and physical Samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Engineer-accepted form.
- B. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.

- C. Identify: Project, Contractor, Subcontractor and supplier, pertinent Drawing and detail number, and Specification Section number appropriate to submittal.
- D. Apply Contractor's stamp, signed or initialed, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of the Work and Contract Documents.
- E. Schedule submittals to expedite Project and deliver to Engineer at business address. Coordinate submission of related items.
- F. For each submittal for review, allow 15 days excluding delivery time to and from Contractor.
- G. Identify variations in Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.
- H. Allow space on submittals for Contractor and Architect/Engineer review stamps.
- I. When revised for resubmission, identify changes made since previous submission.
- J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.
- K. Submittals not requested will not be recognized nor processed.
- L. Incomplete Submittals: Engineer will not review. Complete submittals for each item are required. Delays resulting from incomplete submittals are not the responsibility of Engineer.
- M. Provide three (3) copies to be retained by Engineer, plus however many copies the Contractor and sub-contractors require.
- 1.4 CONSTRUCTION PROGRESS SCHEDULES NOT USED

1.5 PROPOSED PRODUCT LIST

- A. Within 15 days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, indicate manufacturer, trade name, model or catalog designation, and reference standards.

1.6 PRODUCT DATA

- A. Product Data: Action Submittal: Submit to Engineer for review for assessing conformance with information given and design concept expressed in Contract Documents.
- B. Submit number of copies Contractor requires, plus three copies Engineer will retain.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

- D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 Execution and Closeout Requirements.

1.7 SHOP DRAWINGS

- A. Shop Drawings: Action Submittal: Submit to Engineer for assessing conformance with information given and design concept expressed in Contract Documents.
- B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. When required by individual Specification Sections, provide Shop Drawings signed and sealed by a professional Engineer responsible for designing components shown on Shop Drawings.
 - 1. Include signed and sealed calculations to support design.
 - 2. Submit Shop Drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
 - 3. Make revisions and provide additional information when required by authorities having jurisdiction.
- D. Submit number of opaque reproductions Contractor requires, plus three copies Engineer will retain.
- E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 Execution and Closeout Requirements.

1.8 SAMPLES

- A. Samples: Action Submittal: Submit to Engineer for assessing conformance with information given and design concept expressed in Contract Documents.
- B. Samples for Selection as Specified in Product Sections:
 - 1. Submit to Engineer for aesthetic, color, and finish selection.
 - 2. Submit Samples of finishes, textures, and patterns for Engineer selection.
- C. Submit Samples to illustrate functional and aesthetic characteristics of products, with integral parts and attachment devices. Coordinate Sample submittals for interfacing work.
- D. Include identification on each Sample, with full Project information.
- E. Submit number of Samples specified in individual Specification Sections; Engineer will retain two Samples.
- F. Reviewed Samples that may be used in the Work are indicated in individual Specification Sections.
- G. Samples will not be used for testing purposes unless specifically stated in Specification Section.

H. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.9 OTHER SUBMITTALS

- A. Closeout Submittals: Comply with Section 01 70 00 Execution and Closeout Requirements.
- B. Informational Submittal: Submit data for Architect/Engineer's knowledge as Contract administrator or for Owner.
- C. Submit information for assessing conformance with information given and design concept expressed in Contract Documents.

1.10 CERTIFICATES

- A. Informational Submittal: Submit certification by manufacturer, installation/application Subcontractor, or Contractor to Engineer, in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or product but must be acceptable to Architect/Engineer.

1.11 MANUFACTURER'S INSTRUCTIONS

- A. Informational Submittal: Submit manufacturer's installation instructions for Engineer's knowledge as Contract administrator or for Owner.
- B. Submit printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing, to Engineer in quantities specified for Product Data.
- C. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.12 MANUFACTURER'S FIELD REPORTS

- A. Informational Submittal: Submit reports for Engineer's knowledge as Contract administrator or for Owner.
- B. Submit report in duplicate within 5 days of observation to Engineer for information. Any problems shall be reported immediately to the Engineer.
- C. Submit reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.13 CONTRACTOR REVIEW

- A. Review for compliance with Contract Documents and approve submittals before transmitting to Engineer.
- B. Contractor: Responsible for:
 - 1. Determination and verification of materials including manufacturer's catalog numbers.
 - 2. Determination and verification of field measurements and field construction criteria.
 - 3. Checking and coordinating information in submittal with requirements of Work and of Contract Documents.
 - 4. Determination of accuracy and completeness of dimensions and quantities.
 - 5. Confirmation and coordination of dimensions and field conditions at Site.
 - 6. Construction means, techniques, sequences, and procedures.
 - 7. Safety precautions.
 - 8. Coordination and performance of Work of all trades.
- C. Stamp, sign or initial, and date each submittal to certify compliance with requirements of Contract Documents.
- D. Do not fabricate products or begin Work for which submittals are required until approved submittals have been received from Engineer.

1.14 ENGINEER REVIEW

- A. Do not make "mass submittals" to Engineer. "Mass submittals" are defined as six or more submittals or items in one day or 20 or more submittals or items in one week. If "mass submittals" are received, Engineer's review time stated above will be extended as necessary to perform proper review. Engineer will review "mass submittals" based on priority determined by Engineer after consultation with Owner and Contractor.
- B. Informational submittals and other similar data are for Engineer's information, do not require Engineer's responsive action, and will not be reviewed or returned with comment.
- C. Submittals made by Contractor that are not required by Contract Documents may be returned without action.
- D. Submittal approval does not authorize changes to Contract requirements unless accompanied by Change Order or Work Change Directive.
- E. Owner may withhold monies due to Contractor to cover additional costs beyond the second submittal review.
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PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 40 00 QUALITY REQUIREMENTS

PART 1 GENERAL

- 1.1 SECTION INCLUDES
 - A. Quality control.
 - B. Tolerances.
 - C. References.
 - D. Labeling.
 - E. Testing and inspection services.
 - F. Manufacturers' field services.

1.2 QUALITY CONTROL

- A. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with specified standards as the minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- C. Perform Work using persons qualified to produce required and specified quality.
- D. Products, materials, and equipment may be subject to inspection by Engineer and Owner at place of manufacture or fabrication. Such inspections shall not relieve Contractor of complying with requirements of Contract Documents.
- E. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

1.3 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' recommended tolerances and tolerance requirements in reference standards. When such tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current as of date for receiving Bids except where specific date is established by code.
- C. Obtain copies of standards and maintain on Site when required by product Specification Sections.
- D. When requirements of indicated reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.
- E. Neither contractual relationships, duties, or responsibilities of parties in Contract nor those of Architect/Engineer shall be altered from Contract Documents by mention or inference in reference documents.

1.5 LABELING

- A. Attach label from agency approved by authorities having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.
- B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label:
 - 1. Model number.
 - 2. Serial number.
 - 3. Performance characteristics.
- C. Manufacturer's Nameplates, Trademarks, Logos, and Other Identifying Marks on Products: Not allowed on surfaces exposed to view in public areas, interior or exterior.

1.6 TESTING AND INSPECTION SERVICES

- A. Owner will employ and pay for specified services of an independent firm or the Engineer to perform testing and inspection.
- B. Testing, inspections, and source quality control may occur on or off Project Site. Perform off-Site testing as required by Engineer or Owner.
- C. Cooperate with independent firm or the Engineer; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - 1. Notify Engineer or independent firm 48 hours before expected time for operations requiring services.
 - 2. Make arrangements with independent firm or the Engineer and pay for additional Samples and tests required for Contractor's use.
- D. Employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work according to requirements of Contract Documents.

E. Retesting or re-inspection required because of nonconformance with specified or indicated requirements shall be performed by same independent firm on instructions from Engineer. Payment for retesting or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.

1.7 MANUFACTURER'S FIELD SERVICES

- A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe Site conditions, conditions of surfaces and installation, quality of workmanship, startup of equipment, testing, adjusting, and balancing of equipment as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Engineer 30 days in advance of required observations. Observer is subject to approval of Engineer.
- C. Report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.
- D. Refer to Section 01 33 00 Submittal Procedures, "Manufacturer's Field Reports" Article.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 60 00 PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Products.
- B. Product delivery requirements.
- C. Product storage and handling requirements.
- D. Product options.

1.2 PRODUCTS

- A. At minimum, comply with specified requirements and reference standards.
- B. Specified products define standard of quality, type, function, dimension, appearance, and performance required.
- C. Furnish products of qualified manufacturers that are suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise. Confirm that manufacturer's production capacity can provide sufficient product, on time, to meet Project requirements.
- D. Domestic Products: Except where specified otherwise, domestic products are required and interpreted to mean products mined, manufactured, fabricated, or produced in United States or its territories.
- E. Do not use materials and equipment removed from existing premises except as specifically permitted by Contract Documents.
- F. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

- A. Transport and handle products according to manufacturer's instructions.
- B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products; use methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect products according to manufacturer's instructions.

- B. Store products with seals and labels intact and legible.
- C. Store sensitive products in weathertight, climate-controlled enclosures in an environment suitable to product.
- D. For exterior storage of fabricated products, place products on sloped supports aboveground.
- E. Provide off-Site storage and protection when Site does not permit on-Site storage or protection.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products; use methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Products complying with specified reference standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and complying with Specifications; no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit Request for Substitution for any manufacturer not named, according to Section 01 25 00 -Substitution Procedures.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 70 00 EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Field engineering.
- B. Closeout procedures.
- C. Project record documents.
- D. Product warranties and product bonds.
- E. Maintenance service
- F. Warranties
- G. Progress Payments.
- H. Examination.
- I. Preparation.
- J. Execution.
- K. Cutting and patching.
- L. Protecting installed construction.
- M. Final cleaning.

1.2 FIELD ENGINEERING

- A. Owner will locate and Contractor shall protect survey control and reference points. Promptly notify Engineer of discrepancies discovered.
- B. Control datum for survey is established by Owner-provided survey indicated on Drawings.
- C. Prior to beginning Work, verify and establish floor elevations of existing facilities to ensure that new Work will meet existing elevations in smooth and level alignment except where specifically detailed or indicated otherwise.
- D. Verify setbacks and easements; confirm Drawing dimensions and elevations.
- E. Field engineering services provided by Engineer includes: Establish elevations, lines, and levels using recognized engineering survey practices.

- F. Maintain complete and accurate log of control and survey Work as Work progresses.
- G. Protect survey control points prior to starting Site Work; preserve permanent reference points during construction.
- H. Promptly report to Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.
- I. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Engineer.

1.3 CLOSEOUT PROCEDURES

- A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:
 - 1. Submit maintenance manuals, Project record documents, digital images of construction photographs, and other similar final record data in compliance with this Section.
 - 2. Complete facility startup, testing, adjusting, balancing of systems and equipment, demonstrations, and instructions to Owner's operating and maintenance personnel as specified in compliance with this Section.
 - 3. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for being incomplete, and date of anticipated completion for each item. Include copy of list with request for Certificate of Substantial Completion.
 - 4. Obtain and submit releases enabling Owner's full, unrestricted use of Project and access to services and utilities. Include certificate of occupancy, operating certificates, and similar releases from authorities having jurisdiction and utility companies.
 - 5. Deliver tools, spare parts, extra stocks of material, and similar physical items to Owner.
 - 6. Make final change-over of locks eliminating construction master-key system and transmit keys directly to Owner. Advise Owner's personnel of change-over in security provisions.
 - 7. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, mockups, and similar elements.
 - 8. Perform final cleaning according to this Section.
- B. Substantial Completion Inspection:
 - 1. When Contractor considers Work to be substantially complete, submit to Engineer
 - a. Written certificate that Work, or designated portion, is substantially complete.
 - b. List of items to be completed or corrected (initial punch list).
 - 2. Within seven days after receipt of request for Substantial Completion, Engineer will make inspection to determine whether Work or designated portion is substantially complete.
 - 3. Should Engineer determine that Work is not substantially complete:
 - a. Engineer will promptly notify Contractor in writing, stating reasons for its opinion.
 - b. Contractor shall remedy deficiencies in Work and send second written request for Substantial Completion to Engineer.
 - c. Engineer will reinspect Work.
 - d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's inspection.
 - 4. When Engineer finds that Work is substantially complete, Engineer will:

- a. Prepare Certificate of Substantial Completion on AIA G704 Certificate of Substantial Completion or EJCDC C-625 Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected as verified and amended by Engineer and Owner (final punch list).
- b. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in Certificate.
- 5. After Work is substantially complete, Contractor shall:
 - a. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.
 - b. Complete Work listed for completion or correction within time period stipulated.
- 6. Owner will occupy portions of building as specified in Section 01 10 00 Summary.
- C. Prerequisites for Final Completion: Complete following items before requesting final acceptance and final payment.
 - 1. When Contractor considers Work to be complete, submit written certification that:
 - a. Contract Documents have been reviewed.
 - b. Work has been examined for compliance with Contract Documents.
 - c. Work has been completed according to Contract Documents.
 - d. Work is completed and ready for final inspection.
 - 2. Submittals: Submit following:
 - a. Final punch list indicating all items have been completed or corrected.
 - b. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
 - c. Specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents.
 - d. Accounting statement for final changes to Contract Sum.
 - e. Contractor's affidavit of payment of debts and claims.
 - f. Contractor affidavit of release of liens on AIA G706A Contractor's Affidavit of Release of Liens.
 - g. Consent of surety to final payment.
 - 3. Perform final cleaning for Contractor-soiled areas according to this Section.
- D. Final Completion Inspection:
 - 1. Within seven days after receipt of request for final inspection, Engineer will make inspection to determine whether Work or designated portion is complete.
 - 2. Should Engineer consider Work to be incomplete or defective:
 - a. Engineer will promptly notify Contractor in writing, listing incomplete or defective Work.
 - b. Contractor shall remedy stated deficiencies and send second written request to Engineer that Work is complete.
 - c. Engineer will reinspect Work.
 - d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's inspection.

1.4 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

- B. Clean floors and walls.
- C. Provide touch up as required.
- D. Clean site; sweep paved areas, rake clean landscaped surfaces.
- E. Remove waste and surplus materials, rubbish, and construction facilities from the site.
- F. Landscape areas as required in documents.
- G. Restore roads, driveways, parking areas, lawns, drainage, and other items disturbed during construction to original condition or as required by the documents.

1.5 PROJECT RECORD DOCUMENTS

- A. Maintain on Site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, product data, and Samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record, at each product Section, description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates used.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction as follows:
 - 1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
 - 2. Include locations of concealed elements of the Work.
 - 3. Identify depth of buried utility lines and provide dimensions showing distances from permanent facility components that are parallel to utilities.
 - 4. Dimension ends, corners, and junctions of buried utilities to permanent facility components using triangulation.
 - 5. Identify and locate existing buried or concealed items encountered during Project.
 - 6. Measured depths of foundations in relation to finish first floor datum.
 - 7. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

- 8. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
- 9. Field changes of dimension and detail.
- 10. Details not on original Drawings.
- G. Submit marked-up paper copy documents to Engineer before Substantial Completion.

1.6 PRODUCT WARRANTIES AND PRODUCT BONDS

- A. Obtain warranties and bonds executed in duplicate by responsible Subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of Work.
- B. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.
- C. Verify documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Include table of contents and assemble in three D side ring binder with durable plastic cover.
- F. Submit prior to final Application for Payment.
- G. Time of Submittals:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
 - 2. Make other submittals within ten days after date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

1.7 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components indicated in Specification Sections for 1 year from date of Substantial Completion.
- B. Examine system components at frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.
- D. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of Owner.

1.8 WARRANTIES

A. Execute and assemble documents from Sub-contractors, suppliers, and manufacturers.

- B. Provide Table of Contents and assemble in three D size ring three ring binder with durable plastic cloth cover or electronic format.
- C. Submit prior to final Application for Payment.
- D. Warranty all work for a period of one year from the date of the final progress payment.

1.9 PROGRESS PAYMENTS

- A. The Owner may request from the Contractor waivers for proof of payment to all sub-contractors and suppliers utilized on this project prior to issuing payments.
- B. The Owner may request from the Contractor a Sworn Statement listing all sub-contractors and suppliers, their involvement with the project, their subcontracted amount, amount paid to date, and balance due prior to issuing payment.
- C. Failure to provide this information may result in not receiving payments or payments not being issued in a timely manner.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual Specification Sections.
- D. Verify that utility services are available with correct characteristics and in correct locations.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance according to manufacturer's instructions.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer-required or -recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

3.3 EXECUTION

- A. Comply with manufacturer's installation instructions, performing each step in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.
- B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.
- D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
 - 1. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.
 - 2. Physically separate products in place, provide electrical insulation, or provide protective coatings to prevent galvanic action or corrosion between dissimilar metals.
 - 3. Exposed Joints: Provide uniform joint width and arrange to obtain best visual effect. Refer questionable visual-effect choices to Engineer for final decision.
- E. Allow for expansion of materials and building movement.
- F. Climatic Conditions and Project Status: Install each unit of Work under conditions to ensure best possible results in coordination with entire Project.
 - 1. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.
 - 2. Coordinate enclosure of Work with required inspections and tests to minimize necessity of uncovering Work for those purposes.
- G. Mounting Heights: Where not indicated, mount individual units of Work at industry recognized standard mounting heights for particular application indicated.
 - 1. Refer questionable mounting heights choices to Engineer for final decision.
 - 2. Elements Identified as Accessible to Handicapped: Comply with applicable codes and regulations.
- H. Adjust operating products and equipment to ensure smooth and unhindered operation.
- I. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.

3.4 CUTTING AND PATCHING

- A. Employ skilled and experienced installers to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements affecting:
 - 1. Structural integrity of element.
 - 2. Integrity of weather-exposed or moisture-resistant elements.
 - 3. Efficiency, maintenance, or safety of element.
 - 4. Visual qualities of sight-exposed elements.

- 5. Work of Owner or separate contractor.
- C. Execute cutting, fitting, and patching including excavation and fill to complete Work and to:
 - 1. Fit the several parts together, to integrate with other Work.
 - 2. Uncover Work to install or correct ill-timed Work.
 - 3. Remove and replace defective and nonconforming Work.
 - 4. Remove samples of installed Work for testing.
 - 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute Work by methods to avoid damage to other Work and to provide proper surfaces to receive patching and finishing.
- E. Cut masonry and concrete materials using masonry saw or core drill.
- F. Restore Work with new products according to requirements of Contract Documents.
- G. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.
- H. Maintain integrity of wall, ceiling, or floor construction, completely seal voids.
- I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.
- J. Identify hazardous substances or conditions exposed during the Work to Engineer for decision or remedy.

3.5 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual Specification Sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Use durable sheet materials to protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic from landscaped areas.

3.6 FINAL CLEANING

- A. Execute final cleaning prior to final Project assessment.
 - 1. Employ experienced personnel or professional cleaning firm.

- B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains, and foreign substances; polish transparent and glossy surfaces; and vacuum carpeted and soft surfaces.
- C. Clean equipment and fixtures to sanitary condition with appropriate cleaning materials.
- D. Replace filters of operating equipment.
- E. Clean debris from roofs, gutters, downspouts, and drainage systems.
- F. Clean Site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and construction facilities from Site.

END OF SECTION

SECTION 03 10 00 CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Formwork for cast-in place concrete.
 - 2. Shoring, bracing, and anchorage.
 - 3. Form accessories.
 - 4. Form stripping.
- B. Related Sections:
 - 1. Section 03 30 00 Cast-In-Place Concrete.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Excavating Soil Materials:
 - 1. Basis of Measurement: Included in the lump sum price for generator.
 - 2. Basis of Payment: Includes all excavating, fill, labor, material, and equipment to required for concrete forming and accessories as shown on the contract documents or as stated in the specifications.

1.3 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 117 Standard Specifications for Tolerances for Concrete Construction and Materials.
 - 2. ACI 301 Specifications for Structural Concrete.
 - 3. ACI 318 Building Code Requirements for Structural Concrete.
 - 4. ACI 347 Guide to Formwork for Concrete.
- B. American Forest and Paper Association:
 - 1. AF&PA National Design Specifications for Wood Construction.
- C. The Engineered Wood Association:
 - 1. APA/EWA PS 1 Voluntary Product Standard for Construction and Industrial Plywood.
- D. ASTM International:
 - 1. ASTM D1751 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - 2. ASTM E96/E96M Standard Test Methods for Water Vapor Transmission of Materials.
- E. West Coast Lumber Inspection Bureau:
 - 1. WCLIB Standard Grading Rules for West Coast Lumber.
 - 2. Michigan Department of Transportation 2012 Standard Specifications for Construction.

- F. MDOT
 - 1. Michigan Department of Transportation Standard Construction Specifications 2012.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 347.
- B. For wood products furnished for work of this Section, comply with AF&PA.
- C. Perform Work in accordance with State of Michigan Department of Transportation standard construction specifications 2012.
- 1.5 DELIVERY, STORAGE, AND HANDLING
 - A. Section 01 60 00 Product Requirements: Products storage and handling requirements.
 - B. Deliver void forms and installation instructions in manufacturer's packaging.
 - C. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

1.6 COORDINATION

- A. Section 01 30 00 Administrative Requirements: Coordination and project conditions.
- B. Coordinate this Section with other sections of work, requiring attachment of components to formwork.

