CONTRACT DOCUMENTS

ZEHNDER DRAIN IMPROVEMENTS
BIRCH RUN AND FRANKENMUTH TOWNSHIPS
SAGINAW COUNTY, MICHIGAN

BRIAN J. WENDLING
SAGINAW COUNTY PUBLIC WORKS COMMISSIONER
111 SOUTH MICHIGAN STREET
SAGINAW, MI 48602

JANUARY 22, 2016

PREPARED BY:

WADETRIM
1403 South Valley Center Drive
Bay City, MI 48706

SPW 2002.01B

NOTICE OF LETTING OF DRAIN CONTRACT
AND DAY OF REVIEW OF APPORTIONMENTS
ZEHNDER DRAIN

NOTICE IS GIVEN THAT That I, Brian J. Wendling, Public Works Commissioner of the County of Saginaw, State of Michigan, will, on the **17th day of February 2016**, at the office of the Saginaw County Public Works Commissioner, 111 S. Michigan Ave., Saginaw, Michigan 48602, receive construction bids until 4:00 p.m., when bids will be opened and publicly announced for the construction of a certain drain known and designated as "Zehnder Drain" located and established in the Townships of Birch Run and Frankenmuth in said County.

Said Drain is an open channel approximately 2.8 miles in length. Said open drain to have a minimum 6-foot wide bottom width, with 2 horizontal to 1 vertical side slopes, and an average depth of 6 feet. All stations are 100 feet apart. This Notice of Letting, the plans, specifications, and bid proposal shall be considered a part of the contract. The following items will be required and a contract let for same:

Open Drain Construction		
7,553	Lin. Ft.	Open Channel Excavation
436	Lin. Ft.	Restricted Open Channel Excavation
1	Lump Sum	Clearing and Grubbing, Debris Disposal
Crossings		
1	Each	Crossing #1 Warnick Road CMP Culvert 128" x 83" CMPA (Road)
1	Each	Crossing #8 Busch Road Culvert (Road), Reuse 113" x 72" RCP
1	Each	Crossing #9.1 Private Culvert, 95" x 67" CMPA
3	Each	Culvert Cleanout
Maintenance Access Side Drains		
3	Each	MA Road Culvert 12" CMP
1	Each	Stone Ford
Soil Erosion and Sediment Control		
1	Lump Sum	Temporary SESC Control Measures
28	Each	Plain Riprap Spillways (As Directed)
14	Each	Grass Spillways (As Directed)
955	Lin. Ft.	Riprap Toe of Slope Protection
19	Each	Plain Riprap Splash Pad (As Directed)
1	Lump Sum	Seeding, Fertilizing, and Mulching
Miscellaneous		
1	Lump Sum	Cleanup and Restoration
15	Each	4"/6" Field Tile Outlet Repair (as needed)
10	Each	12"/15" Field Tile Outlet Repair (as needed)
3	Each	Surface Water Inlet
1	Lump Sum	Traffic Control

Each proposal shall be accompanied by certified check or bidder's bond in the amount of 5% of the bid. Checks shall be drawn payable to the **Zehnder Drain Drainage District** (the "Drainage District") as security for the acceptance of the Contract and subject to the conditions stated in the Instructions to Bidders. The Owner reserves the right to waive informality in any bid, to reject any or all bids, or to accept any bid which is considered most favorable to the Owner.

A **mandatory pre-bid meeting** will be held at 4:00 pm on the **3rd day of February 2016**, at the office of the Saginaw County Public Works Commissioner, 111 South Michigan Avenue, Saginaw, Michigan 48602. It is a requirement that any prospective General Contractor bidding attend this meeting. Representatives of the Owner and Professional will be present to discuss the project. Attendance is required for sealed bids to be accepted. The Professional will transmit to all prospective bidders of record an Addendum as the Professional considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be legally effective.

Hard copy proposal forms and specifications may be obtained by qualified bidders on the **3rd day of February** at the mandatory pre-bid meeting for a $25 fee, or at no changes at the website of the Saginaw County Public Works Commissioner http://www.saginawcounty.com/PublicWorks/Current-Projects.aspx beginning on the **25th day of January, 2016**. Please call the Saginaw County Public Works Commissioner's office at 989-790-5258 to reserve a hard copy of the proposal forms and specifications by the 29th of January. **The project is to be substantially completed by August 31, 2016 and ready for final payment and ready for final payment by September 30, 2016.**

Said job will be let in accordance with the diagram now on file with the other papers pertaining to said Drain, in the office of the Public Works Commissioner of the County of Saginaw, to which reference may be had by all parties interested and bids will be made an received accordingly.