PART 2 PRODUCTS

2.1 WOOD FORM MATERIALS

- A. Plywood: Douglas Fir 5 ply species; solid one side grade; sound undamaged sheets with clean, true edges.
- B. Lumber Forms:
 - 1. Application: Use for edge forms and unexposed finish concrete.
 - 2. Boards: 6 inches or 8 inches in width, shiplapped or tongue and groove, "Pine species no. 2 grade with grade stamps clearly visible.
- C. Plywood Forms:
 - 1. Application: Use for exposed finish concrete.
 - 2. Forms: Conform to PS 1; full size 4 x 8 feet panels; each panel labeled with grade trademark of APA/EWA.
 - 3. Plywood for Surfaces to Receive Membrane Waterproofing: Minimum of 5/8 inch thick; APA/EWA "B-B Plyform Structural I Exterior" grade.
 - 4. Plywood where "Smooth Finish" is required, as indicated on Drawings: APA/EWA "HD Overlay Plyform Structural I Exterior" grade, minimum of 3/4 inch thick.

2.2 PREFABRICATED FORMS

- A. Furnish materials in accordance with State of Michigan Department of Transportation standard construction specifications 2012.
- B. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.
- C. Tubular Column Type: Round, spirally wound laminated fiber material, surface treated with release agent, non-reusable, sizes as indicated on Drawings.
- D. Steel Forms: Sheet steel, suitably reinforced, and designed for particular use indicated on Drawings.
- E. Form Liners: Smooth, durable, grainless and non-staining hardboard, unless otherwise indicated on Drawings.
- F. Framing, Studding and Bracing: Stud or No. 3 structural light framing grade.

2.3 FORMWORK ACCESSORIES

A. Form Release Agent: Colorless material which will not stain concrete, absorb moisture or impair natural bonding or color characteristics of coating intended for use on concrete; manufactured by W.R. Meadows, or equal.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 Administrative Requirements: Coordination and project conditions.
- B. Verify lines, levels, and centers before proceeding with formwork. Verify dimensions agree with Drawings.
- C. When formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Architect/Engineer.

3.2 INSTALLATION

- A. Earth Forms:
 - 1. Trench earth forms neatly, accurately, and at least 2 inches wider than standard detail widths indicated on Drawings.
 - 2. Trim sides and bottom of earth forms.
 - 3. Construct wood edge strips at top of each side of trench to secure reinforcing and prevent trench from sloughing.
 - 4. Form sides of footings where earth sloughs.

- 5. Tamp earth forms firm and clean forms of debris and loose material before depositing concrete.
- B. Formwork General:
 - 1. Provide top form for sloped surfaces steeper than 1.5 horizontal to 1 vertical to hold shape of concrete during placement, unless it can be demonstrated that top forms can be omitted.
 - 2. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations.

3.

- 4. Camber forms where necessary to produce level finished soffits unless otherwise shown on Drawings.
- 5. Carefully verify horizontal and vertical positions of forms. Correct misaligned or misplaced forms before placing concrete.
- 6. Complete wedging and bracing before placing concrete.
- C. Forms for Smooth Finish Concrete:
 - 1. Use steel, plywood or lined board forms.
 - 2. Use clean and smooth plywood and form liners, uniform in size, and free from surface and edge damage capable of affecting resulting concrete finish.
 - 3. Install form lining with close-fitting square joints between separate sheets without springing into place.
 - 4. Use full size sheets of form lines and plywood wherever possible.
 - 5. Tape joints to prevent protrusions in concrete.
 - 6. Use care in forming and stripping wood forms to protect corners and edges.
 - 7. Level and continue horizontal joints.
 - 8. Keep wood forms wet until stripped.
- D. Framing, Studding and Bracing:
 - 1. Space studs at 16 inches on center maximum for boards and 12 inches on center maximum for plywood.
 - 2. Size framing, bracing, centering, and supporting members with sufficient strength to maintain shape and position under imposed loads from construction operations.
 - 3. Construct beam soffits of material minimum of 2 inches thick.
 - 4. Distribute bracing loads over base area on which bracing is erected.
 - 5. When placed on ground, protect against undermining, settlement or accidental impact.
- E. Erect formwork, shoring, and bracing to achieve design requirements, in accordance with requirements of ACI 301 and MDOT Standard Construction Specifications.
- F. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- G. Obtain Architect/Engineer's approval before framing openings in structural members not indicated on Drawings.
- H. Install void forms in accordance with manufacturer's recommendations.

3.3 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces are indicated to receive special finishes that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.
- D. Reuse and Coating of Forms: Thoroughly clean forms and reapply form coating before each reuse. For exposed work, do not reuse forms with damaged faces or edges. Apply form coating to forms in accordance with manufacturer's specifications. Do not coat forms for concrete indicated to receive "scored finish". Apply form coatings before placing reinforcing steel.

3.4 INSTALLATION - INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Install formed openings for items to be embedded in or passing through concrete work.
- B. Locate and set in place items required to be cast directly into concrete.
- C. Coordinate with Work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.
- D. Install accessories straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- E. Install water stops continuous without displacing reinforcement.
- F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.
- H. Form Ties:
 - 1. Use sufficient strength and sufficient quantity to prevent spreading of forms.
 - 2. Place ties at least 1 inch away from finished surface of concrete.
 - 3. Leave inner rods in concrete when forms are stripped.
 - 4. Space form ties equidistant, symmetrical and aligned vertically and horizontally unless otherwise shown on Drawings.
- I. Arrangement: Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.
- J. Construction Joints:
 - 1. Install surfaced pouring strip where construction joints intersect exposed surfaces to provide straight line at joints.

- 2. Just prior to subsequent concrete placement, remove strip and tighten forms to conceal shrinkage.
- 3. Show no overlapping of construction joints. Construct joints to present same appearance as butted plywood joints.
- 4. Arrange joints in continuous line straight, true and sharp.
- K. Embedded Items:
 - 1. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, water stops, and other features.
 - 2. Do not embed wood or uncoated aluminum in concrete.
 - 3. Obtain installation and setting information for embedded items furnished under other Specification sections.
 - 4. Securely anchor embedded items in correct location and alignment prior to placing concrete.
 - 5. Verify conduits and pipes, including those made of coated aluminum, meet requirements of ACI 318 for size and location limitations.
- L. Openings for Items Passing Through Concrete:
 - 1. Frame openings in concrete where required. Establish exact locations, sizes, and other conditions required for openings and attachment of work specified under other sections.
 - 2. Openings shall be framed and sealed with a Link Seal type product.
 - 3. Coordinate work to avoid cutting and patching of concrete after placement.
 - 4. Perform cutting and repairing of concrete required as result of failure to provide required openings.
- M. Screeds:
 - 1. Set screeds and establish levels for tops of concrete slabs and levels for finish on slabs.
 - 2. Slope slabs to drain where required or as shown on Drawings.
 - 3. Before depositing concrete, remove debris from space to be occupied by concrete and thoroughly wet forms. Remove freestanding water.
- N. Screed Supports:
 - 1. For concrete over waterproof membranes and vapor retarder membranes, use cradle, pad or base type screed supports which will not puncture membrane.
 - 2. Staking through membrane is not be permitted.
- O. Cleanouts and Access Panels:
 - 1. Provide removable cleanout sections or access panels at bottoms of forms to permit inspection and effective cleaning of loose dirt, debris and waste material.
 - 2. Clean forms and surfaces against which concrete is to be placed. Remove chips, saw dust and other debris. Thoroughly blow out forms with compressed air just before concrete is placed.

3.5 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.

- C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
- D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.6 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads and removal has been approved by Engineer.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.
- D. Leave forms in place for minimum number of days as specified in ACI 347.

3.7 ERECTION TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 301 and MDOT Standard Construction Specifications.
- B. Tolerances: Construct formwork to produce completed concrete surfaces within construction tolerances specified in ACI 117.

3.8 FIELD QUALITY CONTROL

- A. Section 01 40 00 Quality Requirements and 01 70 00 Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.
- C. Notify Architect/Engineer after placement of reinforcing steel in forms, but prior to placing concrete.
- D. Schedule concrete placement to permit formwork inspection before placing concrete.

END OF SECTION

SECTION 03 20 00 CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Reinforcing bars.
 - 2. Welded wire fabric.
 - 3. Reinforcement accessories.
- B. Related Requirements:
 - 1. Section 03 10 00 Concrete Forming and Accessories.
 - 2. Section 03 30 00 Cast-in-Place Concrete.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Bar Reinforcement:
 - 1. Basis of Measurement: Included in the lump sum price for generator.
 - 2. Basis of Payment: Includes all reinforcement, placement, and accessories.

1.3 REFERENCE STANDARDS

- A. American Concrete Institute:
 - 1. ACI 301 Specifications for Structural Concrete.
 - 2. ACI 318 Building Code Requirements for Structural Concrete.
 - 3. ACI 530/530.1 Building Code Requirements and Specification for Masonry Structures.
 - 4. ACI SP-66 ACI Detailing Manual.
- B. American Welding Society:
 - 1. AWS D1.4 Structural Welding Code Reinforcing Steel.
- C. ASTM International:
 - 1. ASTM A184 Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement.
 - 2. ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 - 3. ASTM A704 Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.
 - 4. ASTM A706 Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.
 - 5. ASTM A767 Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
 - 6. ASTM A775 Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
 - 7. ASTM A884 Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement.

- 8. ASTM A934 Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars.
- 9. ASTM A996 Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.
- 10. ASTM A1064 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- D. Concrete Reinforcing Steel Institute:
 - 1. CRSI 10-MSP Manual of Standard Practice.
 - 2. CRSI 10PLACE Placing Reinforcing Bars.

1.4 COORDINATION

- A. Section 01 30 00 Administrative Requirements: Requirements for coordination.
- B. Coordinate Work of this Section with placement of formwork, formed openings, and other Work.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings:

- 1. Indicate bar sizes, spacings, locations, splice locations, and quantities of reinforcing steel.
- 2. Indicate bending and cutting schedules.
- 3. Indicate supporting and spacing devices.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Submit certified copies of mill test report of reinforcement materials analysis.
- E. Welder Certificates: Certify welders and welding procedures employed on Work, verifying AWS qualification within previous 12 months.
- F. Source Quality-Control Submittals: Indicate results of factory tests and inspections.
- G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- H. Qualifications Statement:1. Welders: Qualify procedures and personnel according to AWS D1.1.

1.6 QUALITY ASSURANCE

- A. Perform Work according to ACI 301 ACI 318.
- B. Prepare Shop Drawings according to ACI SP-66.
- C. Perform Work according to Municipal, State, and Federal standards.

1.7 QUALIFICATIONS

A. Welders: AWS qualified within previous 12 months for employed weld types.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- C. Store materials according to manufacturer instructions.
- D. Protection:
 - 1. Protect materials from moisture by storing in clean, dry location remote from construction operations areas.
 - 2. Provide additional protection according to manufacturer instructions.

1.9 EXISTING CONDITIONS

- A. Field Measurements:
 - 1. Verify field measurements prior to fabrication.
 - 2. Indicate field measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 REINFORCEMENT

- A. Reinforcing Steel:
 - 1. Comply with ASTM A615.
 - 2. Yield Strength: 60 ksi.
 - 3. Billet Bars: Deformed.
 - 4. Finish: Uncoated.

2.2 FABRICATION

- A. Fabricate concrete reinforcement according to ACI 318.
- B. Form standard hooks for, 90-degree bends, stirrups and tie hooks as indicated on Drawings.
- C. Form reinforcement bends with minimum diameters according to ACI 318.
- D. Fabricate column reinforcement with offset bends at reinforcement splices.
- E. Form ties and stirrups from following:
 - 1. Bars No. 10 and Smaller: No. 3 deformed bars.
 - 2. Bars No. 11 and Larger: No. 4 deformed bars.

- F. Splicing:
 - 1. If not indicated on Drawings, locate reinforcement splices at point of minimum stress.
 - 2. Obtain approval of splice locations from Engineer.

2.3 ACCESSORY MATERIALS

- A. Tie Wire:
 - 1. Minimum 16 gage, annealed type.
- B. Chairs, Bolsters, Bar Supports, and Spacers:
- C. Size and Shape: To strengthen and support reinforcement during concrete placement conditions.
- D. Epoxy Coating Patching Material: Type as recommended by coating manufacturer.

2.4 SOURCE QUALITY CONTROL

- A. Provide shop inspection and testing of completed assembly.
- B. Section 01 40 00 Quality Requirements: Requirements for testing, inspection, and analysis.
- C. Certificate of Compliance:
 - 1. If fabricator is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.
 - 2. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Place, support, and secure reinforcement against displacement.
- B. Do not deviate from required position beyond specified tolerance.
- C. Do not weld crossing reinforcement bars for assembly except as permitted by Engineer.
- D. Do not displace or damage vapor retarder.
- E. Accommodate placement of formed openings.
- F. Spacing:
 - 1. Space reinforcement bars with minimum clear spacing according to ACI 318.
 - 2. If bars are indicated in multiple layers, place upper bars directly above lower bars.
- G. Maintain minimum concrete cover around reinforcement according to ACI 318 or as shown on the plans.
- H. Epoxy grout reinforcing dowels in place with HILT HIT-HY 200 injectable mortar.

3.2 TOLERANCES

- A. Section 01 40 00 Quality Requirements: Requirements for tolerances.
- B. Install reinforcement within following tolerances for flexural members, walls, and compression members:
 - 1. Reinforcement Depth Greater Than 8 Inches:
 - a. Depth Tolerance: Plus or Minus 3/8 inch
 - b. Minus 3/8 inch
 - 2. Reinforcement Depth Less Than or Equal to 8 Inches:
 - a. Depth Tolerance: Plus or Minus 1/2 inch
 - b. Minus 1/2 inch

3.3 FIELD QUALITY CONTROL

- A. Section 01 70 00 Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.
- B. Perform field inspection and testing according to ACI 318.
- C. Provide unrestricted access to Work and cooperate with appointed inspection and testing firm.
- D. Reinforcement Inspection:
 - 1. Placement Acceptance: Inspect specified and ACI 318 material requirements and specified placement tolerances.
 - 2. Welding: Inspect welds according to AWS D1.1.
 - 3. Periodic Placement Inspection: Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.
 - 4. Weldability Inspection: Inspect for reinforcement weldability if formed from steel other than ASTM A706.
 - 5. Continuous Weld Inspection: Inspect reinforcement according to ACI 318.
 - 6. Periodic Weld Inspection: Inspect other welded connections.

END OF SECTION

SECTION 03 30 00 CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes cast-in-place concrete for the following:
 - 1. Slabs on grade.
 - 2. Equipment pads.
 - 3. Thrust blocks.
 - 4. Building Foundations.
- B. Related Sections:
 - 1. Section 03 10 00 Concrete Forming and Accessories:

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Cast-in-Place Concrete:
 - 1. Basis of Measurement: Included in the lump sum price for generator.
 - 2. Basis of Payment: Includes all labor, material, equipment required for cast-in-place concrete as shown on the contract documents or as stated in the specifications.

1.3 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 301 Specifications for Structural Concrete.
 - 2. ACI 305 Hot Weather Concreting.
 - 3. ACI 306.1 Standard Specification for Cold Weather Concreting.
 - 4. ACI 308.1 Standard Specification for Curing Concrete.
 - 5. ACI 318 Building Code Requirements for Structural Concrete.
- B. ASTM International:
 - 1. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 2. ASTM C31/C31M Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 - 3. ASTM C33 Standard Specification for Concrete Aggregates.
 - 4. ASTM C39/C39M Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - 5. ASTM C42/C42M Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
 - 6. ASTM C94/C94M Standard Specification for Ready-Mixed Concrete.
 - 7. ASTM C143/C143M Standard Test Method for Slump of Hydraulic Cement Concrete.
 - 8. ASTM C150 Standard Specification for Portland Cement.
 - 9. ASTM C172 Standard Practice for Sampling Freshly Mixed Concrete.
 - 10. ASTM C173/C173M Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

- 11. ASTM C231 Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
- 12. ASTM C260 Standard Specification for Air-Entraining Admixtures for Concrete.
- 13. ASTM C330 Standard Specification for Lightweight Aggregates for Structural Concrete.
- 14. ASTM C494/C494M Standard Specification for Chemical Admixtures for Concrete.
- 15. ASTM C595 Standard Specification for Blended Hydraulic Cements.
- 16. ASTM C618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
- 17. ASTM C685/C685M Standard Specification for Concrete Made By Volumetric Batching and Continuous Mixing.
- 18. ASTM C845 Standard Specification for Expansive Hydraulic Cement.
- 19. ASTM C989 Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
- 20. ASTM C1017/C1017M Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
- 21. ASTM C1064/C1064M Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
- 22. ASTM C1107/C1107M Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
- 23. ASTM C1116 Standard Specification for Fiber-Reinforced Concrete and Shotcrete.
- 24. ASTM C1157 Standard Performance Specification for Hydraulic Cement.
- 25. ASTM C1218/C1218M Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
- 26. ASTM C1240 Standard Specification for Silica Fume Used in Cementitious Mixtures.
- 27. ASTM D994 Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
- 28. ASTM D1751 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- 29. ASTM D1752 Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
- 30. ASTM D6690 Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
- 31. ASTM E96/E96M Standard Test Methods for Water Vapor Transmission of Materials.
- 32. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials.
- 33. ASTM E1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.
- 34. ASTM E1745 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
- C. Michigan Department of Transportation:
 - 1. 2012 Standard Specifications for Construction.

1.4 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Submittal procedures.
- B. Design Data:
 - 1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:

- a. Hot and cold weather concrete work.
- b. Air entrained concrete work.
- 2. Identify mix ingredients and proportions, including admixtures.
- 3. Identify chloride content of admixtures and whether or not chloride was added during manufacture.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents: Accurately record actual locations of embedded utilities and components concealed from view in finished construction.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301.
- B. Conform to ACI 305 when concreting during hot weather.
- C. Conform to ACI 306.1 when concreting during cold weather.
- D. Acquire cement and aggregate from one source for Work.
- E. Perform Work in accordance with State of Michigan Department of Transportation Standard Specifications for Construction.
- F. Maintain one copy of each document on site.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 Product Requirements: Environmental conditions affecting products on site.
- B. Maintain concrete temperature after installation at minimum 50 degrees F for minimum 7 days.
- C. Maintain high early strength concrete temperature after installation at minimum 50 degrees F for minimum 3 days.

1.8 COORDINATION

- A. Section 01 30 00 Administrative Requirements: Coordination and project conditions.
- B. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: ASTM C150, Type IA - Air Entraining Portland type; manufactured by.

- B. Expansive Hydraulic Cement: ASTM C845.
- C. Coarse Aggregates: ASTM C33.1. In accordance with MDOT 6AA.
- D. Fine Aggregate: ASTM C33.1. In accordance with MDOT 2NS.
- E. Water: ACI 318; potable, without deleterious amounts of chloride ions.

2.2 ADMIXTURES

- A. Furnish materials according to State of Michigan Department of Transportation standard specification for construction.
- B. Air Entrainment: ASTM C260.
- C. Chemical: ASTM C494/C494M.
 - 1. Type A Water Reducing.
 - 2. Type B Retarding.
 - 3. Type C Accelerating.
 - 4. Type F Water Reducing, High Range.
- D. Fly Ash: ASTM C618 Class C.
- E. Plasticizing: ASTM C1017/C1017M Type I, plasticizing.

2.3 ACCESSORIES

- A. Bonding Agent: Two component modified epoxy resin.
 - 1. Manufacturers:
 - a. Sikadur 32, Hi-Mod LV manufactured by Sika Corp; concessive 1001 LPL, 3007.
 - b. Substitutions: Or equal manufactured by structural bonding company.
- B. Non-Shrink Grout: ASTM C1107/C1107M; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 7,000 psi in 28 days.
 - 1. <u>Manufacturers</u>:
 - a. Five Star Grout as manufactured by U.S. Grout Company.
 - b. Or equal.
- C. Epoxy Adhesive: Two components epoxy resin adhesive; Sikadur 35, Hi-Mod LV manufactured by Sika Corporation, Glendale Hts., IL 708-924-7900.
- D. Adhesive Anchors: Hilti HVA adhesive anchoring system. Hilti adhesive anchors shall be comprised on an HEA capsule with an ASTM A193, Grade B & HAS stainless steel rod assembly with stainless steel ASTM F594 nuts and ANSI B 18.221 (1965), Type A, plain washers under the turned element. Install per manufacturer's specifications.

2.4 JOINT DEVICES AND FILLER MATERIALS

- A. Joint Filler Type A: ASTM D1751; Asphalt impregnated fiberboard or felt, 1/4 to 1 inch thick; tongue and groove profile; manufactured by A.C.D. International or equal.
- B. Construction Joint Devices: ANSI/ASTM D1751 type; 1/4 inch to 1 inch thick, manufactured by A.C.D. International or equal.
- C. Expansion and Contraction Joint Devices: Supply materials in accordance with MDOT 2012 standard specifications for construction.
- D. Sealant: ASTM D6690, Type I; Son-No-Mar, manufactured by Sonneborn Building Products or equal.

2.5 CONCRETE MIX

- A. Select proportions for normal weight concrete in accordance with ACI 301 Method 2.
- B. Select proportions for concrete in accordance with ACI 318 without trial mixtures or field experience when approved by Engineer.
- C. Provide concrete to the following criteria:

Concrete Grade: MDOT P1/S2

Material and Property	Measurement
Flexural Strength (7 day)	550 psi
Flexural Strength (28 day)	650 psi
Compressive Strength (7 day)	2,600 psi
Compressive Strength (28 day)	3,500 psi
Cement Type	Type A or IA
Cement Content (minimum)	6.0 sacks
Coarse Aggregate Type	6AA
Coarse Aggregate	72 percent by bulk volume (Dry, loose)
Fine Aggregate	2NS
Air Content	6.5 percent plus or minus 1.5 percent
Slump	4 inches plus or minus 1 inch

- D. Admixtures: Include admixture types and quantities indicated in concrete mix designs only when approved by Engineer.
 - 1. Use accelerating admixtures in cold weather. Use of admixtures will not relax cold weather placement requirements.
 - 2. Do not use calcium chloride nor admixtures containing calcium chloride.
 - 3. Use set retarding admixtures during hot weather.

- 4. Add air entrainment admixture to concrete mix for work exposed to freezing and thawing.
- 5. For concrete exposed to deicing chemicals, limit fly ash, pozzolans, silica fume, and slag content as required by applicable ACI code.
- E. Average Compressive Strength Reduction: Permitted in accordance with ACI 318.
- F. Ready Mixed Concrete: Mix and deliver concrete in accordance with ASTM C94/C94M.
- G. Site Mixed Concrete: Mix concrete in accordance with ACI 318.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 Administrative Requirements: Coordination and project conditions.
- B. Verify requirements for concrete cover over reinforcement.
- C. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

3.2 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Remove laitance, coatings, and unsound materials.
- B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
- C. Remove debris and ice from formwork, reinforcement, and concrete substrates.
- D. Remove water from areas receiving concrete before concrete is placed.

3.3 PLACING CONCRETE

- A. Place concrete in accordance with ACI 301 and MDOT Standard Specifications for Construction.
- B. Notify testing laboratory and Engineer minimum 24 hours prior to commencement of operations.
- C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.
- D. Deposit concrete at final position. Prevent segregation of mix.
- E. Place concrete in continuous operation for each panel or section determined by predetermined joints.
- F. Consolidate concrete after placing by means of mechanical vibrators or other suitable tools approved by the Engineer.

- G. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- H. Place concrete continuously between predetermined expansion, control, and construction joints.
- I. Do not interrupt successive placement; do not permit cold joints to occur.
- J. Saw cut joints within 24 hours after placing. Use 3/16 inch thick blade, cut into 1/4 depth of slab thickness.
- K. Concrete transported in a truck mixer, agitator or other transportation device shall be discharged at the job within 1 1/2 hours after the cement has been added to the water or aggregates.
- L. When had mixing is authorized, it shall be done on a watertight platform and in such a manner as to ensure a uniform distribution of the materials throughout the mass. Mixing shall continue until a homogeneous mixture of the required consistency is obtained.
- M. Retempering of partially hardened concrete or mortar will not be permitted.

3.4 CONCRETE FINISHING

- A. Formed Surfaces:
 - 1. As a minimum of formed surfaces shall receive a plain finish and rubbed finish.
 - 2. Plain Finish: Immediately after removal of forms, all fins and loose material shall be removed and all holes, voids, aggregate pockets and depressions shall be cut out to solid concrete. All such defective areas shall be cleaned and wetted thoroughly and immediately be brushed and net cement and filled with Portland Cement grout finished, flush with the adjacent surfaces. Patch work shall be damp cured for a period of 48 hours and, when exposed, it shall be finished to match adjacent surfaces.
 - 3. Rubbed Finish: All form marks and other such irregularities shall be removed by rubbing the surface with a Carborundum stone and water as soon as practical after form removal.
 - 4. Bagged Finish: All formed surfaces which are not earth backfilled shall receive a bagged finish. All air and water voids shall be finished flush with the wall surface. The wall shall first be moistened with water. Portland cement grout matching the color of the base concrete shall be worked into the voids using burlap or sponge rubber finishing pads.
- B. Unformed Surface Finishes
 - 1. Troweled Finish: After a floated finish, provide a smooth surface, free of defects with a steel trowel. Follow the first troweling with a second troweling after the concrete has hardened sufficiently to produce a ringing sound as the towel is moved over the surface. The finish surface shall be essentially free of trowel marks, uniform in texture and appearance and shall be plane to 1/8" in 10 ft. tolerance.
 - 2. Broomed Finish: After receiving the floated and troweled finishes, apply a broomed finish with a fiber-bristle brush in a direction transverse to the line of traffic.
 - 3. Floated Finish: Place, consolidate, strike off and level concrete. After the concrete has stiffened sufficiently, floating shall begin using a hard float, power trowel and float shoes or powered disc float. Cut down high spots and fill low spots to 1/4" in 10 ft. tolerance. Float to a uniform sandy texture.

- 4. Scratched Finish: After the concrete has been placed consolidated, struck off and leveled to a 1/4" in 2 ft. tolerance, roughen with stiff brushes or rakes before the final set.
- C. Finish concrete floor surface in accordance with ACI 301.
- D. Provide a troweled finish for base slabs.
- E. Provide a floated finish for slabs as directed by the Engineer.
- F. Provide a broom finish for exterior slabs, sidewalks, pavements and where directed by the Engineer.
- G. Provide a scratched finish where concrete is specified to receive a subsequent concrete tapping.
- H. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at one inch per 10 feet unless otherwise indicated on drawings.
- I. Maximum variation of surface flatness for exposed concrete floors 1/8 inch in 10 feet.

3.5 CURING AND PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Cure concrete in accordance with MDOT Standard Specification for Construction.
- D. Membrane Curing Compound: Apply curing compound in accordance with manufacturer's instructions. Curing compound shall not contain any ingredients which might stain or otherwise injure the concrete or prevent a good bond for subsequent coatings or finishing's.

3.6 FIELD QUALITY CONTROL

- A. Section 01 40 00 Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Field inspection and testing will be performed by Owner's testing laboratory in accordance with MDOT Standard Specification for Construction.
- C. Provide free access to Work and cooperate with appointed firm.
- D. Submit proposed mix design of each class of concrete to Engineer for review prior to commencement of Work.
- E. Concrete Inspections:
 - 1. Continuous Placement Inspection: Inspect for proper installation procedures.
 - 2. Periodic Curing Inspection: Inspect for specified curing temperature and procedures.

- F. Strength Test Samples:
 - 1. Sampling Procedures: ASTM C172.
 - 2. Cylinder Molding and Curing Procedures: ASTM C31/C31M, cylinder specimens, standard cured.
 - 3. Sample concrete and make one set of three cylinders for every 75 cu yds or less of each class of concrete placed each day and for every 5,000 sf of surface area for slabs and walls.
 - 4. When volume of concrete for any class of concrete would provide less than 5 sets of cylinders, take samples from five randomly selected batches, or from every batch when less than 5 batches are used.
 - 5. Make one additional cylinder during cold weather concreting, and field cure.
- G. Field Testing:
 - 1. Slump Test Method: ASTM C143/C143M.
 - 2. Air Content Test Method: ASTM C231.
 - 3. Temperature Test Method: ASTM C1064/C1064M.
 - 4. Measure slump and temperature for each compressive strength concrete sample.
 - 5. Measure air content in air entrained concrete for each compressive strength concrete sample.
- H. Cylinder Compressive Strength Testing:
 - 1. Test Method: ASTM C39/C39M.
 - 2. Test Acceptance: In accordance with MDOT Standard Specification for Construction.
 - 3. Test one cylinder at 7 days.
 - 4. Test two cylinders at 28 days.
 - 5. Dispose remaining cylinders when testing is not required.
- I. Core Compressive Strength Testing:
 - 1. Sampling and Testing Procedures: ASTM C42/C42M.
 - 2. Test Acceptance: In accordance with MDOT Standard Specification for Construction.
 - 3. Drill three cores for each failed strength test from concrete represented by failed strength test.
- J. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken.

3.7 PATCHING

- A. Allow Engineer to inspect concrete surfaces immediately upon removal of forms.
- B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Engineer upon discovery.
- C. Patch imperfections as directed by Engineer in accordance with MDOT Standard Specification for Construction.

3.8 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by Engineer.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Engineer for each individual area.

END OF SECTION

SECTION 26 05 05 SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Removal of existing electrical equipment, wiring, and conduit in areas to be remodeled; removal of designated construction; dismantling, cutting and alterations for completion of the Work.
 - 2. Disposal of materials.
 - 3. Storage of removed materials.
 - 4. Identification of utilities.
 - 5. Salvaged items.
 - 6. Protection of items to remain as scheduled at end of section or as indicated on Drawings.
 - 7. Relocate existing equipment to accommodate construction.

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Selective Demolition for Electrical:
 - 1. Basis of Measurement: Included in the lump sum price for generator.
 - 2. Basis of Payment: Includes all labor, material, equipment required for selective demolition of electrical equipment as shown on the contract documents or as stated in the specifications.

1.3 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate demolition and removal sequence and location of salvageable items; location and construction of temporary work. Describe demolition removal procedures and schedule.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of capped utilities, conduits and equipment abandoned in place, and any remaining items originally scheduled for demolition.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with Perform Work in accordance with all applicable Federal, State, and local Codes and Ordinances.

1.6 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.7 COORDINATION

- A. Section 01 30 00 Administrative Requirements: Requirements for coordination.
- B. Conduct demolition to minimize interference with adjacent building areas.
- C. Coordinate demolition work with Owner, Architect/Engineer, and all other trades.
- D. Coordinate and sequence demolition so as not to cause shutdown of operation of surrounding areas.
- E. Shut-down Periods:
 - 1. Arrange timing of shut-down periods of in-service panels with Owner and Architect/Engineer. Do not shut down any utility without prior written approval.
 - 2. Keep shut-down period to minimum or use intermittent period as directed by Owner and Architect/Engineer.
 - 3. Maintain life-safety systems in full operation in occupied facilities or provide notice minimum 3 days in advance.
- F. Identify salvage items in cooperation with Owner.

PART 2 - PRODUCTS

2.1 Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify wiring and equipment indicated to be demolished serve only abandoned facilities.
- C. Verify termination points for demolished services.

3.2 PREPARATION

A. Erect, and maintain temporary safeguards, including warning signs and lights, barricades, and similar measures, for protection of the public, Owner, Contractor's employees, and existing improvements to remain.

B. Temporary egress signage and emergency lighting

3.3 DEMOLITION

- A. Demolition Drawings are based on casual field observation and existing record documents. Report discrepancies to Owner, Architect/Engineer, and other Contractor(s) before disturbing existing installation.
- B. Remove exposed abandoned conduit and wire, including abandoned conduit and wire above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- C. Remove conduit, wire, boxes, and fastening devices to avoid any interference with new installation.
- D. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.
- E. Reconnect equipment being disturbed by renovation work and required for continued service to temporary service or nearest available panel, unless otherwise directed.
- F. Disconnect or shut off service to areas where electrical work is to be removed. Remove electrical fixtures, equipment, and related switches, outlets, conduit and wiring which are not part of final project.
- G. Install temporary wiring and connections to maintain existing systems in service during construction.
- H. Perform work on energized equipment or circuits with experienced and trained personnel.
- I. Remove, relocate, and extend existing installations to accommodate new construction.
- J. Repair adjacent construction and finishes damaged during demolition and extension work.
- K. Remove exposed abandoned grounding and bonding components, fasteners and supports, and electrical identification components, including abandoned components above accessible ceiling finishes. Cut embedded support elements flush with walls and floors.
- L. Clean and repair existing equipment to remain or to be reinstalled.
- M. Protect and retain power to existing active equipment remaining.
- N. Cap abandoned empty conduit at both ends.

3.4 EXISTING PANELBOARDS

- A. Ring out circuits in existing panel affected by the Work. Where additional circuits are needed, reuse circuits available for reuse. Install new breakers.
- B. Tag unused circuits as spare.

- C. Where existing circuits are indicated to be reused, use sensing measuring devices to verify circuits feeding Project area or are not in use.
- D. Remove existing wire no longer in use from panel to equipment.
- E. Provide new updated directories where more than three circuits have been modified or rewired.

3.5 SALVAGE ITEMS

- A. Remove and protect items indicated in Schedule and on Drawings to be salvaged and turn over to Owner, unless otherwise directed.
- B. Items of salvageable value may be removed as work progresses. Transport salvaged items from site as they are removed.

3.6 REUSABLE ELECTRICAL EQUIPMENT

- A. Carefully remove equipment, materials, or fixtures which are to be reused.
- B. Disconnect, remove, or relocate existing electrical material and equipment interfering with new installation.
- C. Relocate existing lighting fixtures as indicated on Drawings. Clean fixtures and re-lamp. Test fixture to see if it is in good working condition before installation at new location.

3.7 CLEANING

- A. Section 01 70 00 Execution and Closeout Requirements: Requirements for cleaning.
- B. Remove demolished materials as work progresses. Legally dispose.
- C. Keep workplace neat.

3.8 PROTECTION OF FINISHED WORK

- A. Section 01 70 00 Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Do not permit traffic over unprotected floor surface.

END OF SECTION

SECTION 26 05 19 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes building wire and cable; nonmetallic-sheathed cable; direct burial cable; service entrance cable; armored cable; metal clad cable; and wiring connectors and connections.
- B. Related Sections:
 - 1. Section 26 05 53 Identification for Electrical Systems: Product requirements for wire identification.
 - 2. Section 31 23 17 Trenching: Execution requirements for trenching required by this section.

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Low voltage electrical power conductors and cables
 - 1. Basis of Measurement: Included in the lump sum price for generator.
 - 2. Basis of Payment: Includes all labor, material, equipment required for low voltage electrical power conductors and cables as shown on the contract documents or as stated in the specifications.
- 1.3 REFERENCES
 - A. International Electrical Testing Association:
 - 1. NETA ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
 - B. National Fire Protection Association:
 - 1. NFPA 70 National Electrical Code.
 - 2. NFPA 262 Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.
 - C. Underwriters Laboratories, Inc.:
 - 1. UL 1277 Standard for Safety for Electrical Power and Control Tray Cables with Optional Optical-Fiber Members.

1.4 SYSTEM DESCRIPTION

- A. Product Requirements: Provide products as follows:
 - 1. Solid conductor for feeders and branch circuits 10 AWG and smaller.
 - 2. Stranded conductors for control circuits.
 - 3. Conductor not smaller than 12 AWG for power and lighting circuits.
 - 4. Conductor not smaller than 14 AWG for control circuits.
 - 5. Increase wire size in branch circuits to limit voltage drop to a maximum of 3 percent.

- B. Wiring Methods: Provide the following wiring methods:
 - 1. Concealed Dry Interior Locations: Use only building wire, Type THHN/THWN insulation, in raceway, nonmetallic- sheathed cable, armored cable or metal clad cable.
 - 2. Exposed Dry Interior Locations: Use only building wire, Type THHN/THWN insulation, in raceway, nonmetallic-sheathed cable, armored cable or metal clad cable.
 - 3. Above Accessible Ceilings: Use only building wire, Type THHN/THWN insulation, in raceway, nonmetallic-sheathed cable, armored cable or metal clad cable.
 - 4. Wet or Damp Interior Locations: Use only building wire, Type THHN/THWN insulation, in raceway, direct burial cable, armored cable or metal clad cable.
 - 5. Exterior Locations: Use only building wire, Type THHN/THWN insulation, in raceway, direct burial cable, service-entrance cable, armored cable or metal clad cable.
 - 6. Underground Locations: Use only building wire, Type THHN/THWN insulation, in raceway, direct burial cable, service-entrance cable, armored cable or metal clad cable.
 - 7. Cable Tray Locations: Use only Tray cable Type TC.

1.5 DESIGN REQUIREMENTS

- A. Conductor sizes are based on copper unless indicated as aluminum or "AL".
- B. When aluminum conductor is substituted for copper conductor, size to match circuit requirements, terminations, conductor ampacity and voltage drop.

1.6 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit for building wire and each cable assembly type.
- C. Design Data: Indicate voltage drop and ampacity calculations for aluminum conductors substituted for copper conductors.
- D. Test Reports: Indicate procedures and values obtained.

1.7 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of components and circuits.

1.8 QUALITY ASSURANCE

- A. Provide wiring materials located in plenums with peak optical density not greater than 0.5, average optical density not greater than 0.15, and flame spread not greater than 5 feet (1.5 m) when tested in accordance with NFPA 262.
- B. Perform Work in accordance with all applicable Federal, State, and local Codes and Ordinances.
- C. Maintain one copy of each document on site.

1.9 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.10 FIELD MEASUREMENTS

A. Verify field measurements are as indicated on Drawings.

1.11 COORDINATION

- A. Section 01 30 00 Administrative Requirements: Requirements for coordination.
- B. Where wire and cable destination is indicated and routing is not shown, determine routing and lengths required.
- C. Wire and cable routing indicated is approximate unless dimensioned. Include wire and cable lengths within 10 ft of length shown.

PART 2 - PRODUCTS

2.1 BUILDING WIRE

A. Manufacturers:

- 1. Cerro Wire LLC.
- 2. General Cable; General Cable Corporation.
- 3. Southwire Company.
- 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description: Single conductor insulated wire.
- C. Conductor: Copper.
- D. Insulation Voltage Rating: 600 volts.
- E. Insulation Temperature Rating: 105 degrees C.
- F. Insulation Material: Thermoplastic.

2.2 NONMETALLIC-SHEATHED CABLE

- A. Manufacturers:
 - 1. Cerro Wire LLC.
 - 2. General Cable; General Cable Corporation.
 - 3. Southwire Company.
 - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

2.3 DIRECT BURIAL CABLE

- A. Manufacturers:
 - 1. Cerro Wire LLC.
 - 2. General Cable; General Cable Corporation.
 - 3. Southwire Company.
 - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Conductor: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation Temperature Rating: 90 degrees C.

2.4 SERVICE ENTRANCE CABLE

- A. Manufacturers:
 - 1. Cerro Wire LLC.
 - 2. General Cable; General Cable Corporation.
 - 3. Southwire Company.
 - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Conductor: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation: Type USE, SE, or USE-2, as approved by Utility Company.

2.5 ARMORED CABLE

- A. Manufacturers:
 - 1. Cerro Wire LLC.
 - 2. General Cable; General Cable Corporation.
 - 3. Southwire Company.
 - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Conductor: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation Temperature Rating: 90 degrees C.
- E. Insulation Material: Thermoplastic.
- F. Armor Material: Steel.
- G. Armor Design: Interlocked metal tape.

2.6 METAL CLAD CABLE

A. Manufacturers:

- 1. Cerro Wire LLC.
- 2. General Cable; General Cable Corporation.
- 3. Southwire Company.
- 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Conductor: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation Temperature Rating: 90 degrees C.
- E. Insulation Material: Thermoplastic.
- F. Armor Material: Steel.
- G. Armor Design: Interlocked metal tape.
- H. Jacket: Where required.

2.7 TRAY CABLE

A. Manufacturers:

- 1. EGS/Appleton Electric.
- 2. General Cable; General Cable Corporation.
- 3. Thomas & Betts Corporation; A Member of the ABB Group.
- 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description: Multiconductor power and control cable NFPA 70 Type TC.
- C. Conductor: Copper.
- D. Insulation: Flame-retardant.
- E. Overall Jacket: Polyvinyl Chlorine (PVC) in accordance with UL 1277.
- F. Insulation Voltage Rating: 600 volts.
- G. Insulation Temperature Rating: 90 degrees C.
- H. Listings: Finished cable UL listed as Type TC, and sunlight resistant.

2.8 WIRING CONNECTORS

- A. Split Bolt Connectors:
 - 1. Manufacturers:
 - a. Burndy: Part of Hubbell Electrical Systems.
 - b. ILSCO.
 - c. Thomas & Betts Corporation; A Member of the ABB Group.
 - d. Substitutions: Section 01 60 00 Product Requirements.
- B. Solderless Pressure Connectors:
 - a. Burndy: Part of Hubbell Electrical Systems.
 - b. ILSCO.
 - c. Thomas & Betts Corporation; A Member of the ABB Group.
 - d. Substitutions: Section 01 60 00 Product Requirements.
- C. Spring Wire Connectors:
 - 1. Manufacturers:
 - a. Burndy: Part of Hubbell Electrical Systems.
 - b. ILSCO.
 - c. Thomas & Betts Corporation; A Member of the ABB Group.
 - d. Substitutions: Section 01 60 00 Product Requirements.
- D. Compression Connectors:
 - 1. Manufacturers:
 - a. Burndy: Part of Hubbell Electrical Systems.
 - b. ILSCO.
 - c. Thomas & Betts Corporation; A Member of the ABB Group.
 - d. Substitutions: Section 01 60 00 Product Requirements.

2.9 TERMINATIONS

- A. Terminal Lugs for Wires 6 AWG and Smaller: Solderless, compression type copper.
- B. Lugs for Wires 4 AWG and Larger: Color keyed, compression type copper, with insulating sealing collars.

PART 3 - EXECUTION

- 3.1 EXAMINATION
 - A. Section 01 30 00 Administrative Requirements: Coordination and project conditions.
 - B. Verify interior of building has been protected from weather.
 - C. Verify mechanical work likely to damage wire and cable has been completed.
 - D. Verify raceway installation is complete and supported.

3.2 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.3 EXISTING WORK

- A. Remove exposed abandoned wire and cable, including abandoned wire and cable above accessible ceiling finishes. Patch surfaces where removed cables pass through building finishes.
- B. Disconnect abandoned circuits and remove circuit wire and cable. Remove abandoned boxes when wire and cable servicing boxes is abandoned and removed. Install blank cover for abandoned boxes not removed.
- C. Provide access to existing wiring connections remaining active and requiring access. Modify installation or install access panel.
- D. Extend existing circuits using materials and methods compatible with existing electrical installations, or as specified.
- E. Clean and repair existing wire and cable remaining or wire and cable to be reinstalled.