Contracts will be made with the lowest responsible bidder giving adequate security for the performance of the work, in the sum then and there to be fixed by me, reserving to myself the right to reject any and all bids, and to adjourn such letting to such time and place as I shall publicly announce.

The date for the completion of such contract, and the terms of payment therefore, shall and will be announced at the time and place of letting. Any person desiring to bid on the above-mentioned work will be required to deposit as a guarantee that they will enter into contract and furnish the required bonds as prescribed by law. The checks and other bid guarantees of all unsuccessful bidders will be returned after the contract is awarded. The payments for the above-mentioned work will be made as follows, as provided in the contract to be entered into with the successful bidder:

Not later than the 25th day of each calendar month, the Owner will make partial payment to the Contractor on the basis of a duly certified, approved estimate of the work performed during the preceding calendar month by the Contractor, but the Owner will retain a percentage as stated in Act No. 524 of the amount of each such estimate until final completion and acceptance of all work covered by this contract.

Final Payment. Upon final completion and acceptance of the Work in accordance with paragraph 43 of the General Conditions, OWNER shall pay the remainder of the Contract Price as recommended by PROFESSIONAL as provided in Section 43.

NOTICE IS FURTHER HERBY GIVEN, that on the **25th day of February, 2016,** in the Office of the Saginaw County Public Works Commissioner, 111 S. Michigan Ave., Suite 103, Saginaw, Michigan, in the City of Saginaw, County of Saginaw, or at such other time and place thereafter, to which I, the County Public Works Commissioner aforesaid, may adjourn the same, the apportionment for benefits and the land comprised within the "Zehnder Drain Special Assessment District," and the apportionments thereof will be subject to review for one day, from 9:00 a.m. to 5:00 p.m. At said review, the computation of costs for said Drain will also be available for inspection by any parties interested. Drain assessments against land will be collected in the same manner as property taxes. If the collection period is greater than one year, the land owner may pay the assessments in full with any interest to date at any time and thereby avoid further interest charges.

Pursuant to Section 155 of the Michigan Drain Code, any owner of land within the drainage district or any city, village, township, district or county feeling aggrieved by the apportionment of benefits made by the Public Works Commissioner, may appear the apportionment within ten (10) days after the day of review of apportionment by making an application to the Saginaw County Probate Court for the appointment of a board of review.

The description of area that is served by the Zehnder Drain consists of lands situated in Sections 3-5 and 8-10 of Birch Run Township, T.10N.-R.06E., and Sections 32 and 33 of Frankenmuth Township, T.11N.-R06E., Saginaw County, Michigan.

Birch Run Township – T.10N.-R.06E. Saginaw County, Michigan.
In Section 3 – The south ½ of the south ½ of the southwest ¼
In Section 4 – The entire section except the west ½ of the southwest ¼
In Section 5 – The north ½ of the northeast ¼
In Section 8 – The northeast ¼, the southeast ¼ of the northwest ¼ and the north ½ of the south ½
In Section 9 – The entire section except the southwest ¼ of the southwest ¼
In Section 10 – The west ½ of the northeast ¼, the south ½ of the southeast ¼ of the northeast ¼, the west ½ and the southeast 1/4

Frankenmuth Township – T.11N.-R.06E. Saginaw County, Michigan.
In Section 33 – The southwest ¼, the southwest ¼ of the southeast ¼ of the Section

The following public corporations will be assessed at large to pay part of the cost of the Drain:

Birch Run Township
Frankenmuth Township
Saginaw County
Michigan Department of Transportation

NOW, THEREFORE, All unknown and non-resident persons, owners and persons interested in the above described lands, and you:

Supervisor of Birch Run Township, Ray Letterman
Supervisor of Frankenmuth Township, Tim Hildner
Saginaw County Road Commission Managing Director, Dennis Borchard
Clerk of Saginaw County, Susan Kaltenbach
Michigan Department of Transportation

are hereby notified that at the time and place aforesaid, or at such other time and place thereafter to which said letting may be adjourned, I shall proceed to receive bids for the construction of said "Zehnder Drain," in the manner herein before stated; and, also, that at such time and place as stated above from nine o'clock in the forenoon until five o'clock in the afternoon, the apportionment for benefits and the lands comprised within the "Zehnder Drain Special Assessment District" will be subject to review.

AND TO YOU AND EACH OF YOU, Owners and persons interested in the aforesaid lands, are hereby cited to appear at the time and place of such reviewing of appointments as aforesaid, and be heard with respect to such special assessments and your interests in relation thereto, if you so desire.

This review of apportionment is consistent with Sections 154 of the Michigan Drain Code of 1956.

Dated this 22nd day of January, 2016.