3.4 INSTALLATION

- A. Route wire and cable to meet Project conditions.
- B. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- C. Identify and color code wire and cable under provisions of Section 26 05 53. Identify each conductor with its circuit number or other designation indicated.
- D. Special Techniques--Building Wire in Raceway:
 - 1. Pull conductors into raceway at same time.
 - 2. Install building wire 4 AWG and larger with pulling equipment.
- E. Special Techniques Cable:
 - 1. Protect exposed cable from damage.
 - 2. Support cables above accessible ceiling, using spring metal clips or metal cable ties to support cables from structure or ceiling suspension system. Do not rest cable on ceiling panels.
 - 3. Use suitable cable fittings and connectors.
- F. Special Techniques Direct Burial Cable:
 - 1. Trench and backfill for direct burial cable installation. Refer to Section 31 23 23 and Section 31 23 17. Install warning tape along entire length of direct burial cable, within 3 inches of grade.
 - 2. Use suitable direct burial cable fittings and connectors.
- G. Special Techniques Wiring Connections:

- 1. Clean conductor surfaces before installing lugs and connectors.
- 2. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- 3. Tape uninsulated conductors and connectors with electrical tape to 150 percent of insulation rating of conductor.
- 4. Install split bolt connectors for copper conductor splices and taps, 6 AWG and larger.
- 5. Install solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
- 6. Install insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
- 7. Terminate aluminum conductors with tin-plated, aluminum-bodied compression connectors only. Fill with anti-oxidant compound before installing conductor.
- 8. Install suitable reducing connectors or mechanical connector adaptors for connecting aluminum conductors to copper conductors.
- H. Install stranded conductors for branch circuits 10 AWG and smaller. Install crimp on fork terminals for device terminations. Do not place bare stranded conductors directly under screws.
- I. Install terminal lugs on ends of 600 volt wires unless lugs are furnished on connected device, such as circuit breakers.
- J. Size lugs in accordance with manufacturer's recommendations terminating wire sizes. Install 2-hole type lugs to connect wires 4 AWG and larger to copper bus bars.
- K. For terminal lugs fastened together such as on motors, transformers, and other apparatus, or when space between studs is small enough that lugs can turn and touch each other, insulate for dielectric strength of 2-1/2 times normal potential of circuit.

3.5 WIRE COLOR

- A. General:
 - 1. For wire sizes 10 AWG and smaller, install wire colors in accordance with the following:
 - a. Black and red for single phase circuits at 120/240 volts.
 - b. Black, red, and blue for circuits at 120/208 volts single or three phase.
 - c. Orange, brown, and yellow for circuits at 277/480 volts single or three phase.
 - 2. For wire sizes 8 AWG and larger, identify wire with colored tape at terminals, splices and boxes. Colors are as follows:
 - a. Black and red for single phase circuits at 120/240 volts.
 - b. Black, red, and blue for circuits at 120/208 volts single or three phase.
 - c. Orange, brown, and yellow for circuits at 277/480 volts single or three phase.
- B. Neutral Conductors: White. When two or more neutrals are located in one conduit, individually identify each with proper circuit number.
- C. Branch Circuit Conductors: Install three or four wire home runs with each phase uniquely color coded.
- D. Feeder Circuit Conductors: Uniquely color code each phase.

- E. Ground Conductors:
 - 1. For 6 AWG and smaller: Green.
 - 2. For 4 AWG and larger: Identify with green tape at both ends and visible points including junction boxes.
- 3.6 FIELD QUALITY CONTROL
 - A. Section 01 40 00 Quality Requirements
 - B. Section 01 70 00 Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
 - C. Inspect and test in accordance with NETA ATS, except Section 4.
 - D. Perform inspections and tests listed in NETA ATS, Section 7.3.1.

END OF SECTION

SECTION 26 05 26 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Rod electrodes.
 - 2. Active electrodes.
 - 3. Wire.
 - 4. Grounding well components.
 - 5. Mechanical connectors.
 - 6. Exothermic connections.
- B. Related Sections:
 - 1. Section 03 20 00 Concrete Reinforcing: Bonding or welding bars when reinforcing steel is used for electrodes.

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Grounding and bonding for electrical systems:
 - 1. Basis of Measurement: Included in the lump sum price for generator.
 - 2. Basis of Payment: Includes all labor, material, equipment required for grounding and bonding of electrical systems as shown on the contract documents or as stated in the specifications.

1.3 REFERENCES

- A. Institute of Electrical and Electronics Engineers:
 - 1. IEEE 142 Recommended Practice for Grounding of Industrial and Commercial Power Systems.
 - 2. IEEE 1100 Recommended Practice for Powering and Grounding Electronic Equipment.
- B. International Electrical Testing Association:
 - 1. NETA ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- C. National Fire Protection Association:
 - 1. NFPA 70 National Electrical Code.
 - 2. NFPA 99 Standard for Health Care Facilities.

1.4 SYSTEM DESCRIPTION

- A. Grounding systems use the following elements as grounding electrodes:
 - 1. Edit the following list to meet Project requirements. Generally, two separate electrodes are required.
 - 2. Metal underground water pipe.

- 3. Metal building frame.
- 4. Concrete-encased electrode.
- 5. Ground ring specified in Section 33 79 00.
- 6. Rod electrode.
- 7. Plate electrode.

1.5 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 5 ohms maximum.

1.6 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data on grounding electrodes and connections.
- C. Test Reports: Indicate overall resistance to ground and resistance of each electrode.
- D. Manufacturer's Installation Instructions: Submit for active electrodes.
- E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.7 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of components and grounding electrodes.

1.8 QUALITY ASSURANCE

- A. Provide grounding materials conforming to requirements of NEC, IEEE 142, and UL labeled.
- B. Perform Work in accordance with all applicable Federal, State, and local Codes and Ordinances.
- C. Maintain one copy of each document on site.

1.9 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three (3) years documented experience or approved by manufacturer.

1.10 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.11 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept materials on site in original factory packaging, labeled with manufacturer's identification.
- C. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.
- D. Do not deliver items to project before time of installation. Limit shipment of bulk and multipleuse materials to quantities needed for immediate installation.

1.12 COORDINATION

- A. Section 01 30 00 Administrative Requirements: Requirements for coordination.
- B. Complete grounding and bonding of building reinforcing steel prior concrete placement.

PART 2 - PRODUCTS

2.1 ROD ELECTRODES

- A. Manufacturers:
 - 1. ERICO International Corporation.
 - 2. Harger Lightning & Grounding.
 - 3. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description:
 - 1. Material: Copper.
 - 2. Diameter: 3/4 inch or as indicated on drawings.
 - 3. Length: 10 feet, unless otherwise indicated.
- C. Connector: Connector for exothermic welded connection.
 - 1. U-bolt clamp only allowed upon approval by Engineer.

2.2 ACTIVE ELECTRODES

- A. Manufacturers:
 - 1. ERICO International Corporation.
 - 2. Harger Lightning & Grounding.
 - 3. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description:
 - 1. Material: Metallic-salt-filled copper-tube electrode.
 - 2. Shape: As indicated on Drawings.
 - 3. Length: As indicated on Drawings.
 - 4. Connector: Connector for exothermic welded connection.

5. U-bolt clamp only allowed upon approval by Engineer.

2.3 WIRE

- A. Material: Stranded copper.
- B. Foundation Electrodes: 2 AWG.
- C. Grounding Electrode Conductor: Copper conductor bare.
- D. Bonding Conductor: Copper conductor bare.

2.4 GROUNDING WELL COMPONENTS

- A. Well Pipe: 8 inches NPS by 24 inches long concrete pipe with belled end.
- B. Well Cover: Fiberglass with legend "GROUND" embossed on cover.

2.5 MECHANICAL CONNECTORS

- A. Manufacturers:
 - 1. Burndy: Part of Hubbell Electrical Systems.
 - 2. ERICO International Corporation.
 - 3. Harger Lightning & Grounding.
 - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Description: Bronze connectors, suitable for grounding and bonding applications, in configurations required for particular installation.

2.6 EXOTHERMIC CONNECTIONS

- A. Manufacturers:
 - 1. Cadweld.
 - 2. ERICO International Corporation.
 - 3. Harger Lightning & Grounding.
 - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description: Exothermic materials, accessories, and tools for preparing and making permanent field connections between grounding system components.

PART 3 - EXECUTION

- 3.1 EXAMINATION
 - A. Section 01 30 00 Administrative Requirements: Verification of existing conditions before starting work.
 - B. Verify final backfill and compaction has been completed before driving rod electrodes.

3.2 PREPARATION

A. Remove paint, rust, mill oils, and surface contaminants at connection points.

3.3 EXISTING WORK

- A. Modify existing grounding system to maintain continuity to accommodate renovations.
- B. Extend existing grounding system using materials and methods compatible with existing electrical installations, or as specified.

3.4 INSTALLATION

- A. Install in accordance with IEEE 1421. Where sensitive equipment is present, install in accordance with IEEE 1100.
- B. Install rod electrodes at locations as indicated on Drawings. Install additional rod electrodes to achieve specified resistance to ground.
- C. Install grounding and bonding conductors concealed from view.
- D. Install grounding well pipe with cover at rod locations as indicated on Drawings. Install well pipe top flush with finished grade.
- E. Install 2 AWG bare copper wire in foundation footing as indicated on Drawings.
- F. Bond together metal siding not attached to grounded structure; bond to ground.
- G. Bond together reinforcing steel and metal accessories in water containment structures.
- H. Install ground grid under access floors. Construct grid of 2 AWG bare copper wire installed on 24 inch centers both ways. Bond each access floor pedestal to grid.
- I. Bond together each metallic raceway, pipe, duct and other metal object entering space under access floors. Bond to underfloor ground grid. Install 2 AWG bare copper bonding conductor.
- J. Install isolated grounding conductor for circuits supplying, personal computers and other such sensitive electronics in accordance with IEEE 1100.
- K. Install grounding and bonding in patient care areas to meet requirements of NFPA 99.
- L. Equipment Grounding Conductor: Install separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.
- M. Connect to site grounding system. Refer to Section 33 79 00.
- N. Bond to lightning protection system. Refer to Section 26 41 00.

- O. Install continuous grounding using underground cold-water system and building steel as grounding electrode. Where water piping is not available, install artificial station ground by means of driven rods or buried electrodes.
- P. Permanently ground entire light and power system in accordance with NEC, including service equipment, distribution panels, lighting panelboards, switch and starter enclosures, motor frames, grounding type receptacles, and other exposed non-current carrying metal parts of electrical equipment.
- Q. Install branch circuits feeding isolated ground receptacles with separate insulated grounding conductor, connected only at isolated ground receptacle, ground terminals, and at ground bus of serving panel.
- R. Accomplish grounding of electrical system by using insulated grounding conductor installed with feeders and branch circuit conductors in conduits. Size grounding conductors in accordance with NEC. Install from grounding bus of serving panel to ground bus of served panel, grounding screw of receptacles, lighting fixture housing, light switch outlet boxes or metal enclosures of service equipment. Ground conduits by means of grounding bushings on terminations at panelboards with installed number 12 conductor to grounding bus.
- S. Grounding electrical system using continuous metal raceway system enclosing circuit conductors in accordance with NEC.
- T. Permanently attach equipment and grounding conductors prior to energizing equipment.

3.5 FIELD QUALITY CONTROL

- A. Section 01 40 00 Quality Requirements.
- B. Section 01 70 00 Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- C. Inspect and test in accordance with NETA ATS, except Section 4.
- D. Grounding and Bonding: Perform inspections and tests listed in NETA ATS, Section 7.13.
- E. Perform ground resistance testing in accordance with IEEE 142.
- F. Perform leakage current tests in accordance with NFPA 99.
- G. Perform continuity testing in accordance with IEEE 142.
- H. When improper grounding is found on receptacles, check receptacles in entire project and correct. Perform retest.

END OF SECTION

SECTION 26 05 29 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Conduit supports.
 - 2. Formed steel channel.
 - 3. Spring steel clips.
 - 4. Sleeves.
 - 5. Mechanical sleeve seals.
 - 6. Firestopping relating to electrical work.
 - 7. Firestopping accessories.
 - 8. Equipment bases and supports.

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Cast-in-Place Concrete:
 - 1. Basis of Measurement: Included in the lump sum price for generator.
 - 2. Basis of Payment: Includes all labor, material, equipment required for hangers and supports for electrical systems as shown on the contract documents or as stated in the specifications.

1.3 REFERENCES

- A. ASTM International:
 - 1. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials.
 - 3. ASTM E814 Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
 - 4. ASTM E1966 Standard Test Method for Fire-Resistive Joint Systems.
- B. FM Global:
 - 1. FM Approval Guide, A Guide to Equipment, Materials & Services Approved by Factory Mutual Research for Property Conservation.
- C. National Fire Protection Association:
 - 1. NFPA 70 National Electrical Code.
- D. Underwriters Laboratories Inc.:
 - 1. UL 263 Fire Tests of Building Construction and Materials.
 - 2. UL 723 Tests for Surface Burning Characteristics of Building Materials.
 - 3. UL 1479 Fire Tests of Through-Penetration Firestops.
 - 4. UL 2079 Tests for Fire Resistance of Building Joint Systems.
 - 5. UL Fire Resistance Directory.

1.4 **DEFINITIONS**

A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

1.5 SYSTEM DESCRIPTION

- A. Firestopping Materials: ASTM E119, ASTM E814, UL 263, UL 1479 to achieve fire ratings as noted on Drawings for adjacent construction, but not less than 1 hour fire rating.
 - 1. Ratings may be 3-hours for firestopping in through-penetrations of 4-hour fire rated assemblies unless otherwise required by applicable codes.
- B. Firestop interruptions to fire rated assemblies, materials, and components.

1.6 PERFORMANCE REQUIREMENTS

- A. Firestopping: Conform to applicable codes FM, UL, WH for fire resistance ratings and surface burning characteristics.
- B. Firestopping: Provide certificate of compliance from authority having jurisdiction indicating approval of materials used.

1.7 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate system layout with location and detail of trapeze hangers.
- C. Product Data:
 - 1. Hangers and Supports: Submit manufacturers catalog data including load capacity.
 - 2. Firestopping: Submit data on product characteristics, performance and limitation criteria.
- D. Firestopping Schedule: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.
- E. Design Data: Indicate load carrying capacity of trapeze hangers and hangers and supports.
- F. Manufacturer's Installation Instructions:
 - 1. Hangers and Supports: Submit special procedures and assembly of components.
 - 2. Firestopping: Submit preparation and installation instructions.
- G. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- H. Firestopping Engineering Judgments: For conditions not covered by UL or WH listed designs, submit judgments by licensed professional engineer suitable for presentation to authority having jurisdiction for acceptance as meeting code fire protection requirements.

1.8 QUALITY ASSURANCE

- A. Through Penetration Firestopping of Fire Rated Assemblies: UL 1479 or ASTM E814 with 0.10 inch water gage minimum positive pressure differential to achieve fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
 - 1. Wall Penetrations: Fire F-Ratings as indicated on Drawings, but not less than 1-hour.
 - 2. Floor and Roof Penetrations: Fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
 - a. Floor Penetrations Within Wall Cavities: T-Rating is not required.
- B. Through Penetration Firestopping of Non-Fire Rated Floor and Roof Assemblies: Materials to resist free passage of flame and products of combustion.
 - 1. Noncombustible Penetrating Items: Noncombustible materials for penetrating items connecting maximum of three stories.
 - 2. Penetrating Items: Materials approved by authorities having jurisdiction for penetrating items connecting maximum of two stories.
- C. Fire Resistant Joints in Fire Rated Floor, Roof, and Wall Assemblies: ASTM E1966 or UL 2079 to achieve fire resistant rating as indicated on Drawings for assembly in which joint is installed.
- D. Fire Resistant Joints Between Floor Slabs and Exterior Walls: ASTM E119 with 0.10 inch water gage minimum positive pressure differential to achieve fire resistant rating as indicated on Drawings for floor assembly.
- E. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- F. Perform Work in accordance with all applicable standards.
- G. Maintain two copies of each document on site.

1.9 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three years documented experience or approved by manufacturer.

1.10 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

- B. Accept materials on site in original factory packaging, labeled with manufacturer's identification.
- C. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

1.12 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 Product Requirements: Environmental conditions affecting products on site.
- B. Do not apply firestopping materials when temperature of substrate material and ambient air is below 60 degrees F.
- C. Maintain this minimum temperature before, during, and for minimum 3 days after installation of firestopping materials.
- D. Provide ventilation in areas to receive solvent cured materials.

PART 2 PRODUCTS

2.1 CONDUIT SUPPORTS

- A. <u>Manufacturers</u>:
 - 1. ERICO International Corporation.
 - 2. Thomas & Betts Corporation: A Member of the ABB Group.
 - 3. Unistrut: Part of Atkore International.
 - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Hanger Rods: Threaded high tensile strength galvanized carbon steel with free running threads.
- C. Beam Clamps: Malleable Iron, with tapered hole in base and back to accept either bolt or hanger rod. Set screw: hardened steel.
- D. Conduit clamps for trapeze hangers: Galvanized steel, notched to fit trapeze with single bolt to tighten.
- E. Conduit clamps general purpose: One-hole malleable iron for surface mounted conduits.
- F. Cable Ties: High strength nylon temperature rated to 185 degrees F. Self-locking.

2.2 FORMED STEEL CHANNEL

- A. Manufacturers:
 - 1. B-Line, and Eaton Business.
 - 2. Unistrut: Part of Atkore International.
 - 3. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description: Galvanized 12 gage thick steel. With holes 1-1/2 inches on center.

2.3 SPRING STEEL CLIPS

A. Manufacturers:

- 1. B-line, an Eaton Business.
- 2. Minerallac Company.
- 3. Morris Products, Inc.
- 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description: Mounting hole and screw closure.

2.4 SLEEVES

- A. Furnish materials in accordance with all applicable Federal, State, and Local Codes and Ordinances.
- B. Sleeves for Through Non-fire Rated Floors: 18 gage thick galvanized steel.
- C. Sleeves for Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage thick galvanized steel.
- D. Sleeves for Through Fire Rated and Fire Resistive Floors and Walls, and Fire Proofing: Prefabricated fire rated sleeves including seals, UL listed.
- E. Stuffing or Fire-stopping Insulation: Glass fiber type, non-combustible.

2.5 MECHANICAL SLEEVE SEALS

- A. Manufacturers:
 - 1. Pipeline Seal and Insulator, Inc.
 - 2. Substitution: Section 01 60 00 Product Requirements.
- B. Product Description: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

2.6 FIRESTOPPING

- A. Manufacturers:
 - 1. 3M Fire Protection Products.
 - 2. Nelson Firestop; a brand of Emerson Industrial Automation.
 - 3. United States Gypsum Company.
 - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.

- 1. Select one or more of the following products. Coordinate with list manufacturers acceptable for this Project.
- 2. Silicone Firestopping Elastomeric Firestopping: Single or Multiple component silicone elastomeric compound and compatible silicone sealant.
- 3. Foam Firestopping Compounds: Single or Multiple component foam compound.
- 4. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
- 5. Fiber Stuffing and Sealant Firestopping: Composite of mineral or ceramic fiber stuffing insulation with silicone elastomer for smoke stopping.
- 6. Mechanical Firestopping Device with Fillers: Mechanical device with incombustible fillers and silicone elastomer, covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.
- 7. Intumescent Firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
- 8. Firestop Pillows: Formed mineral fiber pillows.
- C. Color: As selected from manufacturer's full range of colors.

2.7 FIRESTOPPING ACCESSORIES

- A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces and suitable for required fire ratings.
- B. Dam Material: Permanent:
 - 1. Mineral fiberboard.
 - 2. Mineral fiber matting.
 - 3. Sheet metal.
 - 4. Plywood or particle board.
 - 5. Alumina silicate fire board.
- C. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

D. General:

- 1. Furnish UL listed products.
- 2. Select products with rating not less than rating of wall or floor being penetrated.
- E. Non-Rated Surfaces:
 - 1. Stamped steel, chrome plated, hinged, split ring escutcheons or floor plates or ceiling plates for covering openings in occupied areas where conduit is exposed.
 - 2. For exterior wall openings below grade, furnish modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill annular space between conduit and cored opening or water-stop type wall sleeve.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify openings are ready to receive sleeves.
- C. Verify openings are ready to receive firestopping.

3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.
- B. Remove incompatible materials affecting bond.
- C. Install backing and/or damming materials to arrest liquid material leakage where required.
- D. Obtain permission from Engineer before using powder-actuated anchors.
- E. Do not drill or cut structural members.

3.3 INSTALLATION - HANGERS AND SUPPORTS

- A. Anchors and Fasteners:
 - 1. Concrete Structural Elements: Provide precast inserts, expansion anchors, powder actuated anchors and preset inserts.
 - 2. Steel Structural Elements: Provide beam clamps, spring steel clips, steel ramset fasteners, and welded fasteners.
 - 3. Concrete Surfaces: Provide self-drilling anchors and expansion anchors.
 - 4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Provide toggle bolts and hollow wall fasteners.
 - 5. Solid Masonry Walls: Provide expansion anchors and preset inserts.
 - 6. Sheet Metal: Provide sheet metal screws.
 - 7. Wood Elements: Provide wood screws.
- B. Inserts:
 - 1. Install inserts for placement in concrete forms.
 - 2. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
 - 3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
 - 4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
 - 5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above flush with top of or recessed into and grouted flush with slab as indicated on drawings.
- C. Install conduit and raceway support and spacing in accordance with NEC.

- D. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
- E. Install multiple conduit runs on common hangers.
- F. Supports:
 - 1. Fabricate supports from structural steel or formed steel channel. Install hexagon head bolts to present neat appearance with adequate strength and rigidity. Install spring lock washers under nuts.
 - 2. Install surface mounted cabinets and panelboards with minimum of four anchors.
 - 3. In wet and damp locations install steel channel supports to stand cabinets and panelboards 1 inch off wall.
 - 4. Support vertical conduit at every floor.

3.4 INSTALLATION - FIRESTOPPING

- A. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, conduit and other items, requiring firestopping.
- B. Apply primer where recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.
- C. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating, to uniform density and texture.
- D. Where each material is installed:
 - 1. Compress fibered material to maximum 40 percent of its uncompressed size.
 - 2. Place foamed material in layers to ensure homogenous density, filling cavities and spaces. Place sealant to completely seal junctions with adjacent dissimilar materials.
 - 3. Place intumescent coating in sufficient coats to achieve rating required.
- E. Remove dam material after firestopping material has cured, unless otherwise indicated on drawings.
- F. Fire Rated Surface:
 - 1. Seal opening at floor, wall, partition, ceiling, and roof as follows:
 - a. Install sleeve through opening and extending beyond minimum of 1 inch on both sides of building element.
 - b. Size sleeve allowing minimum of 1 inch void between sleeve and building element.
 - c. Pack void with backing material.
 - d. Seal ends of sleeve with UL listed fire resistive silicone compound to meet fire rating of structure penetrated.
 - 2. Where cable tray, bus, cable bus, conduit, wireway, trough, and other raceways penetrate fire rated surface, install firestopping product in accordance with manufacturer's instructions.
- G. Non-Rated Surfaces:
 - 1. Seal opening through non-fire rated wall, partition floor, ceiling, and roof opening as follows:
 - a. Install sleeve through opening and extending beyond minimum of 1 inch on both sides of building element.

- b. Size sleeve allowing minimum of 1 inch void between sleeve and building element.
- c. Install type of firestopping material recommended by manufacturer.
- 2. Install escutcheons floor plates or ceiling plates where conduit, penetrates non-fire rated surfaces in occupied spaces. Occupied spaces include rooms with finished ceilings and where penetration occurs below finished ceiling.
- 3. Exterior wall openings below grade: Assemble rubber links of mechanical seal to size of conduit and tighten in place, in accordance with manufacturer's instructions.
- 4. Interior partitions: Seal pipe penetrations at each partition between different room types. Apply sealant to both sides of penetration to completely fill annular space between sleeve and conduit.

3.5 INSTALLATION - EQUIPMENT BASES AND SUPPORTS

- A. Provide housekeeping pads of concrete, minimum 3-1/2 inches thick and extending 6 inches beyond supported equipment.
- B. Using templates furnished with equipment, install anchor bolts, and accessories for mounting and anchoring equipment.
- C. Construct supports of steel members. Brace and fasten with flanges bolted to structure.

3.6 INSTALLATION - SLEEVES

- A. Exterior watertight entries: Seal with adjustable interlocking rubber links.
- B. Conduit penetrations not required to be watertight: Sleeve and fill with silicon foam.
- C. Set sleeves in position in forms. Provide reinforcing around sleeves.
- D. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- E. Extend sleeves through floors 1 inch above finished floor level. Caulk sleeves.
- F. Where conduit or raceway penetrates floor, ceiling, or wall, close off space between conduit or raceway and adjacent work with stuffing or fire stopping insulation and caulk airtight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
- G. Install chrome plated steel plastic or stainless-steel escutcheons at finished surfaces.

3.7 FIELD QUALITY CONTROL

- A. Section 01 40 00 Quality Requirements
- B. Section 01 70 00 Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- C. Inspect installed firestopping for compliance with specifications and submitted schedule.

3.8 CLEANING

- A. Section 01 70 00 Execution and Closeout Requirements: Requirements for cleaning.
- B. Clean adjacent surfaces of firestopping materials.

3.9 PROTECTION OF FINISHED WORK

- A. Section 01 70 00 Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 26 05 33 RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes conduit and tubing, surface raceways, wireways, outlet boxes, pull and junction boxes, and handholes.
- B. Related Sections:
 - 1. Section 26 05 83 Wiring Connections.
 - 2. Section 26 05 26 Grounding and Bonding for Electrical Systems.
 - 3. Section 26 05 53 Identification for Electrical Systems.

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Raceway and boxes for electrical systems:
 - 1. Basis of Measurement: Included in the lump sum price for generator.
 - 2. Basis of Payment: Includes all labor, material, equipment required for raceway and boxes for electrical systems as shown on the contract documents or as stated in the specifications.

1.3 REFERENCES

- A. ANSI: American National Standards Institute:
 - 1. ANSI C80.1 Rigid Steel Conduit, Zinc Coated.
 - 2. ANSI C80.3 Specification for Electrical Metallic Tubing, Zinc Coated.
 - 3. ANSI C80.5 Aluminum Rigid Conduit (ARC).
- B. NEMA: National Electrical Manufacturers Association:
 - 1. NEMA 250 Enclosures for Electrical Equipment (1000 Volts Maximum).
 - 2. NEMA FB 1 Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
 - 3. NEMA OS 1 Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
 - 4. NEMA OS 2 Nonmetallic Outlet Boxes, Device Boxes, Covers, and Box Supports.
 - 5. NEMA RN 1 Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
 - 6. NEMA TC 2 Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
 - 7. NEMA TC 3 PVC Fittings for Use with Rigid PVC Conduit and Tubing.
- C. NECA: National Electrical Contractors Association
 - 1. NECA 1 Standard Practices for Good Workmanship in Electrical Contracting.
- D. NFPA: National Fire Protection Association
 - 1. NFPA 70 National Electric Code.

1.4 SYSTEM DESCRIPTION

- A. Raceway and boxes located as indicated on Drawings, and at other locations required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements. Raceway and boxes are shown in approximate locations unless dimensioned. Provide raceway to complete wiring system.
- B. Underground More than 5 feet outside Foundation Wall: Provide, thickwall nonmetallic conduit. Provide cast metal boxes or nonmetallic handhole.
- C. Underground Within 5 feet from Foundation Wall: Provide rigid steel conduit. Provide cast metal or nonmetallic boxes.
- D. In or Under Slab on Grade: Provide, thickwall nonmetallic conduit. Provide cast or nonmetallic metal boxes.
- E. Outdoor Locations, Above Grade: Provide PVC coated metal conduit. Provide cast metal or nonmetallic outlet, pull, and junction boxes.
- F. In Slab Above Grade: Provide thickwall nonmetallic conduit. Provide cast boxes.
- G. Wet and Damp Locations: Provide rigid steel or conduit, intermediate metal conduit unless otherwise noted as requiring PVC coated metal conduit. Provide cast metal or nonmetallic outlet, junction, and pull boxes. Provide flush mounting outlet box in finished areas.
- H. Concealed Dry Locations: Provide, electrical metallic tubing. Provide sheet-metal boxes. Provide flush mounting outlet box in finished areas. Provide hinged enclosure for large pull boxes.
- I. Exposed Dry Locations: Provide rigid steel conduit. Provide sheet-metal boxes. Provide flush mounting outlet box in finished areas. Provide hinged enclosure for large pull boxes.

1.5 DESIGN REQUIREMENTS

A. Minimum Raceway Size: 3/4 inch unless otherwise specified.

1.6 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Submittal procedures.
- B. Product Data: Submit for the following:
 - 1. Flexible metal conduit.
 - 2. Liquidtight flexible metal conduit.
 - 3. Nonmetallic conduit.
 - 4. Flexible nonmetallic conduit.
 - 5. Nonmetallic tubing.
 - 6. Raceway fittings.
 - 7. Conduit bodies.
 - 8. Surface raceway.
 - 9. Wireway.

- 10. Pull and junction boxes.
- 11. Handholes.
- 12. PVC coated metal conduit.
- C. Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.7 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents:
 - 1. Record actual routing of conduits larger than 1 inch.
 - 2. Record actual locations and mounting heights of outlet, pull, and junction boxes.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 Product Requirements: Product storage and handling requirements.
- B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- C. Protect PVC conduit from sunlight.

1.9 COORDINATION

- A. Section 01 30 00 Administrative Requirements: Coordination and project conditions.
- B. Coordinate installation of outlet boxes for equipment connected under Section 26 05 03.
- C. Coordinate mounting heights, orientation and locations of outlets mounted above counters, benches, and backsplashes.

PART 2 PRODUCTS

2.1 METAL CONDUIT

- A. Manufacturers:
 - 1. Allied Tube & Conduit; a part of Atkore International
 - 2. EGS/Appleton Electric
 - 3. Thomas & Betts Corporation; A Member of the ABB Group
 - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. Rigid Aluminum Conduit: ANSI C80.5.

- D. Intermediate Metal Conduit (IMC): Rigid steel.
- E. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

2.2 PVC COATED METAL CONDUIT

- A. Manufacturers:
 - 1. Plasti-Bond
 - 2. Thomas & Betts Corporation; A Member of the ABB Group
 - 3. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description: NEMA RN 1; rigid steel conduit with external PVC coating, 40 mil thick.
- C. Fittings and Conduit Bodies: NEMA FB 1; steel fittings with external PVC coating to match conduit.

2.3 FLEXIBLE METAL CONDUIT

- A. Product Description: Interlocked steel construction.
- B. Fittings: NEMA FB 1.

2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- A. Manufacturers:
 - 1. AFC Cable Systems; a part of Atkore International
 - 2. EGS/Appleton Electric
 - 3. Southwire Company
 - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description: Interlocked steel construction with PVC jacket.
- C. Fittings: NEMA FB 1.

2.5 ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers:
 - 1. Carlon; a brand of Thomas & Betts Corporation
 - 2. Republic Conduit
 - 3. Western Tube and Conduit Corporation
 - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description: ANSI C80.3; galvanized tubing.
- C. Fittings and Conduit Bodies: NEMA FB 1; steel or malleable iron, compression type.

2.6 NONMETALLIC CONDUIT

- A. Manufacturers:
 - 1. Carlon; a brand of Thomas & Betts Corporation
 - 2. EGS/Appleton Electric
 - 3. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description: NEMA TC 2; Schedule 40 PVC.
- C. Fittings and Conduit Bodies: NEMA TC 3.

2.7 NONMETALLIC TUBING

- A. Manufacturers:
 - 1. Carlon; a brand of Thomas & Betts Corporation
 - 2. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description: NEMA TC 2.
- C. Fittings and Conduit Bodies: NEMA TC 3.

2.8 SURFACE METAL RACEWAY

- A. Manufacturers:
 - 1. Niedax Inc
 - 2. Panduit Corp.
 - 3. Wiremold / Legrand
 - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description: Sheet metal channel with fitted cover, suitable for use as surface metal raceway.
- C. Size: Per Code plus additional 25% spare, unless otherwise indicated.
- D. Finish: Gray enamel. Stainless steel in hazardous locations or where corrosive elements are present.
- E. Fittings, Boxes, and Extension Rings: Furnish manufacturer's standard accessories; match finish on raceway.

2.9 SURFACE NONMETAL RACEWAY

- A. Manufacturers:
 - 1. Panduit Corp.
 - 2. Wiremold / Legrand
 - 3. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description: Plastic channel with fitted cover, suitable for use as surface raceway.

- C. Size: Per Code plus additional 25% spare, unless otherwise indicated.
- D. Finish: Gray.
- E. Fittings, Boxes, and Extension Rings: Furnish manufacturer's standard accessories, finish to match raceway.

2.10 WIREWAY

- A. Manufacturers:
 - 1. Carlon; a brand of Thomas & Betts Corporation
 - 2. Hoffman; a brand of Pentair Equipment Protection
 - 3. Square D; by Schneider Electric
 - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description: General purpose, Oil-tight and dust-tight, or Raintight type wireway. Product rating shall match NEMA Rating for enclosures in same location.
- C. Knockouts: Manufacturer's standard. Bottom only in Wet, Damp or Outdoor locations.
- D. Size: 4 x 4 inch, 6 x 6 inch, 8 x 8 inch, and 12 x 12 inch; length as indicated on Drawings.
- E. Cover: Hinged or Screw cover with full gaskets.
- F. Connector: Slip-in or Flanged.
- G. Fittings: Lay-in type with removable top, bottom, and side; captive screws and drip shield.
- H. Finish: Rust inhibiting primer coating with gray enamel finish.
- I. Product Description: Raintight type wireway.
- J. Knockouts: Manufacturer's standard.

2.11 OUTLET BOXES

- A. Manufacturers:
 - 1. Allied Moulded Products, Inc
 - 2. Carlon; a brand of Thomas & Betts Corporation
 - 3. RACO; Hubbell
 - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
 - 1) Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; furnish 1/2-inch male fixture studs where required.
 - 2) Concrete Ceiling Boxes: Concrete type.
- C. Nonmetallic Outlet Boxes: NEMA OS 2.
- D. Cast Boxes: NEMA FB 1, Type FD, cast feraloy. Furnish gasketed cover by box manufacturer. Furnish threaded hubs.
- E. Wall Plates for Finished Areas: As required for location area.
- F. Wall Plates for Unfinished Areas: Furnish gasketed cover.

2.12 PULL AND JUNCTION BOXES

- A. Manufacturers:
 - 1. Emerson Process Management; Rosemount Division
 - 2. Hoffman; a brand of Pentair Equipment Protection
 - 3. RACO; Hubbell
 - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Sheet Metal Boxes: NEMA OS 1, galvanized steel.
- C. Hinged Enclosures: As required for area classification.
- D. Surface Mounted Cast Metal Box: NEMA 250, Type 4, 4X or 6 (per environmental conditions); flat-flanged, surface mounted junction box:
 - 1. Material: Galvanized cast iron.
 - 2. Cover: Furnish with ground flange, neoprene gasket, and stainless-steel cover screws.
- E. In-Ground Cast Metal Box: NEMA 250, Type 6, flanged, recessed cover box for flush mounting:
 - 1. Material: Galvanized cast iron.
 - 2. Cover: Smooth or Nonskid cover (to match surrounding surfaces) with neoprene gasket and stainless-steel cover screws.
 - 3. Cover Legend: "ELECTRIC" unless otherwise indicated.
- F. Fiberglass Concrete composite Handholes: Die-molded, glass-fiber concrete composite hand holes:
 - 1. Cable Entrance: Pre-cut 6 inch x 6 inch cable entrance at center bottom of each side.
 - 2. Cover: Glass-fiber concrete composite, weatherproof cover with nonskid finish
- G. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
 - 1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; furnish 1/2 inch male fixture studs where required.
 - 2. Concrete Ceiling Boxes: Concrete type.
- H. Nonmetallic Outlet Boxes: NEMA OS 2.
- I. Cast Boxes: NEMA FB 1, Type FD, aluminum. Furnish gasketed cover by box manufacturer. Furnish threaded hubs.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 Administrative Requirements: Coordination and project conditions.
- B. Verify outlet locations and routing and termination locations of raceway prior to rough-in.

3.2 EXISTING WORK

- A. Remove exposed abandoned raceway. Cut raceway flush with walls and floors, and patch surfaces.
- B. Remove concealed abandoned raceway to its source.
- C. Disconnect abandoned outlets and remove devices. Remove abandoned outlets when raceway is abandoned and removed. Install blank cover for abandoned outlets not removed.
- D. Maintain access to existing boxes and other installations remaining active and requiring access. Modify installation or provide access panel.
- E. Extend existing raceway and box installations using materials and methods compatible with existing electrical installations, or as specified.
- F. Clean and repair existing raceway and boxes to remain or to be reinstalled.

3.3 INSTALLATION

- A. Ground and bond raceway and boxes in accordance with Section 26 05 26.
- B. Fasten raceway and box supports to structure and finishes in accordance with Section 26 05 29.
- C. Identify raceway and boxes in accordance with Section 26 05 53.
- D. Arrange raceway and boxes to maintain headroom and present neat appearance.
- E. Install Work in accordance with State of Michigan.

3.4 INSTALLATION - RACEWAY

- A. Raceway routing is shown in approximate locations unless dimensioned. Route to complete wiring system.
- B. Arrange raceway supports to prevent misalignment during wiring installation.
- C. Support raceway using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- D. Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports

- E. Do not attach raceway to ceiling support wires or other piping systems.
- F. Construct wireway supports from steel channel specified in Section 26 05 29.
- G. Route exposed raceway parallel and perpendicular to walls.
- H. Route raceway installed above accessible ceilings parallel and perpendicular to walls.
- I. Route conduit in and under slab from point-to-point.
- J. Maximum Size Conduit in Slab Above Grade: 3/4 inch. Do not cross conduits in slab.
- K. Maintain clearance between raceway and piping for maintenance purposes.
- L. Maintain 12-inch clearance between raceway and surfaces with temperatures exceeding 104 degrees F.
- M. Cut conduit square using saw or pipe cutter; de-burr cut ends.
- N. Bring conduit to shoulder of fittings; fasten securely.
- O. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for minimum 20 minutes.
- P. Install conduit hubs to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.
- Q. Install no more than equivalent of three 90-degree bends between boxes. Install conduit bodies to make sharp changes in direction, as around beams. Install hydraulic one-shot bender to fabricate bends in metal conduit larger than 2-inch size.
- R. Avoid moisture traps; install junction box with drain fitting at low points in conduit system.
- S. Install fittings to accommodate expansion and deflection where raceway crosses expansion joints.
- T. Install suitable pull string or cord in each empty raceway except sleeves and nipples.
- U. Install suitable caps to protect installed conduit against entrance of dirt and moisture.
- V. Surface Raceway: Install flat-head screws, clips, and straps to fasten raceway channel to surfaces; mount plumb and level. Install insulating bushings and inserts at connections to outlets and corner fittings.
- W. Close ends and unused openings in wireway.

3.5 INSTALLATION - BOXES

A. Install wall mounted boxes at elevations to accommodate mounting heights.

- B. Adjust box location up to 10 feet prior to rough-in to accommodate intended purpose.
- C. Orient boxes to accommodate wiring devices.
- D. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- E. In Accessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- F. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- G. Do not install flush mounting box back-to-back in walls; install with minimum 6 inches separation. Install with minimum 24 inches separation in acoustic rated walls.
- H. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- I. Install stamped steel bridges to fasten flush mounting outlet box between studs.
- J. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- K. Install adjustable steel channel fasteners for hung ceiling outlet box.
- L. Do not fasten boxes to ceiling support wires or other piping systems.
- M. Support boxes independently of conduit.
- N. Install gang box where more than one device is mounted together. Do not use sectional box.
- O. Install gang box with plaster ring for single device outlets.

3.6 INTERFACE WITH OTHER PRODUCTS

A. Route conduit through walls as required without interfering with other products.

3.7 ADJUSTING

- A. Section 01 70 00 Execution and Closeout Requirements: Testing, adjusting, and balancing.
- B. Adjust flush-mounting outlets to make front flush with finished wall material.
- C. Install knockout closures in unused openings in boxes.

3.8 CLEANING

- A. Section 01 70 00 Execution and Closeout Requirements: Final cleaning.
- B. Clean interior of boxes to remove dust, debris, and other material.

C. Clean exposed surfaces and restore finish.

SECTION 26 05 53 IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Nameplates.
 - 2. Labels.
 - 3. Wire markers.
 - 4. Conduit markers.
 - 5. Stencils.
 - 6. Underground Warning Tape.
 - 7. Lockout Devices.

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Identification for electrical systems:
 - 1. Basis of Measurement: Included in the lump sum price for generator.
 - 2. Basis of Payment: Includes all labor, material, equipment required for identification for electrical systems as shown on the contract documents or as stated in the specifications.

1.3 REFERENCES

- A. NFPA: National Fire Protection Association
 - 1. NFPA 70 National Electric Code

1.4 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Submittal procedures.
- B. Product Data:
 - 1. Submit manufacturer's catalog literature for each product required.
 - 2. Submit electrical identification schedule including list of wording, symbols, letter size, color coding, tag number, location, and function.
- C. Manufacturer's Installation Instructions: Indicate installation instructions, special procedures, and installation.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of tagged devices; include tag numbers.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with NFPA 70.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years experience.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept identification products on site in original containers. Inspect for damage.
- C. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.
- D. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Environmental conditions affecting products on site.
- B. Install labels only when ambient temperature and humidity conditions for adhesive are within range recommended by manufacturer.

PART 2 PRODUCTS

2.1 NAMEPLATES

- A. Furnish materials in accordance with State of Michigan and Authority having jurisdiction standards.
- B. Product Description: Laminated three-layer plastic with engraved black letters on white contrasting background color.

C. Letter Size:

- 1. 1/8 inch high letters for identifying individual equipment and loads.
- 2. 1/4 inch high letters for identifying grouped equipment and loads.
- D. Minimum nameplate thickness: 1/8 inch.

2.2 LABELS

- A. Furnish materials in accordance with State of Michigan and Authority having jurisdiction standards.
- B. Labels: Embossed adhesive tape, with 3/16 inch white letters on black background.

2.3 WIRE MARKERS

- A. Furnish materials in accordance with State of Michigan and Authority having jurisdiction standards.
- B. Description: Cloth tape, split sleeve, or tubing type wire markers.
- C. Legend:
 - 1. Power and Lighting Circuits: Branch circuit or feeder number as indicated on Drawings.
 - 2. Control Circuits: Control wire number as indicated on shop drawings.