Brian J. Wendling
Saginaw County Public Works Commissioner

Division 00
Procurement and Contracting Requirements

Table of Contents

Table of Contents

Section 00 0115
List of Drawing Sheets

Part 1 General

1.01 Description

A. The Plans bearing the general title of **Zehnder Drain Improvements** and dated **January 22, 2016** included with and form a part of the Contract Documents for this Project.

1.02 List of Plans

SHEET NUMBER	TITLE
1.0	Cover Sheet
2.0	Legend Sheet
3.0	General Construction Notes and Soil Erosion Control Details
4.0	Plan Sheet Index
5.0-6.0	District Maps
6.1	Warnick Road and Busch Road Culvert Replacement Traffic Control Plan
7.0-13.0	Zehnder Drain Plan and Profile Sheets
14.0	Zehnder Drain Cross Sections
15.0-17.0	Detail Sheets

Part 2 Products (Not Used)

Part 3 Execution (Not Used)

End of Section

Section 00 2113
Instructions to Bidders

Part 1 General

1.01 Defined Terms

A. Terms used in these Instructions to Bidders have the meanings assigned to them in the General Conditions.

1. The term "Bidder" means one who submits a Bid directly to OWNER as distinct from a subbidder who submits a Bid to a Bidder.

2. The term "Successful Bidder" means the lowest, qualified, responsible Bidder to whom OWNER makes an award.

3. The terms "OWNER" and "ENGINEER" are defined in the Supplementary Instructions to Bidders.

1.02 Scope of Work

A. The scope and location of Work are set forth in Section 01 1100, Summary of Work.

1.03 Bidders Qualifications

A. No Bid will be considered from any Bidder unless known to be skilled and regularly engaged in work of a character similar to that covered by the Contract Documents. In order to aid the OWNER in determining the responsibility of any Bidder, the Bidder, within 48 hours after being requested in writing by the OWNER to do so, shall furnish evidence, satisfactory to the OWNER, of the Bidder's experience and familiarity with Work of the character specified, and his financial ability to properly prosecute the proposed Work to completion within the specified time. The evidence requested may include, but shall not be limited to, the following:

1. The address and description of the Bidder's plant or permanent place of business.

2. The Bidder's performance records for all Work awarded to, or started by him within the past three years.

3. An itemized list of the Bidder's equipment available for use on the proposed Contract.

4. The Bidder's financial statement, including statement of ownership of equipment necessary to be used in executing Work under Contract.

5. Evidence that the Bidder is authorized to do business in the state in which the project is located, in case of a corporation organized under the laws of any other state; and,

6. Such additional information as will satisfy the OWNER that the Bidder is adequately prepared to fulfill the Contract.

1.04 Examination of Contract Documents and Site

A. It is the responsibility of each Bidder before submitting a Bid, to:

1. examine the Contract Documents thoroughly,

2. visit the site to familiarize himself with local conditions that may in any manner affect cost, progress or performance of the Work,

3. consider federal, state, and local Laws and Regulations that may affect cost, progress, performance, or furnishing of the Work; and

4. study and carefully correlate Bidder's knowledge and observations with the Contract Documents and such other related data; and

5. promptly notify ENGINEER in writing of all conflicts, errors, ambiguities or discrepancies which Bidder has discovered in or between Contract Documents and such related documents.

B. Reference is made to the Supplementary Conditions for the identification of those reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Work which have been relied upon by ENGINEER in preparing the Contract Documents.

1. If such reports are not included as appendices to the Contract Documents, OWNER will make copies available to any Bidder requesting them. These reports are included for reference only and are not guaranteed as to accuracy or completeness, nor are they part of the Contract Documents.

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

3. Before submitting his Bid each Bidder will, at his own expense, make such additional investigations and tests as the Bidder may deem necessary to determine his Bid for performance of the Work in accordance with the time, price and other terms and conditions of the Contract Documents.

C. On request OWNER will provide each Bidder access to the site to conduct such investigations and tests as each Bidder deems necessary for submission of his Bid. Bidder shall fill all holes and clean up and restore the site to its former conditions upon completion of such investigations and tests.

D. The lands upon which the Work is to be performed, rights-of-way for access thereto and other lands designated for use by CONTRACTOR in performing the Work are identified in Section 01 1100, Summary of Work, or on the Plans.

E. The locations of utilities as shown on the Plans are taken from sources believed to be reliable. Neither the OWNER nor the ENGINEER will be responsible for any omissions of, or variations from, the indicated location of existing utilities which may be encountered in the Work.

F. The submission of a Bid will constitute an incontrovertible representation by the Bidder that he has complied with every requirement of this Article 1.04, that without exception the Bid is based upon performing and furnishing the Work required by the Contract Documents and applying the specific means, methods, techniques, sequences or procedures of construction (if any) that may be shown, indicated or required by the Contract Documents, that Bidder has given ENGINEER written notice of all conflicts, errors, ambiguities and discrepancies that Bidder has discovered in Contract Documents and the resolution by ENGINEER is acceptable to Bidder, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performing and furnishing the Work, and that the time stated in the Proposal is sufficient to complete the project.

1.05 Interpretations and Addenda

A. Should any prospective bidder find discrepancies in, or omissions from the Plans, Specifications or other parts of the Contract Documents, he may submit a written request to the ENGINEER for an interpretation thereof. The person submitting the request will be held responsible for its prompt delivery at least seven (7) days prior to the date for opening of Bids. Questions received less than seven (7) days prior to the date for opening of bids will not be answered. Any interpretation of inquiry will be made by Addendum duly issued to all prospective bidders.

B. Any change in or addition to the Contract Documents deemed necessary by the OWNER shall be made in the form of an Addendum issued to all prospective bidders who have taken out Contract Documents and all such Addenda shall become a part of the Contract Documents as though same were incorporated into same originally. Oral explanations and information do not constitute official notification and are not binding.

1.06 Bid Security

A. Bid Security shall be made payable to the "Zehnder Drain Drainage District" in an amount of five (5) percent of the Bidder's maximum Bid price and in a form as indicated in the Notice of Letting. Bid Bonds, if indicated as acceptable in the Notice of Letting, shall be issued on the form included in the Contract Documents by a Surety meeting the requirements of paragraph 5.01 of the General Conditions.

B. The Bid Security of the Successful Bidder will be retained until such Bidder has executed the Agreement and furnished the required Contract Security, whereupon it will be returned; if the successful Bidder fails to execute and deliver the Agreement and furnish the required Contract Security within 15 days of the Notice of Award, OWNER may annul the Notice of Award and the Bid Security of that Bidder will be forfeited. The Bid Security of any Bidder whom OWNER believes to have a reasonable chance of receiving the award may be retained by OWNER until the earliest of the seventh day after the "Effective Date of Agreement" (which term is defined in the General Conditions) or the expiration of the hold period on the Bids. Bid Security of other Bidders will be returned within 14 days of the Bid opening, unless indicated otherwise in the Notice of Letting.

1.07 Contract Time

A. The number of days within which, or the date by which, the Work is to be Substantially Completed, if applicable, and also completed and ready for final payment (the Contract Time) are set forth in the Proposal and will be included in the Agreement.

1.08 Substitute and "Or-Equal" Items

A. The Contract, if awarded, will be on the basis of materials and equipment described in the Plans or specified in the Specifications without consideration of possible substitute or "or-equal" items. Whenever it is indicated in the Plans or specified in the Specifications that a substitute or an "or-equal" item of material or equipment may be furnished or used by CONTRACTOR if acceptable to ENGINEER, application for such acceptance will not be considered by ENGINEER until after the Effective Date of Agreement. In addition, in no case shall ENGINEER's denial of CONTRACTOR's application give rise to any claim for additional cost, it being understood by CONTRACTOR that acceptance of substitute or an "or equal" item of material is at the sole discretion of ENGINEER.

1.09 Receipt and Form of Bid

A. Bids shall be submitted at the time and place indicated in the Notice of Letting and shall be included in an opaque sealed envelope, marked with the Project title and name and address of the Bidder and accompanied by the Bid Security and other required documents. If the Bid is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face thereof. Any Bid received after the scheduled time and place indicated in the Notice of Letting shall be returned unopened.

1. OWNER invites bids on the Proposal and other form(s) attached hereto. Bids will be received at the time and place indicated in the Notice of Letting and thereupon will be publicly opened and read. An abstract of the amounts of the base bids and any major alternates will be made available after the opening of Bids.

2. OWNER may consider as informal any Bid on which there is an alteration of, or departure from the Proposal Form attached hereto.

3. The complete set of Contract Documents must be used in preparing Bids: neither OWNER nor ENGINEER assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Contract Documents. In order to verify the completeness of the set of Contract Documents the Bidder used in preparing his Bid, the OWNER may require the Bidder to submit the set of Contract Documents he used in preparing his Bid. The Bidder shall submit his Bid on the separate Proposal form included in these Contract Documents.

4. The Proposal shall be legibly prepared, with ink or typewriter, on the form included in these Contract Documents. All blank spaces in the proposal forms must be correctly filled in where indicated for each and every item for which a quantity is given. Proposals will be compared on basis of lump sum items, if any, and on product of the quantities of items listed at the respective unit prices bid.