2.4 CONDUIT AND RACEWAY MARKERS

- A. Furnish materials in accordance with State of Michigan and Authority having jurisdiction standards.
- B. Description: Nameplate fastened with straps.
- C. Color:
 - 1. Medium Voltage System: Black lettering on white background.
 - 2. 480 Volt System: Black lettering on white background.
 - 3. 208 Volt System: Black lettering on white background.

D. Legend:

- 1. Medium Voltage System: HIGH VOLTAGE.
- 2. 480 Volt System: 480 VOLTS.
- 3. 208 Volt System: 208 VOLTS.

2.5 STENCILS

- A. Furnish materials in accordance with State of Michigan and Authority having jurisdiction standards.
- B. Stencils: With clean cut symbols and letters of following size:
 - 1. Up to 2 inches Outside Diameter of Raceway: 1/2 inch high letters.
 - 2. 2-1/2 to 6 inches Outside Diameter of Raceway: 1 inch high letters.
- C. Stencil Paint: Colors conforming to the following:
 - 1. Black lettering on white background.
 - 2. White lettering on gray background.
 - 3. Red lettering on white background.
 - 4. Blue lettering on white background.

2.6 UNDERGROUND WARNING TAPE

A. Description: 4 inch wide plastic tape, detectable type, colored yellow with suitable warning legend describing buried electrical lines.

2.7 LOCKOUT DEVICES

- A. Lockout Hasps:
 - 1. Reinforced nylon hasp with erasable label surface; size minimum $7-1/4 \ge 3$ inches.

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

- A. Install identifying devices after completion of painting.
- B. Nameplate Installation:
 - 1. Install nameplate parallel to equipment lines.
 - 2. Install nameplate for each electrical distribution and control equipment enclosure with corrosive-resistant mechanical fasteners, or adhesive.
 - 3. Install nameplates for each control panel and major control components located outside panel with corrosive-resistant mechanical fasteners, or adhesive.
 - 4. Secure nameplate to equipment front using screws, rivets, or adhesive.
 - 5. Secure nameplate to inside surface of door on recessed panelboard in finished locations.
 - 6. Install nameplates for the following:
 - a. Switchboards.
 - b. Panelboards.
 - c. Transformers.
 - d. Service Disconnects.
- C. Label Installation:
 - 1. Install label parallel to equipment lines.
 - 2. Install label for identification of individual control device stations.
 - 3. Install labels for permanent adhesion and seal with clear lacquer.
- D. Wire Marker Installation:
 - 1. Install wire marker for each conductor at panelboard gutters, pull boxes, outlet and junction boxes, and each load connection.
 - 2. Mark data cabling at each end. Install additional marking at accessible locations along the cable run.
 - 3. Install labels at data outlets identifying patch panel and port designation.
- E. Conduit Marker Installation:
 - 1. Install conduit marker for each conduit longer than 6 feet.

- 2. Conduit Marker Spacing: 20 feet on center.
- 3. Raceway Painting: Identify conduit using field painting.
 - a. Paint colored band on each conduit longer than 6 feet.
 - b. Paint bands 20 feet on center.
 - c. Color:
 - 1) 480 Volt System: Blue.
 - 2) 208 Volt System: Yellow.
- F. Stencil Installation:
 - 1. Apply stencil painting in a neat and clean manner that's straight and clearly readable.
- G. Install Work in accordance with State of Michigan and Authority having jurisdiction Standards.

SECTION 26 05 83 WIRING CONNECTIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes electrical connections to equipment.
- B. Related Sections:
 - 1. Section 26 05 19 Low-Voltage Electrical Power Conductors and Cables.
 - 2. Section 26 05 33 Raceway and Boxes for Electrical Systems.

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Wiring Connections:
 - 1. Basis of Measurement: Included in the lump sum price for generator.
 - 2. Basis of Payment: Includes all labor, material, equipment required for wiring connections as shown on the contract documents or as stated in the specifications.

1.3 REFERENCES

- A. National Electrical Manufacturers Association:
 - 1. NEMA WD 1 General Requirements for Wiring Devices.
 - 2. NEMA WD 6 Wiring Devices-Dimensional Requirements.

1.4 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Submittal procedures.
- B. Product Data: Submit wiring device manufacturer's catalog information showing dimensions, configurations, and construction.
- C. Manufacturer's installation instructions.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 Execution and Closeout Requirements: Submittal procedures.
- B. Project Record Documents: Record actual locations, sizes, and configurations of equipment connections.

1.6 COORDINATION

- A. Section 01 30 00 Administrative Requirements: Coordination and project conditions.
- B. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.

- C. Determine connection locations and requirements.
- D. Sequence rough-in of electrical connections to coordinate with installation of equipment.
- E. Sequence electrical connections to coordinate with start-up of equipment.

PART 2 - PRODUCTS

2.1 CORD AND PLUGS

- A. Manufacturers:
 - 1. Leviton Manufacturing Co., Inc.
 - 2. Pass & Seymour/Legrand (Pass & Seymour).
 - 3. Square D; by Schneider Electric.
 - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Attachment Plug Construction: Conform to NEMA WD 1.
- C. Configuration: NEMA WD 6; match receptacle configuration at outlet furnished for equipment.
- D. Cord Construction: Type SO or SJO multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
- E. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 Administrative Requirements: Coordination and project conditions.
- B. Verify equipment is ready for electrical connection, for wiring, and to be energized.

3.2 EXISTING WORK

- A. Remove exposed abandoned equipment wiring connections, including abandoned connections above accessible ceiling finishes.
- B. Disconnect abandoned utilization equipment and remove wiring connections. Remove abandoned components when connected raceway is abandoned and removed. Install blank cover for abandoned boxes and enclosures not removed.
- C. Extend existing equipment connections using materials and methods compatible with existing electrical installations, or as specified.

3.3 INSTALLATION

- A. Make electrical connections.
- B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.
- C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- D. Install receptacle outlet to accommodate connection with attachment plug.
- E. Install cord and cap for field-supplied attachment plug.
- F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- H. Install terminal block jumpers to complete equipment wiring requirements.
- I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.
- J. Coolers and Freezers: Cut and seal conduit openings in freezer and cooler walls, floor, and ceilings.
- K. Classified Areas: Install and seal conduits and openings as required per classified area per NEC.

3.4 ADJUSTING

- A. Section 01 70 00 Execution and Closeout Requirements: Testing, adjusting, and balancing.
- B. Cooperate with utilization equipment installers and field service personnel during checkout and starting of equipment to allow testing and balancing and other startup operations. Provide personnel to operate electrical system and checkout wiring connection components and configurations.

SECTION 26 32 13 ENGINE GENERATORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes engine generator set, radiator, exhaust silencer and fittings, transfer switch, fuel fittings and fuel tank, control panel, load bank, battery, coolant heater and charger.
- B. Related Sections:
 - 1. Section 26 05 26 Grounding and Bonding for Electrical Systems.
 - 2. Section 26 05 53 Identification for Electrical Systems.

1.2 REFERENCES

- A. National Electrical Manufacturers Association:
 - 1. NEMA 250 Enclosures for Electrical Equipment (1000 Volts Maximum).
 - 2. NEMA ICS 10 Industrial Control and Systems: AC Transfer Switch Equipment.
 - 3. NEMA MG 1 Motors and Generators.
- B. International Electrical Testing Association:
 - 1. NETA ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- C. National Fire Protection Association:
 - 1. NFPA 30 Flammable and Combustible Liquids Code.
 - 2. NFPA 37 Installation and Use of Stationary Combustion Engines.
 - 3. NFPA 70 National Electrical Code.
 - 4. NFPA 110 Standard for Emergency and Standby Power Systems.
- D. Underwriters Laboratories Inc.:
 - 1. UL 489 Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures.
 - 2. UL 2200 Standard for Stationary Engine Generator Assemblies.
- E. American Society of mechanical Engineers:
 - 1. ASME B15.1 Safety Standards for Mechanical Power Transmission Apparatus.

1.3 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Packaged Engine Generators:
 - 1. Basis of Measurement: Included in the unit price bid for Generator.
 - 2. Basis of Payment: Includes all labor, materials, and equipment to provide and install packaged engine generators and appurtenances as shown on the contract documents and as stated in the specifications.

1.4 SYSTEM DESCRIPTION

- A. Description: Engine generator assembly and accessories to provide source of power for Level 1 applications in accordance with NFPA 110.
- B. Capacity: As specified on the Drawings or Packaged Engine Generator Schedule.
- C. Elevation Above Sea Level: As specified on the Drawings or Packaged Engine Generator Schedule.
- D. Standby rated using specified engine cooling scheme.

1.5 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate electrical characteristics and connection requirements. Include plan and elevation views with overall and interconnection point dimensions, fuel consumption rate curves at various loads, ventilation and combustion air requirements, electrical diagrams including schematic and interconnection diagrams.
- C. Product Data: Submit data showing dimensions, weights, ratings, interconnection points, and internal wiring diagrams for engine, generator, control panel, transfer switch, battery, battery rack, battery charger, exhaust silencer, vibration isolators, day tank, and remote radiator.
- D. Test Reports: Indicate results of performance testing.
- E. Manufacturer's Field Reports: Indicate inspections, findings, and recommendations.

1.6 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 Execution and Closeout Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit instructions and service manuals for normal operation, routine maintenance, oil sampling and analysis for engine wear, and emergency maintenance procedures.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience, and with service facilities within 100 miles of project.
- B. Supplier: Authorized distributor of specified manufacturer with minimum three years documented experience.

1.8 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Furnish five-year manufacturer warranty.

1.9 MAINTENANCE MATERIALS

- A. Section 01 70 00 Execution and Closeout Requirements: Spare parts and maintenance products.
- B. Furnish one set of tools required for preventative maintenance of engine generator system. Package tools in adequately sized metal toolbox.
- C. Furnish two of each fuel, oil and air filter element.

PART 2 - PRODUCTS

2.1 ENGINE AND GENERATOR

- A. <u>Manufacturers</u>:
 - 1. Cummins Power Generation.
 - 2. Or approved equal.
 - a. Substitutions: Section 01 60 00 Product Requirements.

B. Engine:

- 1. Product Description: Water-cooled in-line or V-type, four-stroke cycle, electric ignition internal combustion engine.
- 2. Rating: Sufficient to operate under 10 percent overload for one hour in ambient of 90 degrees F.
- 3. Fuel System: As specified on the Drawings or Packaged Engine Generator Schedule.
- 4. Engine speed: 1800 rpm or less.
- 5. Safety Devices: Engine shutdown on high water temperature, low oil pressure, overspeed, and engine overcrank. Limits as selected by manufacturer.
- 6. Engine Starting: DC starting system with positive engagement, number and voltage of starter motors in accordance with manufacturer's instructions. Furnish remote starting control circuit, with MANUAL-OFF-REMOTE selector switch on engine-generator control panel.
- 7. Engine Jacket Heater: Thermal circulation type water heater with integral thermostatic control, sized to maintain engine jacket water at 90 degrees F, and suitable for operation on 120 volts AC.
- 8. Radiator: Radiator using glycol coolant, with blower type fan, sized to maintain safe engine temperature in ambient temperature of 110 degrees F Radiator air flow restriction 0.5 inches of water maximum.
- 9. Engine Accessories: Fuel filter, lube oil filter, intake air filter, lube oil cooler, fuel transfer pump, fuel priming pump, gear-driven water pump. Furnish fuel pressure gage, water temperature gage, and lube oil pressure gage on engine/generator control panel.
- 10. Mounting: Furnish unit with suitable spring-type vibration isolators and mount on structural steel base.
- C. Generator:
 - 1. Product Description: NEMA MG1, single phase and three phase, reconnectable brushless synchronous generator with brushless exciter.
 - 2. Insulation Class: F.

- 3. Temperature Rise: 120 degrees C Standby.
- 4. Enclosure: NEMA MG1, open drip proof.
- 5. Voltage Regulation: Furnish generator mounted volts per hertz exciter-regulator to match engine and generator characteristics, with voltage regulation plus or minus 1 percent from no load to full load. Furnish manual controls to adjust voltage droop, voltage level (plus or minus 5 percent) and voltage gain.
- D. Governor:
 - 1. Product Description: Isochronous governor to maintain engine speed within 0.5 percent, steady state, and 5 percent, no load to full load, with recovery to steady state within 2 seconds following sudden load changes. Equip governor with means for manual operation and adjustment.
- E. Sub Base Fuel Tank:
 - 1. Product Description: Fuel tank unit with dual integral pumps and level control.
 - 2. Capacity: As specified on the Drawings or Packaged Engine Generator Schedule.
 - 3. Furnish flexible fuel line connections, fuel gage, check valve, high fuel level alarm contact, and indicating light.
 - 4. Pump Motor: 120 volts AC.
 - 5. Conform to NFPA 30 and UL-142.
 - 6. Fuel filling locations shall have a spill containment box. High fuel level alarm shall be provided and connected to alarm notification system.
 - 7. Fuel tank shall be dual walled to meet MDEQ standards.
 - 8. Contractor shall fill fuel tank with recommended fuel per manufacturer. Approximately 78 gallons.
- F. Automatic Transfer Switch Service Rated
 - 1. Transfer Switch shall be supplied by generator manufacturer.
 - 2. Product Description: NEMA ICS 10, automatic transfer switch.
 - 3. Configuration: Electrically operated, mechanically held transfer switch.
 - 4. Control Features and Functions:
 - 5. Digital display with lockable cover.
 - 6. Indicating Lights: Mount in cover of enclosure to indicate NORMAL SOURCE AVAILABLE, ALTERNATE SOURCE AVAILABLE, switch position.
 - 7. Test Switch: Mount in cover of enclosure to simulate failure of normal source.
 - 8. Return to Normal Switch: Mount in cover of enclosure to initiate manual transfer from alternate source to normal source.
 - 9. Transfer Switch Auxiliary Contacts: 1 normally open; 1 normally closed.
 - 10. Normal Source Monitor: Monitor each line of normal source voltage and frequency; initiate transfer when voltage drops below 85 percent or frequency varies more than 3 percent Hertz from rated nominal value.
 - 11. Alternate Source Monitor: Monitor alternate source voltage and frequency; inhibit transfer when voltage is below 85 percent or frequency varies more than 3 percent Hertz from rated nominal value.
 - 12. Switched Neutral: Non-Overlapping contacts.
 - 13. Daylight savings time capable.
- G. Automatic Sequence of Operation:

- 1. Initiate Time Delay to Start Alternate Source Engine Generator: Upon initiation by normal source monitor.
- 2. Time Delay to Start Alternate Source Engine Generator: 0 to 120 seconds, adjustable.
- 3. Initiate Transfer Load to Alternate Source: Upon initiation by normal source monitor and permission by alternate source monitor.
- 4. Time Delay Before Transfer to Alternate Power Source: 0 to 120 seconds, adjustable.
- 5. Initiate Retransfer Load to Normal Source: Upon permission by normal source monitor.
- 6. Time Delay Before Transfer to Normal Power: 0 to 120 seconds, adjustable; bypass time delay in event of alternate source failure.
- 7. Time Delay Before Engine Shut Down: 0 to 30 minutes, adjustable, of unloaded operation.
- 8. Engine Exerciser: Start engine every 7 days; run for 30 minutes before shutting down.
- 9. Alternate System Exerciser: Transfer load to alternate source during engine exercising period.

H. Enclosure:

- 1. Enclosure:
 - a. ICS 10
 - b. Indoor: Type 1
 - c. Outdoor: Type 3R or 4X
- 2. Finish: Manufacturer's standard enamel or stainless steel.

2.2 ACCESSORIES

- A. Skid-Mounted Fuel Tank:
 - 1. With fill and vent.
 - 2. Capacity: As specified on the Drawings or Packaged Engine Generator Schedule.
 - 3. Contractor shall fill fuel tank before load bank testing. Approximately 78 gallons.
- B. Exhaust Silencer: Residential type silencer, with muffler companion flanges and flexible stainless-steel exhaust fitting, sized in accordance with engine manufacturer's instructions.
- C. Batteries: Heavy duty, diesel starting type lead-acid storage batteries, 170 ampere-hours minimum capacity. Match battery voltage to starting system. Furnish cables and clamps.
- D. Battery Tray: Treated for electrolyte resistance, constructed to contain spillage.
- E. Battery Charger: Current limiting type designed to float at 2.17 volts for each cell and equalize at 2.33 volts for each cell. Furnish overload protection, full wave rectifier, DC voltmeter and ammeter, and 120 volts AC fused input. Furnish wall mounted enclosure to meet NEMA 250, Type 1 requirements.
- F. Line Circuit Breaker: UL 489, molded case circuit breaker on generator output with integral thermal and instantaneous magnetic trip in each pole. Furnish battery voltage operated shunt trip, connected to open circuit breaker on engine failure. Unit mount in enclosure to meet NEMA 250, Type 1 requirements.
- G. Engine-Generator Control Panel: NEMA 250, Type 1 generator-mounted control panel enclosure with engine and generator controls and indicators. Furnish provision for padlock and the following equipment and features:

- 1. Frequency Meter: 45-65 Hz. range, 3.5 inch dial.
- 2. AC Output Voltmeter: 3.5 inch dial, 2 percent accuracy, with phase selector switch.
- 3. AC Output Ammeter: 3.5 inch dial, 2 percent accuracy, with phase selector switch.
- 4. Output voltage adjustment.
- 5. Push-to-test indicator lamps, one each for low oil pressure, high water temperature, overspeed, and overcrank.
- 6. Engine start/stop selector switch.
- 7. Engine running time meter.
- 8. Oil pressure gage.
- 9. Water temperature gage.
- 10. Auxiliary Relay: 3PDT, operates when engine runs, with contact terminals prewired to terminal strip.
- 11. Additional visual indicators and alarms in accordance with by NFPA 110.
- 12. Remote Alarm Contacts: Factory wire SPDT contacts to terminal strip for remote alarm functions in accordance with NFPA 110.
- H. Weather-protective Enclosure: Reinforced steel housing allowing access to control panel and service points, with lockable doors and panels. Furnish fixed louvers, fuel tank, battery rack, and silencer.
 - 1. Factory-assembled to generator set base and radiator cowling.
 - 2. Nosie emitting from generator shall not exceed 72 dba at 23 feet.
- I. Load Bank:
 - 1. Complete 2 hour load bank for pacing resistive load on generator.
 - 2. Complete with transfer switches, disconnect, ventilation fans and enclosure.
- J. All safety hazards including physical, chemical, and electrical shall be properly labeled. Flammable, hazardous, toxic, and corrosive substances, etc., shall be properly labeled and identified as to their specific hazards.
- K. The rotating and moving parts (any belts, pulleys, drive shafts, fly wheels) that may be part of the engine/generator shall be properly guarded and have lockout provisions where applicable.

2.3 SOURCE QUALITY CONTROL

A. Provide shop inspection and testing of completed assembly.

PART 3 - EXECUTION

- 3.1 EXISTING WORK NOT USED
- 3.2 INSTALLATION
 - A. Install engraved plastic nameplates in accordance with Section 26 05 53.
 - B. Ground and bond generator and other electrical system components in accordance with Section 26 05 26.

3.3 FIELD QUALITY CONTROL

- A. Section 01 40 00 Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.22.

3.4 MANUFACTURER'S FIELD SERVICES

- A. Section 01 40 00 Quality Requirements: Manufacturer's field services.
- B. Prepare and start up engine-generator assembly.

3.5 ADJUSTING

- A. Section 01 70 00 Execution and Closeout Requirements: Testing, adjusting, and balancing.
- B. Adjust generator output voltage and engine speed to meet specified ratings.

3.6 CLEANING

- A. Section 01 70 00 Execution and Closeout Requirements: Final cleaning.
- B. Clean engine and generator surfaces.

3.7 DEMONSTRATION AND TRAINING

- A. Furnish 8 hours of instruction each for two persons, to be conducted at project site with manufacturer's representative.
- B. Describe loads connected to emergency and standby system and restrictions for future load additions.
- C. Simulate power outage by interrupting normal source, and demonstrate system operates to provide emergency and standby power.

3.8 ATTACHMENTS

A. None.

SECTION 31 05 13 SOILS FOR EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Subsoil materials.
 - 2. Topsoil materials.

B. Related Sections:

- 1. Section 31 05 16 Aggregates for Earthwork.
- 2. Section 31 22 13 Rough Grading.
- 3. Section 31 23 17 Trenching.
- 4. Section 32 91 19 Landscape Grading.
- 5. Section 32 92 19 Seeding and Soil Supplements.

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Soils for earthwork:
 - 1. Basis of Measurement: Included in the lump sum price for generator.
 - 2. Basis of Payment: Includes all labor, material, equipment required for soils for earthwork as shown on the contract documents or as stated in the specifications.

1.3 REFERENCES

- A. American Association of State Highway and Transportation Officials:
 - 1. AASHTO T180 Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- B. ASTM International:
 - 1. ASTM D698 Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3).
 - 2. ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3).
 - 3. ASTM D2487 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

1.4 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Requirements for submittals.
- B. Samples: Maybe requested for submittal by the Engineer for testing. Submit, in air-tight containers, 10 lb sample of each type of fill to testing laboratory.
- C. Materials Source: Submit name of imported materials source.

D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Furnish each subsoil and topsoil material from single source throughout the Work. A second source maybe requested for approval by the Engineer.
- B. Perform Work in accordance with Local, State, and Federal Standards.
- C. Maintain one copy on site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Type S1: MDOT Class II granular material for dry excavation, compacted to 95 percent of maximum density.
- B. Type S2: Acceptable Native Subsoil: Reused, free of gravel larger than 3 inch size, and debris, compacted to 95 percent of maximum density.
- C. Type S3: Topsoil material conforming to MDOT Standard Specifications for Construction.