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

6. Names must be typed or printed below the signature.

7. The quantities as shown in the Proposal are approximate only and will be used as a basis of comparison of Bids, and award of Contracts. Payment will be made on basis of actual quantities of Work performed in accordance with the Contract Documents. The Unit Prices bid, shall include such amounts as the Bidder deems proper for overhead, profit, taxes, General Conditions and such other incidentals as noted in the Contact Documents.

8. The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Proposal Form.

9. The Legal Status of Bidder Form contained in the Contract Documents must be submitted with each Proposal and must clearly state the legal position of a Bidder. In the case of a corporation, the home address, name and title of all officers must be given. In the case of a partnership, show names and home addresses of all partners. If an individual, so state. Any individual bid not signed by the individual must have attached, thereto, a power of attorney evidencing authority to sign.

10. Other documents to be attached to the Proposal and made a condition thereof are identified in the Proposal. The same individual signing the Proposal shall sign these other documents.

1.10 Modifications and Withdrawal of Bids

A. Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids. If, within 24 hours after Bids are opened, any Bidder files a duly signed written notice with OWNER and promptly thereafter demonstrates to the reasonable satisfaction of OWNER that there was a material and substantial mistake in the preparation of his Bid, that Bidder may withdraw his Bid and the Bid Security will be returned. Thereafter, at the sole option of OWNER, that Bidder will be disqualified from further Bidding on the Work to be provided under the Contract Documents.

1.11 Award of Contract

A. OWNER reserves the right to reject any and all Bids for any reason, to waive any and all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder, and the right to disregard all nonconforming, non-responsive, unbalanced, or conditional Bids. Discrepancies between words and figures will be resolved in favor of words. Discrepancies in the multiplication of units of work and unit prices, will be resolved in favor of unit price. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

B. In evaluating Bids, OWNER shall consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data if requested in the Bid forms. It is OWNER's intent to accept alternates (if any are accepted) in the order in which they are listed in the Bid form but OWNER may accept them in any order or combination.

C. Subject to the approval of OWNER, the Contract will be awarded to the lowest responsive and responsible Bidder. Responsibility of Bidder will be determined on basis of past performance and Work of similar character, equipment and labor available to do the Work and financial status. The Contract shall be considered to have been awarded after the approval of the OWNER has been duly obtained and a formal Notice of Award duly served on the successful Bidder by OWNER. The Contract shall not be binding upon the OWNER until the Agreement has been duly executed by the Bidder and the duly authorized officials of the OWNER.

D. If the Contract is to be awarded, OWNER will give the successful Bidder a Notice of Award within ninety (90) days after the day of the Bid opening, unless such other time is specified in the Notice of Letting.

1.12 Signing of Agreement

A. Within 15 days after OWNER gives a Notice of Award to the successful Bidder, the CONTRACTOR shall sign and deliver the specified number of counterparts of the Agreement to OWNER with all other Contract Documents attached. Within ten (10) days thereafter, OWNER will deliver two (2) fully signed counterparts to CONTRACTOR. ENGINEER will identify, date or correct those portions of the Contract Documents not fully signed, dated or executed by OWNER and CONTRACTOR and such identification, dating or correction shall be binding on all parties.

Part 2 Products (Not Used)

Part 3 Execution (Not Used)

End of Section

Section 00 2213
Supplementary Instructions to Bidders

Part 1 General

1.01 Modifications

A. These Supplementary Instructions to Bidders amend or supplement, Section 00 2113, Instructions to Bidders, as indicated below. All provisions which are not amended or supplemented remain in full force and effect.

B. The terms used in these Supplementary Instructions to Bidders have the meanings assigned to them in the Instructions to Bidders, General Conditions, and as follows:

1. OWNER – Saginaw County Public Works Commissioner, a Municipal Corporation, and being a party of the first part of this Contract acting on behalf of the Zehnder Drain Drainage District.

2. ENGINEER - Wade Trim, Inc., 1403 South Valley Center Drive, Bay City, Michigan 48706, or his duly authorized representative.

Part 2 Products (Not Used)

Part 3 Execution (Not Used)

End of Section

Section 00 4243
Proposal

Saginaw County Public Works Commissioner
111 South Michigan Avenue
Saginaw, MI 48602

Re: **Zehnder Drain Improvements**

Gentlemen:

The undersigned Bidder proposes and agrees, if this Proposal is accepted, to enter into an Agreement with Saginaw County Public Works Commissioner in the form included in the Contract Documents to complete all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the Contract Documents.

In submitting this Proposal, Bidder represents, as more fully set forth in the Agreement, that;

a) Bidder has examined copies of all Contract Documents which he understands and accepts as sufficient for the purpose, including any and all Addenda officially issued, the receipt of which is hereby acknowledged.

Addendum No.	Date of Release	Signature

b) Bidder has examined the surface and subsurface conditions where the Work is to be performed, the legal requirements and local conditions affecting cost, progress, furnishing or performance of the Work and has made such independent investigations as Bidder deems necessary.

c) This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any Agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or a corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for himself any advantage over any other Bidder or over OWNER.

The Bidder agrees to complete the Work, in accordance with the Contract Documents, for the following Contract Price:

Item	Description	Quantity	Unit	Unit Price	Amount
1.	Open Channel Excavation	7,553	Lft	$ _____	$ _____
2.	Restricted Open Channel Excavation	436	Lft	$ _____	$ _____
3.	Clearing and Grubbing, Debris Disposal	1	Lsum	$ _____	$ _____

Item	Description	Quantity	Unit	Unit Price	Amount
Crossings					
4.	Crossing #1: Warnick Rd CMP Culvert 128" x 83" CMPA (Road)	1	Each	$ _____	$ _____
5.	Crossing #8: Busch Road Culvert (Road), Reuse 113" x 72" RCP	1	Each	$ _____	$ _____
6.	Crossing #9: Demolition and Disposal of Existing Bridge				
7.	Crossing #9.1: Private Crossing, 95" x 67" CMPA	1	Each	$ _____	$ _____
8.	Culvert Cleanout	3	Each	$ _____	$ _____
Maintenance Access Side Drains					
9.	MA Road Culvert 12"CMP	3	Each	$ _____	$ _____
10.	MA Stone Ford (As Directed)	1	Each	$ _____	$ _____
Soil Erosion and Sediment Control					
11.	Temporary SESC Control Measures	1	Lsum	$ _____	$ _____
12.	Plain Riprap Spillways (As Directed)	28	Each	$ _____	$ _____
13.	Grass Spillways (As Directed)	14	Each	$ _____	$ _____
14.	Riprap Toe of Slope Protection	955	Lft	$ _____	$ _____
15.	Plain Riprap Splash Pad (As Directed)	19	Each	$ _____	$ _____
16.	Seeding, Fertilizing, and Mulching	1	Lsum	$ _____	$ _____
Miscellaneous					
17.	Cleanup and Restoration	1	Lsum	$ _____	$ _____
18.	4"/6" Field Tile Outlet Repair (As Needed)	15	Each	$ _____	$ _____
19.	12"/15" Field Tile Outlet Repair (As Needed)	10	Each	$ _____	$ _____
20.	Surface Water Inlet	3	Each	$ _____	$ _____
21.	Traffic Control	1	Lsum	$ _____	$ _____

TOTAL BASE CONTRACT PRICE – ZEHNDER DRAIN
(Items 1 through 21) $ _____
(numeric)

The undersigned, as Bidder, hereby certifies that he or a qualified designated person in his employ has examined the Contract Documents provided by the OWNER for bidding purposes. Further, the undersigned certifies that he or his qualified employee has reviewed the Bidder's proposed construction methods and finds them compatible with the conditions and from the information provided for Bidding.

The undersigned, as Bidder, shall complete the Work under any job circumstances or field conditions present and/or ascertainable prior to bidding. In addition, he shall also complete the Work under whatever conditions he may create by his own sequence of construction, construction methods, or other conditions he may create, at no additional cost to the OWNER.

The undersigned, as Bidder, declares that he has familiarized himself with the location of the proposed Work and the conditions under which it must be constructed. Also, that he has carefully examined the Plans, the Specifications, and the Contract Documents, which he understands and accepts as sufficient for the purpose, and agrees that he will Contract with the OWNER to furnish all labor, material, tools, and equipment necessary to do all Work specified and prescribed for the completion of the Project.

The undersigned agrees, if awarded Contract, to sign the Agreement and submit satisfactory bonds and certificates of insurance coverage and other evidence of insurance required by the Contract Documents within 15 days after the date of OWNER'S Notice of Award.

The undersigned agrees that time is of the essence and, if awarded Contract, that the Work will be Substantially Completed on or before **August 31, 2016** and completed by **September 30, 2016.**

Liquidated damages, as specified in the General Conditions, Supplementary Conditions and Agreement, shall also apply to the above Substantial Completion date.

Engineering and inspection costs incurred after the above final completion date shall be paid by the CONTRACTOR to the OWNER as specified in the Conditions of the Contract and Agreement.

Proposals may not be withdrawn for a period of ninety (90) days after bid opening.