D. Type S4:

- 1. Native Topsoil.
- 2. Graded.
- Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.
 a. Screening: Double screened.

E. Type S5:

- 1. Imported borrow.
- 2. Friable loam.
- 3. Reasonably free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds, and foreign matter.
 - a. Screening: Double screened.
- 4. Acidity range (pH) of 5.5 to 7.5.
- 5. Containing minimum of 4 percent and maximum of 25 percent inorganic matter.

2.2 COARSE AGGREGATE MATERIALS

A. Type A1: Coarse aggregate conforming to Class 6A as specified in the MDOT Standard Specifications for Construction.

2.3 DENSE GRADED AGGREGRATE MATERIALS

A. Type A2: Dense graded aggregate conforming to Class 22A as specified in the MDOT Standard Specifications for Construction.

B. Type A3: Dense graded aggregate conforming to class 23A as specified in the MDOT Standard Specifications for Construction.

2.4 FINE AGGREGATE MATERIALS

- A. Type A5 (Sand): Fine graded aggregate conforming to Class II (2NS) as specified in the MDOT Standard Specifications for Construction.
- B. Type A6 (Sand): Fine graded aggregate conforming to Class IIIA as specified in the MDOT Standard Specifications for Construction.

2.5 SOURCE QUALITY CONTROL

- A. Section 014000 Quality Requirements: Testing and Inspection Services Testing and analysis of soil material.
- B. Testing and Analysis of Subsoil Material: Perform in accordance with AASHTO T180.
- C. Testing and Analysis of Topsoil Material: Perform in accordance with AASHTO T180.
- D. When tests indicate materials do not meet specified requirements, change material and retest.
- E. Furnish materials of each type from same source throughout the Work.

PART 3 - EXECUTION

3.1 EXCAVATION

- A. Excavate subsoil and topsoil from areas designated. Strip topsoil to full depth of topsoil in designated areas.
- B. Stockpile excavated material meeting requirements for subsoil materials and topsoil materials.
- C. Remove excess excavated materials subsoil and topsoil not intended for reuse, from site.
- D. Remove excavated materials not meeting requirements for subsoil materials and topsoil materials from site.

3.2 STOCKPILING

- A. Stockpile materials on site at locations approved by the Engineer.
- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate differing materials with dividers or stockpile apart to prevent mixing.
- D. Stockpile topsoil 8 feet high maximum.
- E. Prevent intermixing of soil types or contamination.

- F. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
- G. Stockpile unsuitable or hazardous materials on impervious material and cover to prevent erosion and leaching, until disposed of.

3.3 STOCKPILE CLEANUP

A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

SECTION 31 05 16 AGGREGATES FOR EARTHWORK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Coarse aggregate materials.
 - 2. Fine aggregate materials.

B. Related Sections:

- 1. Section 31 05 13 Soils for Earthwork: Fill and grading materials.
- 2. Section 31 23 17 Trenching.

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Aggregates for Earthwork:
 - 1. Basis of Measurement: Included in the lump sum price for generator.
 - 2. Basis of Payment: Includes all material, labor and equipment required for aggregates for earthwork as shown on the contract documents and as stated in the specifications.

1.3 REFERENCES

- A. American Association of State Highway and Transportation Officials:
 - 1. AASHTO M147 Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses.
 - 2. AASHTO T180 Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- B. ASTM International:
 - 1. ANSI/ASTM C117 Test Method for Materials finer than 75 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - 2. ASTM C136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - 3. ASTM D698 Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
 - 4. ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
 - 5. ASTM D2487 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
 - 6. ASTM D2992 Test Methods of Density of Soil and Soil Aggregate in Place by the Nuclear Method (Shallow Depth).
 - 7. ASTM D4318 Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 - 8. Test method for density of soil in place with loss by wash less than 15% One Point Michigan Cone Test.
 - 9. Test method for density of soil in place with loss by was greater than 15% One Point T-99 Test.

10. MDOT 2012 Standard Specifications for Construction.

1.4 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Requirements for submittals.
- B. Samples: May be requested for submittal by the Engineer for testing.
- C. Materials Source: Submit name of imported materials suppliers.
- D. Manufacturer's Certificate: Certify Products meet or exceed Michigan Department of Transportation 22A crush limestone specification or 6A.

1.5 QUALITY ASSURANCE

- A. Furnish each aggregate material from single source throughout the Work.
- B. Perform Work in accordance with State of Michigan standard for construction.
- C. Maintain one copy of each document on site.

PART 2 PRODUCTS

2.1 COARSE AGGREGATE MATERIALS

A. Coarse Aggregate Type A1 6A compacted crushed limestone: Conforming to State of Michigan Department of Transportation standard within the following limits:

Sieve Size	Percent Passing
2 inches	100
1 inch	95 to 100
3/4 inch	
1/2 inches	30 to 60
3/8 inches	
No. 4	0 to 8
No. 8	
No. 40	
No. 200	2 to 1

B. Coarse Aggregate Type A2 22A crushed limestone: Conforming to State of Michigan Department of Transportation standard specification for construction within the following limits:

Sieve Size	Percent Passing
2 inches	100
1 inch	100
3/4 inch	90 to 100
1/2 inches	

3/8 inches	65 to 85
No. 4	
No. 8	30 to 50
No. 40	
No. 200	4 to 8

- 2.2 FINE AGGREGATE MATERIALS
 - A. Fine Aggregate Type A3 MDOT Class II (2NS): Conforming to State of Michigan Department of Transportation standard specification for construction.

Sieve Size	Percent Passing
No. 4	95 to 100
No. 8	65 to 95
No. 16	35 to 75
No. 30	20 to 55
No. 50	10 to 30
No. 100	0 to 10
No. 200	3

B. Fine Aggregate Type A4 MDOT Class III A: Conforming to State of Michigan Department of Transportation standard specification for construction (used for sanitary sewer backfill – 1' over top of pipe only).

Sieve Size	Percent Passing
3/8 inches	100
No. 4	50 to 100
No. 100	0 to 30
No. 200	0 to 15

- 2.3 SOURCE QUALITY CONTROL
 - A. Section 01 40 00 Quality Requirements: Testing and inspection services.
 - B. Coarse Aggregate Material Testing and Analysis: Perform in accordance with MTM 109 and MTM 108 and other applicable MDOT testing standards.
 - C. Fine Aggregate Material Testing and Analysis: Perform in accordance with MTM 109 and MTM 108 and other applicable MDOT testing standards.
 - D. When tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.1 STOCKPILING

A. Stockpile materials on site at locations approved by the Engineer.

- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate different aggregate materials with dividers or stockpile individually to prevent mixing.
- D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
- E. Stockpile hazardous materials on impervious material and cover to prevent erosion and leaching, until disposed of.
- 3.2 STOCKPILE CLEANUP
 - A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

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SECTION 31 10 00 SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Removing surface debris.
 - 2. Removing designated paving, curbs, and sidewalk.
 - 3. Removing designated trees, shrubs, and other plant life.
 - 4. Removing abandoned utilities.
 - 5. Excavating topsoil.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Site Clearing:
 - 1. Basis of Measurement: Included in the Lump Sum Bid.
 - 2. Basis of Payment: Includes clearing site, loading and removing waste materials from site, applying herbicide to designated plant life.

1.3 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for herbicide. Indicate compliance with applicable codes for environmental protection.

1.4 QUALITY ASSURANCE

- A. Conform to applicable local, state, and federal code for environmental requirements, disposal of debris, use of herbicides.
- B. Perform Work in accordance with Local, State, and Federal standards.
- C. Maintain one copy of each document on site.

PART 2 - PRODUCTS

A. NOT USED

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify existing plant life designated to remain is tagged or identified.
- C. Identify waste area for placing removed materials.

3.2 PREPARATION

- A. Call Local Utility Line Information service at 811 not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.

3.3 PROTECTION

- A. Locate, identify, and protect utilities indicated to remain, from damage.
- B. Protect trees, plant growth, and features designated to remain, as final landscaping as specified in
- C. Protect bench marks, survey control points, and existing structures from damage or displacement.

3.4 CLEARING

- A. Clear areas required for access to site and execution of Work.
- B. Remove trees and shrubs as indicated. Remove stumps, main root ball, and surface rock as indicated on the plans.
- C. Clear undergrowth and deadwood, without disturbing subsoil.
- D. Apply herbicide to remaining stumps to inhibit growth.

3.5 REMOVAL

- A. Remove debris, rock, and extracted plant life from site.
- B. Remove paving, curbs, and sidewalk as indicated on Drawings.
- C. Remove abandoned utilities. Indicated removal termination point for underground utilities on Record Documents.
- D. Continuously clean-up and remove waste materials from site. Do not allow materials to accumulate on site.
- E. Do not burn or bury materials on site. Leave site in clean condition.

3.6 TOPSOIL EXCAVATION

- A. Excavate topsoil from areas to be further excavated, landscaped, or regraded, without mixing with foreign materials for use in finish grading.
- B. Do not excavate wet topsoil.
- C. Stockpile in area designated on site to depth not exceeding 8 feet and protect from erosion. Remove excess topsoil not intended for reuse, from site.

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SECTION 31 23 16 EXCAVATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Soil densification.
 - 2. Excavating for paving, roads, and parking areas.
 - 3. Excavating for slabs-on-grade.
 - 4. Excavating for structures.

B. Related Sections:

- 1. Section 31 05 13 Soils for Earthwork
- 2. Section 31 05 16 Aggregates for Earthwork
- 3. Section 31 22 13 Rough Grading
- 4. Section 31 23 17 Trenching

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Excavating Soil Materials:
 - 1. Basis of Measurement: Included in the lump sum price for generator.
 - 2. Basis of Payment: Includes all excavating, fill, labor, material, and equipment to required elevations, loading and removing excess from site. Over Excavating: Payment will not be made for over excavated work nor for replacement materials.

1.3 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Requirements for submittals.
- B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.
- C. Shop Drawings: Indicate soil densification grid for each size and configuration footing requiring soils densification.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with State of Michigan Department of Transportation standard specifications for construction.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Call Local Utility Line Information service at MISS DIG not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Identify required lines, levels, contours, and datum.
- C. Notify utility company when specified to remove and relocate utilities.
- D. Identify known underground, above ground, and aerial utilities, stake, and flag locations.
- E. Protect above and below ground utilities indicated to remain from damage.
- F. Protect plant life, lawns, rock outcroppings and other features remaining as portion of final landscaping.
- G. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- H. Protect grade and slope stakes.

3.2 OPEN CHANNEL RELOCATION AND RESTORATION

- A. Clear site in accordance with Section 31 10 00 Site Clearing.
- B. Excavation drain to dimensions and cross sections specified on drawings.
- C. Contractor shall check flow line elevations every 100 ft. (grade stakes will be provided by Engineer). Over excavation of 0.3 ft or greater will be filled with Type A1 6A compacted crushed stone to the proposed flow line as incidental cost to the Contractor.
- D. Contractor shall remove all sediment from existing culverts to remain.
- E. When drain parallels a road, all excavation will be on field side slope unless stated on drawing or required by Engineer.
- F. Underpin adjacent structures which may be damaged by excavation work, including utilities and pipe chases.
- G. Machine slope banks to required slopes.
- H. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- I. Correct unauthorized excavation at no extra cost to Owner.

- J. Seed excavated areas daily in accordance with Section 32 92 19 Seeding.
- K. Repair and replace field tile outlets as directed by Engineer.
- L. Match existing side slopes in reaches identified channel cleanout.
- M. Excess spoils on road sides and lawn areas are to be hauled away.
- N. When excavating one side slope of drain. The opposite ditch bank shall be cleared in accordance with Section 31 10 00 Site Clearing. Grass vegetation should not be removed on opposite side slopes.

3.3 SPOIL LEVELING

- A. Seed spoils in accordance with Section 32 92 19 Seeding.
- B. Place soil erosion and sedimentation control measures per SESC plan.
- C. Spoils placed on tillable land shall be spread evenly to allow for tilling.
- D. Spoils in wooded areas shall be stockpiled as shown on plans.
- E. Spoils are to be kept a minimum 3 feet from excavation area.
- F. No excavated materials shall be placed on roads without written permission of the authorities having jurisdiction of said road.
- G. Spoils excavated in areas adjacent to residential or lawn areas are to be removed from the area unless directed by the Engineer, shown on plans, or Contractor receives written permission from Landowner to level in area.
- H. No spoils are to be placed in any watercourse or drain.
- I. Side grade outs for watercourse and ditches shall be done at the time of open drain excavation or channel cleanout.
- J. Non-combustible items (i.e. roots and stumps), brush, or debris shall not be mixed with leveled spoil material.
- K. Shape leveled spoils to prevent the ponding of water behind spoil pile.
- L. Level spoils on the same side of the drain which excavation occurs. If excavation occurs from both sides of drain then made even spoil piles on both sides of drain unless otherwise directed by the Engineer.
- M. In agricultural areas, root rake and hand pick sticks and rocks so that foreign debris 1' in length and/or 6" in diameter is disposed of.

3.4 ROAD SHOULDER CONSTRUCTION

- A. Construct road shoulder and construct 2 horizontal to 1 vertical side slope to drain and valley shaped ditches.
- B. Prior to filling for shoulder construction, remove existing sediment, top soil, and vegetation from area to be filled.
- C. Fill and compact native material for road shoulder. Fill material shall be placed in 12"-24" lifts. Contractor will be responsible for the construction of stable side slopes.
- D. Fill materials must be dry and must be approved by Engineer. Fill materials will be native excavated material.

3.5 EXCAVATION

- A. Underpin adjacent structures which may be damaged by excavation work.
- B. Excavate subsoil to accommodate building foundations, paving and site structures, construction operations, and utility trenches.
- C. Slope banks with machine to angle of repose or less until shored.
- D. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- E. Trim excavation. Remove loose matter.
- F. Remove lumped subsoil, boulders, and rock up to 0.5 cu ft measured by volume. Remove larger material as required.
- G. Notify Engineer of unexpected subsurface conditions.
- H. Correct areas over excavated with structural fill type A1 (6A Compacted Crushed Stone) as directed by Engineer.
- I. Remove excess and unsuitable material from site.

3.6 FIELD QUALITY CONTROL

- A. Section 01 40 00 Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Request visual inspection of bearing surfaces by Engineer before installing subsequent work.

3.7 **PROTECTION**

- A. Prevent displacement or loose soil from falling into excavation; maintain soil stability.
- B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

C. Protect structures, utilities and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth operations.

3.8 DUST CONTROL

A. The Contractor shall implement measures to minimize dust, especially near residents, upon the Engineers request.
SECTION 31 23 17 TRENCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Excavating trenches for utilities within municipal right-of-way or easement.
 - 2. Excavating trenches for utilities from 5 feet outside building to utility service.
 - 3. Compacted fill from top of utility bedding to subgrade elevations.
 - 4. Backfilling and compaction.

B. Related Sections:

- 1. Section 03 30 00 Cast-In-Place Concrete: Concrete materials.
- 2. Section 31 05 13 Soils for Earthwork: Soils for fill.
- 3. Section 31 05 16 Aggregates for Earthwork: Aggregates for fill.
- 4. Section 31 23 16 Excavation: General building excavation.

1.2 REFERENCES

- A. American Association of State Highway and Transportation Officials:
 - 1. AASHTO T180 Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- B. ASTM International:
 - 1. ASTM D698 Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
 - 2. ASTM D1556 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
 - 3. ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
 - 4. ASTM D2167 Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
 - 5. ASTM D2922 Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
 - 6. ASTM D3017 Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.3 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Trenching:
 - 1. Basis of Measurement: Included in other work items of this project.
 - 2. Basis of Payment: Includes all labor, material, equipment required for excavation, filling, backfilling, and compacting required for work items as shown on the contract documents or as stated in the specifications.

1.4 **DEFINITIONS**

A. Utility: Any buried pipe, duct, conduit, or cable.

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable OSHA regulations.

1.6 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Requirements for submittals.
- B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.
- C. Product Data: Submit data for geotextile fabric indicating fabric and construction.
- D. Materials Source: Submit name of imported fill materials suppliers.
- E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.7 QUALITY ASSURANCE

A. Perform Work in accordance with State of Michigan.

1.8 QUALIFICATIONS

A. Prepare excavation protection plan under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Michigan.

1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 COORDINATION

- A. Section 01 30 00 Administrative Requirements: Coordination and project conditions.
- B. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

- A. Subsoil Fill: Type S1 or S2 as specified in Section 31 05 13.
- B. Structural Fill: Type A1 as specified in Section 31 05 16.

- C. Granular Fill: Type A3 as specified in Section 31 05 16.
- D. Concrete: Structural concrete as specified in Section 03 30 00 Cast-in-Place Concrete with compressive strength of 3500 psi or as shown on plans.

2.2 EXCAVATION SUPPORT MATERIALS

- A. Timber and lumber for shoring and bracing shall be new, merchantable pine. Douglas Fir or Spruce, unless otherwise shown or specified. Secondhand timber or lumber shall not be used where strength and/or appearance are important considerations.
- B. Steel for sheeting, shoring, and bracing shall be as per the referenced ASTM specifications.
- C. Temporary Sheeting: Select section modulus, embedment depth and bracing required to complete the work.

PART 3 - EXECUTION

3.1 LINES AND GRADES

- A. Lay pipes to lines and grades indicated on Drawings.
 - 1. Engineer reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.
- B. Use laser-beam instrument with qualified operator to establish lines and grades.

3.2 PREPARATION

- A. Call Miss Dig not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Identify required lines, levels, contours, and datum locations.
- C. Protect plant life, lawns, rock outcropping and other features remaining as portion of final landscaping.
- D. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- E. Maintain and protect above and below grade utilities indicated to remain.
- F. Establish temporary traffic control and detours when trenching is performed in public right-ofway. Relocate controls and reroute traffic as required during progress of Work.

3.3 TRENCHING

A. Excavate subsoil required for utilities as shown on the plan, and as stated in the proposal.

- B. Excavate subsoil for utility piping and accessories as indicated on the drawings.
- C. Excavate on the required line to the depth required below the pipe grade for bedding thickness required.
- D. Remove lumped subsoil, boulders, and rock up of 1/6 cubic yard, measured by volume. Remove larger material as directed by the Engineer.
- E. Do not advance open trench more than one pipe length ahead of installed pipe.
- F. Cut trenches to width indicated on Drawings. Remove water or materials that interfere with Work.
- G. Excavate bottom of trenches in accordance with trench details or specifications.
- H. Excavate trenches to depth indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and utilities being installed.
- I. Excavate trench widths exceed the maximum specified above, the Owner's representative may require special bedding or the use of extra strength pipe at the Contractor's expense.
- J. Do not interfere with 45 degree bearing splay of foundations.
- K. When Project conditions permit, slope side walls of excavation starting 1 feet above top of pipe. When side walls can not be sloped, provide sheeting and shoring to protect excavation as specified in this section.
- L. When subsurface materials at bottom of trench are loose or soft, excavate to greater depth as directed by Engineer until suitable material is encountered.
- M. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Fill Type A and compact to density equal to or greater than requirements for subsequent backfill material.
- N. Trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.
- O. Correct areas over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by Engineer.
- P. Remove excess subsoil not intended for reuse, from site.
- Q. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- R. Notify Owner's representative of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.
- S. Protect excavation by methods required to prevent cave-in or loose soil from failing into excavation.
- T. Provide, operate, and maintain pumping equipment to keep trench free of water.

- U. Use trench boxes or other form of temporary protection when required by OSHA Standards or when protection of existing utilities is necessary.
- V. Stockpile excavated material in area designated on site in accordance with Section 31 05 13.

3.4 SHEETING AND SHORING

- A. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.
- B. Support trenches more than 5 feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.
- C. Design sheeting and shoring to be removed at completion of excavation work.
- D. The Contractor is responsible for the design and location of all sheeting, shoring, and bracing.
- E. When required to properly support the surfaces of excavations and to protect the construction work and workmen, sheeting, bracing and shoring shall be provided.
- F. If the Owner's representative is of the opinion that at any point sufficient or proper supports have not been provided, he may order additional supports at the expense of the Contractor, but neither the placing of such additional supports by the order of the Owner's representative nor the failure of the Owner's representative to order such additional supports placed shall release the Contractor from his responsibility for the sufficiency of such supports and the integrity of the work.
- G. Damage to new or existing structures occurring through settlements due to failure or lack of sheeting or bracing shall be repaired by the Contractor at his own expense.
- H. Conflict of opinion as to whether the settlement is due to the work of the Contractor or to any other cause will be determined by the Owner's representative.
- I. In general, the sheeting and bracing shall be removed, as the trench or excavation is refilled, in such a manner as to avoid the caving in of the work.
- J. Fill voids left by the withdrawal of the sheeting by ramming, or otherwise as directed.
- K. Obtain permission of the Owner's representative prior to the removal of any shoring, sheeting or bracing.
- L. When sheeting and bracing is removed, the Contractor shall assume full responsibility for injury to structures or to other property or persons arising from failure to leave in place such sheeting or bracing.
- M. For the purpose of preventing injury to the structures, or to other property or to persons, the Contractor shall leave in place any sheeting or bracing shown on the plans or ordered in writing by the Owner's representative.