The following documents are attached to and made a condition of this Proposal:

a) Required Bid security in the form checked below:

☐ Certified Check ☐ Cashier's Check ☐ Money Order ☐ Bid Bond

b) Legal Status of Bidder.

c) Bidder's Name: _____

By: _____

Address: _____

_____

Phone No.: _____ Fax No.: _____

Email: _____

Section 00 4313
Bid Bond Form

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____

as Principal, hereinafter called the Principal, and _____

a corporation duly organized under the laws of the State of _____, and duly authorized to transact business in the state of Michigan, as Surety, hereinafter called the Surety, are held and firmly bound unto Saginaw County Public Works Commissioner, hereinafter called the OWNER, in the sum of _____ Dollars ($ _____)

for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a Bid for _____

_____

_____

_____

_____

NOW, THEREFORE, if the OWNER shall accept the Bid of the Principal and the Principal shall enter into a Contract with the OWNER in accordance with the terms of such Bid, and give such Bond or Bonds as may be specified in the Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such Bond or Bonds, if the Principal shall pay to the OWNER the difference not-to-exceed the penalty hereof between the amount specified in said Bid and such larger amount for which the OWNER may in good faith contract with another party to perform the Work covered by said Bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and Sealed this _____ day of _____, 20____.

_____ (Witness)

_____ (Principal)

_____ (Title)

_____ (Witness)

_____ (Surety)

_____ (Title)

Section 00 4345
Legal Status of Bidder

This Proposal is submitted in the name of:

(Print) _____

The undersigned hereby designates below his business address to which all notices, directions or other communications may be served or mailed:

Street _____

City _____

State _____ Zip Code _____

The undersigned hereby declares that he has legal status checked below:

- ☐ SOLE PROPRIETOR
- ☐ SOLE PROPPRIETOR DOING BUSINESS UNDER AN ASSUMED NAME
- ☐ CO-PARTNERSHIP
  The Assumed Name of the Co-Partnership is registered in the County of _____, Michigan
- ☐ CORPORATION INCORPORATED UNDER THE LAWS OF THE STATE OF _____. The Corporation is
  - ☐ authorized to conduct business in the State of Michigan
  - ☐ not now authorized to conduct business in the State of Michigan
  - ☐ possess all required licenses for the work being bid
  - ☐ limited liability corporation

The name, titles, and home addresses of all persons who are officers or partners in the organization are as follows:

NAME AND TITLE	HOME ADDRESS

Signed this _____ day of _____, 20____.

_____
By (Signature)

_____
Printed Name of Signer

_____
Title

Section 00 5100
Notice of Award

To: _____ Date: _____, 20_____

_____

_____

Attention: _____

Project: Zehnder Drain Improvements

Gentlemen:

Pursuant to the provisions of Article 1.11 of the Instructions to Bidders, you are hereby notified that the Saginaw County Public Works Commissioner (OWNER) during a _____ Meeting held on _____, _____, 20_____, has directed the acceptance of your Bid for the above-referenced Project in the amount of $_____ ( ). This project shall consist of _____

_____

as delineated in your Bid submitted to the _____

on _____.

Please comply with the following conditions within 15 days of the date of this Notice of Award; that is by _____, _____, 20_____.

1. Deliver to the ENGINEER **( )** fully executed counterparts of the Agreement including all the Contract Documents.

2. Deliver with the executed Agreement the Contract Security (Bonds), on the form included in the Contract Documents, as specified in the General Conditions (Article 5).

3. Deliver with the executed Agreement the Insurance Certificates (and other evidence of insurance) as specified in the General Conditions (Article 5).

4. Please do not date Agreement and Contract Security (Bonds), as these will be dated by the OWNER when executed by him.

It is important to comply with these conditions and time limits as failure to comply with these conditions within the time specified will entitle OWNER to consider your bid abandoned, to annul this Notice of Award and to declare your Bid Security forfeited.

Within ten (10) days after you comply with those conditions, OWNER will return to you two (2) fully signed counterparts of the Agreement with the Contract Documents attached.

In accordance with paragraph 2.05 of the General Conditions, please submit to the ENGINEER the required schedules prior to the scheduling of a Pre-Construction Meeting.