- N. Cutoff sheeting left in place at the elevation ordered but not be less than 18" below the final ground surface.
- O. Bracing remaining in place shall be driven up tight.
- P. Measurements and payment for sheeting and bracing ordered left in place will be made as extra work, unless noted otherwise.
- Q. The right of the Owner's representative to order sheeting and bracing left in place shall not be construed as creating any obligation on his part to issue such orders.
- R. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.
- S. Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.

3.5 BACKFILLING

- A. Verify all materials to be reused as acceptable.
- B. Backfill trenches to proposed contours and elevations with unfrozen fill materials.
- C. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.
- D. Place geotextile fabric over Fill Type A1 prior to placing subsequent fill materials.
- E. Place material in continuous layers as follows:
 - 1. Subsoil Fill: Maximum 8 inches compacted depth.
 - 2. Structural Fill: Maximum 6 inches compacted depth.
 - 3. Granular Fill: Maximum 8 inches compacted depth.
- F. Place geotextile fabric over Type A1 fill bedding prior to placing last lift of bedding.
- G. Employ placement method that does not disturb or damage, utilities in trench, pavement, sidewalk, and driveways.
- H. Maintain optimum moisture content of fill materials to attain required compaction density.
- I. Do not leave more than 20 feet of trench open at end of working day.
- J. Protect open trench to prevent danger to Owner.
- K. Backfill against supported foundation walls.
- L. Make grade changes gradual. Blend slope into level areas.
- M. Slope fill away from structures a minimum 2 inches in 10 feet.

- N. Leave fill material stockpile areas completely free of excess fill materials.
- O. Employ a compaction method for trench backfill that does not disturb, or damage installed utilities and existing utilities in the trench. Compact backfill to specified density. If required compaction is not achieved and verified using mechanical methods, settling or spiking the trench with water may be used as a compaction method in conformance with ASTM C13 and D2321, as approved by the Engineer.
- P. Backfill simultaneously around all sides of structures, manholes and catch basins.

3.6 TOLERANCES

- A. Top Surface of Backfilling under Paved Areas: Plus or minus 1/2 inch from required elevations.
- B. Top surface of fill for building pads plus or minus 1/4 inch form required elevations.
- C. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.7 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01 40 00.
- B. Tests and analysis of fill material will be performed in accordance with MDOT Standard Requirements and with Section 01 40 00.
- C. Compaction testing will be performed in accordance with MDOT Standard Requirements and with Section 01 40 00.
- D. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.
- E. Frequency of Tests: As directed by Soils Engineer.
- F. Proof roll compacted fill surfaces under paving.

3.8 PROTECTION OF FINISHED WORK

- A. Section 01 70 00 Execution and Closeout Requirements: Protecting finished work.
- B. Reshape and re-compact fills subjected to vehicular traffic during construction.

3.9 SCHEDULE

- A. Fill Under Grass Area:
 - 1. Subsoil Type S1 or S2 fill, to 6 inches below finish grade, compacted to 95 percent maximum dry density as determined by MDOT Standard Requirements.
 - 2. Fill Under Asphalt Paving:
 - 3. A3 to underside of aggregate base course elevation, compacted to 95 percent maximum dry density as determined by MDOT Standard Requirements.

- B. Fill Under Concrete Building Pads, Concrete Pads, Concrete Curb and Gutter and Sidewalks:
 - 1. A3 to within 4" of underside of concrete slab. All fill to be compacted to 95 percent maximum dry density as determined by MDOT Standard Requirements.
- C. Backfill for Utility Trenches:
 - 1. Bedding as specified in individual water and sewer utility standard detail sheets.
- D. Fill for Subgrade and Undercutting:
 - 1. A1 (6A Compacted Crushed Stone) fill to proposed subgrade elevation, compacted to 95 percent maximum dry density as determined by MDOT Standard Requirements.

SECTION 32 91 13 SOIL PREPARATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Preparation of subsoil.
 - 2. Soil tesing.
 - 3. Placing topsoil.
- B. Related Sections:
 - 1. Section 32 91 19 Landscape Grading: Preparation of subsoil and placement of topsoil in preparation for the Work of this section.
 - 2. Section 32 92 19 Seeding

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Landscape Preparation:
 - 1. Basis of Measurement: Included in the lump sum bid.
 - 2. Basis of Payment: Includes all labor, excavation, fill for landscape grading and grading necessary to obtain the required contours and replacement of necessary fences, trees, shrubs, guard rail, mailboxes, and other landscaping necessary to return work area to preconstruction conditions.

1.3 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Requirements for submittals.
- B. Submit minimum 10 lb sample of topsoil proposed. Forward sample to approved testing laboratory in sealed containers to prevent contamination.
- C. Test Reports: Indicate topsoil nutrient and pH levels with recommended soil supplements and application rates.
- D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with Local, State, and Federal standards.
- B. Maintain one copy of each document on site.

1.5 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate with installation of underground sprinkler system piping and watering heads.

PART 2 - PRODUCTS

2.1 PROTECTION

- A. Protect Landscaping and other features remaining as final work.
- B. Protect existing structures, fences, roads, sidewalks, paving, mailboxes, and curbs.

2.2 SOIL MATERIALS

- A. Topsoil: As specified in Section 32 05 13 Type S3.
- B. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots; pH value of minimum 5.5 and maximum 7.5.
- C. Topsoil: Imported, fabric loam; free of subsoil, roots, grass, excessive amounts of weeds, stone, and foreign matter; acidity range (pH) of 5.5 to 7.5; containing a minimum of 4 percent and a maximum of 25 percent organic matter.

2.3 ACCESSORIES

- A. Mulching Material: Conwed Verdoyl #2000.
- B. Fertilizer: FS O-F-241, Commercial Grade with 12-12-12 analysis.
- C. Water: Clean, fresh and free of substances or matter which could inhibit vigorous growth of grass.
- D. Erosion Fabric: Jute matting, open weave.
- E. Stakes: Softwood lumber, chisel pointed.

2.4 SOURCE QUALITY CONTROL

- A. Section 01 40 00 Quality Requirements: Testing, inspection and analysis requirements.
- B. Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value.
- C. Provide recommendation for fertilizer and lime application rates for specified seed mix as result of testing.
- D. Testing is not required when recent tests and certificates are available for imported topsoil. Submit these test results to testing laboratory. Indicate, by test results, information necessary to determine suitability.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify prepared soil base is ready to receive the Work of this section.

3.2 PREPARATION OF SUBSOIL

- A. Prepare sub-soil to eliminate uneven areas and low spots. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.
- B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated sub-soil.
- C. Eliminate uneven areas and low spots. Remove debris, roots, branches, stones, in excess of $\frac{1}{2}$ inch in size. Remove subsoil contaminated with petroleum products.
- D. Scarify subsoil to depth of 3 inches where topsoil is to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted sub-soil.

3.3 PLACING TOPSOIL

- A. Spread topsoil to minimum depth of 4 inches over area to be seeded. Rake until smooth.
- B. Place topsoil during dry weather and on dry unfrozen subgrade.
- C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.
- D. Fine grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.
- E. Install edging at periphery of seeded areas in straight lines to consistent depth.
- F. Remove stone, roots, grass, weeds, debris, and foreign material while spreading.
- G. Manually spread topsoil around trees and plants to prevent damage.
- H. Lightly compact. Roll placed topsoil.
- I. Remove surplus subsoil and topsoil from site.
- J. Leave stockpile area and site clean and raked, ready to receive landscaping.
- K. Place required tree shrubs, fences and mailboxes in their proper locations.

SECTION 32 91 19 LANDSCAPE GRADING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Final grade topsoil for finish landscaping.

B. Related Sections:

- 1. Section 31 22 13 Rough Grading: Site contouring.
- 2. Section 31 23 17 Trenching: Backfilling trenches.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Topsoil:
 - 1. Basis of Measurement: Included in the lump sum bid.
 - 2. Basis of Payment: Includes excavating existing topsoil, supplying topsoil materials, stockpiling, preparing and scarifying substrate surface, placing where required, and rolling.

1.3 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Submittal procedures
- B. Samples: If necessary by the Engineer, submit, in air-tight containers, 10 lb sample of each type of fill to testing laboratory.
- C. Materials Source: Submit name of imported materials source.
- D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- A. Furnish each topsoil material from single source throughout the Work.
- B. Perform Work in accordance with Local, State, and Federal standards.
- C. Maintain one copy on site.

PART 2 - PRODUCTS

2.1 MATERIAL

A. Topsoil: Fill Type S3 as specified in Section 31 05 13.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify building and trench backfilling have been inspected.
- C. Verify substrate base has been contoured and compacted.

3.2 PREPARATION

- A. Protect landscaping and other features remaining as final Work.
- B. Protect existing structures, fences, sidewalks, utilities, paving, and curbs.

3.3 SUBSTRATE PREPARATION

- A. Eliminate uneven areas and low spots.
- B. Remove debris, roots, branches, stones, in excess of 1/2 in size. Remove contaminated subsoil.
- C. Scarify surface to depth of 3 inches where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

3.4 PLACING TOPSOIL

- A. Place topsoil in areas where seeding, sodding, or planting is required. to nominal depth of 4 inches. Place topsoil during dry weather.
- B. Fine grade topsoil to eliminate rough or low areas. Maintain profiles and contour of subgrade.
- C. Remove roots, weeds, rocks, and foreign material while spreading.
- D. Manually spread topsoil close to plant material, building, utilities and curbs to prevent damage.
- E. Roll placed topsoil.
- F. Remove surplus subsoil and topsoil from site.
- G. Leave stockpile area and site clean and raked, ready to receive landscaping.

3.5 TOLERANCES

- A. Section 01 40 00 Quality Requirements: Tolerances.
- B. Top of Topsoil: Plus or minus 1/2 inch.

3.6 PROTECTION OF INSTALLED WORK

- A. Section 01 70 00 Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Prohibit construction traffic over topsoil.

3.7 SCHEDULES

- A. Compacted topsoil thicknesses:
 - 1. Seeded Grass: 4 inches.
 - 2. Sod: 4 inches.

SECTION 32 92 19 SEEDING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fertilizing.
 - 2. Seeding.
 - 3. Hydroseeding.
 - 4. Mulching.
 - 5. Maintenance.

B. Related Sections:

- 1. Section 31 22 13 Rough Grading: Rough grading of site.
- 2. Section 31 23 17 Trenching: Rough grading over cut.
- 3. Section 32 05 13 Soils for Exterior Improvements: Topsoil material.
- 4. Section 32 84 00 Planting Irrigation.
- 5. Section 32 91 13 Soil Preparation
- 6. Section 32 91 19 Landscape Grading: Preparation of subsoil and placement of topsoil in preparation for the Work of this section.
- 7. Section 32 92 23 Sodding.
- 8. Section 32 93 00 Plants.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Seeding:

- 1. Basis of Measurement: Included in the lump sum bid.
- 2. Basis of Payment: Includes all excavation, labor, materials, fertilizer, mulch, landscape, grading, topsoil, subsoil, seeding, watering and maintenance to provide for uniform grass growth and any re-seeding and erosion repair to provide for a uniform grass growth at the completion of the project.

1.3 REFERENCES

- A. ASTM International:
 - 1. ASTM C602 Standard Specification for Agricultural Liming Materials.

1.4 **DEFINITIONS**

A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.5 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for seed mix, fertilizer, mulch, and other accessories.
- C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.6 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 Execution and Closeout Requirements: Requirements for submittals.
- B. Operation and Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer;.

1.7 QUALITY ASSURANCE

- A. Provide seed mixture in containers showing percentage of seed mix, germination percentage, inert matter percentage, weed percentage, year of production, net weight, date of packaging, and location of packaging.
- B. Perform Work in accordance with Local, State, and Federal standards.
- C. Maintain one copy of each document on site.

1.8 QUALIFICATIONS

- A. Seed Supplier: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum 3 years documented experience.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 Product Requirements: Product storage and handling requirements.
- B. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.
- C. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.10 MAINTENANCE SERVICE

- A. Section 01 70 00 Execution and Closeout Requirements: Requirements for maintenance service.
- B. Maintain seeded areas immediately after placement until grass is well established, exhibits vigorous growing condition and is accepted by Owner. Guarantee replacement of dead material for one year from date of substantial completion

C. Contractor shall be responsible for maintaining adequate seedbed moisture until the sodbed is established.

PART 2 - PRODUCTS

2.1 SEED MIXTURE

- A. Furnish materials in accordance with Municipal, State and Federal standards.
- B. Seed Mixture:

Kentucky Blue Grass	30 percent			
Creeping Red Fescue Grass	40 percent			
Perennial Rye Grass (Manhattan)	30 percent			

2.2 ACCESSORIES

- A. Mulching Material: Conwed Verdoyl #2000.
- B. Fertilizer: FS 0-F-241, Commercial Grade A with 12-12-12 analysis.
- C. Lime: ASTM C602, Class T agricultural limestone containing a minimum 80 percent calcium carbonate equivalent.
- D. Water: Clean, fresh and free of substances or matter capable of inhibiting vigorous growth of grass.
- E. Erosion Fabric: Jute matting, open weave.
- F. Stakes: Softwood lumber, chisel pointed.
- G. String: Inorganic fiber.

2.3 SOURCE QUALITY CONTROL

- A. Section 01 40 00 Quality Requirements: Testing, inspection and analysis requirements.
- B. Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value.
- C. Provide recommendation for fertilizer and lime application rates for specified seed mix as result of testing.
- D. Testing is not required when recent tests and certificates are available for imported topsoil. Submit these test results to testing laboratory. Indicate, by test results, information necessary to determine suitability.
- E. Notify Engineer 72 hours prior to hydroseeding and fertilizing for approval to proceed.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify prepared soil base is ready to receive the Work of this section.

3.2 FERTILIZING

- A. Apply fertilizer at application rate of 500 lbs per acre.
- B. Apply after smooth raking of topsoil and prior to roller compaction.
- C. Do not apply fertilizer at same time or with same machine used to apply seed.
- D. Mix fertilizer thoroughly into upper 2 inches of topsoil.
- E. Lightly water soil to aid dissipation of fertilizer. Irrigate top level of soil uniformly.

3.3 SEEDING

- A. Apply seed at rate of 500 lbs per acre evenly in two intersecting directions. Rake in lightly.
- B. Do not seed areas in excess of that which can be mulched on same day.
- C. Planting Season: May 1 to October 10 unless otherwise approved by the Engineer.
- D. Do not sow immediately following rain, when ground is too dry, or when winds are over 12 mph.
- E. Roll seeded area with roller not exceeding 112 lbs/linear foot.
- F. Immediately following seeding and compacting, apply mulch to thickness of 1/8 inches. Maintain clear of shrubs and trees.
- G. Apply water with fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.

3.4 HYDROSEEDING

- A. Apply fertilizer, mulch and seeded slurry with hydraulic seeder at rate of 200 lbs per acre of seed, 500 lbs per acre of fertilizer and 14000 lbs per acre of mulch, evenly on prepared seedbed. Do not apply slurry on shrubs or trees.
- B. After application, apply water with fine spray immediately after each area has been hydroseeded. Saturate to 3 inches of soil and maintain moisture levels two to four inches.

3.5 SEED PROTECTION

- A. Cover seeded slopes where grade is 6 inches per foot or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.
- B. Lay fabric smoothly on surface, bury top end of each section in 6 inch deep excavated topsoil trench. Overlap edges and ends of adjacent rolls minimum 12 inches. Backfill trench and rake smooth, level with adjacent soil.
- C. Secure outside edges and overlaps at 36 inch intervals with stakes.
- D. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.
- E. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum 6 inches.

3.6 MAINTENANCE

- A. Immediately reseed areas showing bare spots.
- B. Repair any eroded areas and reseed immediately.
- C. Contractor shall guarantee a uniform grass growth over the entire project and shall reseed bare and the areas until this is accomplished at no additional cost to the project.
- D. Water to prevent grass and soil from drying out.
- E. Roll surface to remove minor depressions or irregularities.
- F. Control growth of weeds. Apply herbicides. Remedy damage resulting from improper use of herbicides.
- G. Immediately reseed areas showing bare spots.
- H. Repair washouts or gullies.
- I. Protect seeded areas with warning signs during maintenance period.

<u>GENERAL NOTES</u>

ALL PRODUCTS SHALL BE MANUFACTURER'S BEST BRAND OR GRADE AND INSTALLED AS PER MANUFACTURER'S RECOMMENDATIONS.

ALL WORK SHALL BE GUARANTEED FOR A MINIMUM OF ONE YEAR FROM THE DATE OF FINAL PAYMENT.

CONSTRUCT ALL MATERIALS STRAIGHT, PLUMB, AND LEVEL UNLESS SPECIFICALLY NOTED OR INDICATED OTHERWISE.

ALL WORK SHALL BE INSTALLED IN CONFORMANCE WITH FEDERAL, STATE, AND LOCAL - CODES, RULES, AND REGULATIONS.

ALL MATERIALS SHALL BE INSTALLED IN CONFORMANCE WITH INDUSTRY STANDARDS AND THE ASSOCIATION THAT PERTAINS TO THE PARTICULAR PRODUCT. FOR EXAMPLE, AISC – AMERICAN INSTITUTE FOR STEEL CONSTRUCTION. USE THE MOST CURRENT EDITION WHEN REFERRING TO INDUSTRY STANDARDS.

SITE PROTECTION: THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING ANY AND ALL ADJACENT EXISTING STRUCTURES AND UTILITIES DURING CONSTRUCTION. ANY DAMAGE INCURRED DURING CONSTRUCTION SHALL, AT A MINIMUM, BE RESTORED TO A STATE EQUAL TO ITS PRE-CONSTRUCTION STATE AT THE CONTRACTORS EXPENSE.

SITE RESTORATION: ALL DISTURBED AREAS SHALL BE RESTORED AS NOTED ON THE PLANS AND IN ACCORDANCE WITH THE SPECIFICATIONS. ALL SEEDED AREAS SHALL RECEIVE A MINIMUM OF 3 INCHES OF TOPSOIL UNLESS OTHERWISE NOTED. THE RESTORED AREAS SHALL BE MAINTAINED UNTIL VEGETATION IS WELL ESTABLISHED. ANY AREAS DISTURBED FOR ANY REASON PRIOR TO FINAL ACCEPTANCE OF THE PROJECT WILL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

<u>CONTACTS</u>

CITY OF SAGINAW ATTN: PHIL KARWAT 1435 S. WASHINGTON AVE SAGINAW, MI 48601 PHONE: (989) 759–1728	OWNER
CITY OF SAGINAW FIRE DEPARTMENT ATTN: CHIEF RAINES 801 FEDERAL AVE. SAGINAW, MI 48601 PHONE: (989) 759–1375	OWNER
CONSUMERS ENERGY ATTN: MARCIA JANSON-WILSON 2400 WEISS STREET SAGINAW, MI 48602 PHONE: (989) 791–5869	GAS
CONSUMERS ENERGY ATTN: GREG SQUANDA 2400 WEISS STREET SAGINAW, MI 48602 PHONE: (989) 791–5353	ELECTRIC
AT&T ATTN: JOHN CARY 309 S. WASHINGTON AVE SAGINAW, MI 48607 PHONE: (989) 776–4070	TELEPHONE
SPICER GROUP ATTN: BRAD LUCZAK 230 S. WASHINGTON AVE SAGINAW, MI 48607 PHONE: (989) 754–4717	ENGINEER

CITY OF SAGINAW FIRE STATION NO. 4 EMERGENCY GENERATOR



PROJECT LOCATION 2208 STATE ST.



LOCATION MAP 2208 STATE ST.



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DE-1169-03	DETAILS	E2	3

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<u>NOTES:</u>

- 1. DIMENSIONS AND EQUIPMENT PER APPROVED SHOP DRAWINGS.
- 2. REFER TO SPECIFICATIONS FOR ELECTRICAL REQUIREMENTS.
- 3. FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS.
- 4. CONTRACTOR SHALL VERIFY EQUIPMENTS POWER REQUIREMENTS AND CONFIGURATIONS WITH MANUFACTURER, AND SUPPLY REQUIRED CIRCUIT PROTECTION. THIS INCLUDES, BUT NOT LIMITED TO, CIRCUIT BREAKERS, FUSE BLOCKS AND FUSES.
- 5. CONTRACTOR SHALL COORDINATE WITH ELECTRICIAN PRIOR TO POURING CONCRETE PAD AND INSTALL CONDUIT PENETRATIONS FOR WIRING.
- 6. CONDUITS SHOWN AS TYPICAL. CONTRACTOR SHALL ROUTE CONDUITS AS REQUIRED FOR A COMPLETE AND WORKING SYSTEM. INTERIOR CONDUIT ROUTING IS NOT SHOWN BY REQUIRED AS NEEDED.
- 7. ALL WORK SHALL MEET THE REQUIREMENTS OF NEC AND CITY OF SAGINAW STANDARDS.
- 8. CONTRACTOR SHALL COMPLETELY FILL FUEL TANK WITH RECOMMENDED FUEL BEFORE START-UP.
- 9. CONTRACTOR IS REQUIRED FOR ALL REQUIRED PERMITS AND FEES.
- 10. GENERATOR SHALL HAVE BLOCK HEATER AND BATTERY CHARGER THAT WILL BE POWERED FROM EXISTING 120/240 VOLT PANEL.
- 11. REMOTE ANNUNCIATOR PANEL TO BE MOUNTED INSIDE BUILDING NEAR ELECTRICAL PANEL.

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	CITY OF SAGINAW FIRE STATION NO. 4 GENERATOR SAGINAW, MI 48602						
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