Copy to ENGINEER:
Wade Trim, Inc.
1403 South Valley Center Drive
Bay City, MI 48706

_____
(OWNER)

By: _____
(Authorized Signature)

Section 00 5200
Agreement

This Agreement, made and entered into this _____ day of _____ in the year 20_____ by and between the Saginaw County Public Works Commissioner on behalf of the Zehnder Drain Drainage District hereinafter called OWNER, and _____ hereinafter called CONTRACTOR, in consideration of the mutual covenants hereinafter sent forth, agree as follows:

ARTICLE 1. WORK

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

A drain physically located in Section 33 of Frankenmuth Township, Town 11 North, Range 06 East, and Sections 4 and 9 of Birch Run Township, Town 10 North, Range 06 East, Saginaw County, Michigan includes approximately 2.8 miles of Drain Improvements. Work includes, but is not limited to: open channel excavation, tree clearing and grubbing, culvert improvements and replacements, road reconstruction, riprap drain bank protection, field tile outlet repair, seeding, traffic control, project cleanup and restoration.

ARTICLE 2. CONTRACT TIME

2.1 The Work will be substantially completed on or before **August 31, 2016**, and completed and ready for final payment in accordance with paragraph 14.11 of the General Conditions on or before **September 30, 2016**.

2.2 Engineering and inspection costs incurred after the specified final completion date shall be paid by the CONTRACTOR to the OWNER prior to final payment authorization. Charges shall be made at such times and in such amounts as the ENGINEER shall invoice the OWNER, provided however said charges shall be in accordance with the ENGINEER's current rate schedule at the time the costs are incurred. The costs of ENGINEER incurred after the specified final completion date shall be deducted from the CONTRACTOR's progress payments.

2.3 Liquidated Damages. OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not Substantially Complete within the time specified in Article 2.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by OWNER if the Work is not Substantially Complete on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as penalty) CONTRACTOR shall pay OWNER **Five Hundred Dollars** (**$500**) for each day that expires after the time specified in Article 2.1 for Substantial Completion until the Work is Substantially Complete. Liquidated damages charged shall be deducted from the CONTRACTOR's progress payment.

ARTICLE 3. CONTRACT PRICE

3.1 OWNER shall pay CONTRACTOR as provided in the attached Proposal for performance of the Work in accordance with the Contract Documents.

ARTICLE 4. PAYMENT PROCEDURES

Progress payments and retainage under this Contract are governed by the provisions of PA 1980, No. 524 (MCLA 125.1561 et seq.). That Act is incorporated herein by reference and made a part of this Contract.

Without excluding any provisions of the Act from this Contract, but in order to comply therewith and summarize certain provisions, the following shall apply:

4.1 The person representing CONTRACTOR who will submit written requests for progress payments shall be: _____

4.2 The person representing OWNER to whom requests for progress payments are to be submitted shall be: _____

4.3 CONTRACTOR's representative, listed above, shall submit Applications for Payment on the form provided in the Contract Documents in accordance with Article 14 of the General Conditions. Applications for Payment will be processed as provided in the General Conditions.

ARTICLE 5. CONTRACTOR'S REPRESENTATIONS

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

5.1 CONTRACTOR has considered the nature and extent of the Contract Documents, Work, locality, and all local conditions and federal, state and local laws, and regulations that may affect cost, progress, performance, or furnishing of the Work.

5.2 CONTRACTOR has studied carefully all reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Work which were relied upon in the preparation of the Plans and Specifications and which have been identified in the Supplementary Conditions.

5.3 CONTRACTOR has made or caused to be made examinations, investigations and tests and studies of such reports and related data in addition to those referred to in Article 5.2 as he deems necessary for the performance of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations, tests, reports or similar data are or will be required by CONTRACTOR for such purposes.

5.4 CONTRACTOR has correlated the results of all such observations, examinations, investigations, tests, reports and data with the terms and conditions of the Contract Documents.

5.5 CONTRACTOR has given ENGINEER written notice of all conflicts, errors or discrepancies that he has discovered in the Contract documents and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

ARTICLE 6. CONTRACT DOCUMENTS

The Contract Documents which comprise the entire Contract between OWNER and CONTRACTOR are attached to this Agreement, made a part hereof and consists of the following:

6.1 Procurement Requirements (including Advertisement for Bids, Instructions to Bidders, Supplementary Instructions to Bidders, Proposal, Legal Status of Bidder, and other documents listed in the Table of Contents thereof).

6.2 This Agreement

6.3 Performance and other Bonds

6.4 Notice of Award

6.5 Notice to Proceed (if issued)

6.6 Conditions of the Contract (including General Conditions and Supplementary Conditions, if any)

6.7 Specifications contained within Division 01 through 49 of the Contract Documents dated **JANUARY 22, 2016**.

6.8 Plans consisting of sheets dated **JANUARY 22, 2016** and numbered 1 through 17 inclusive with each sheet bearing the following general title: Zehnder Drain Improvements.

6.9 Addenda numbers _____ to _____, inclusive

6.10 Documentation submitted by CONTRACTOR prior to Notice of Award

6.11 Any Modification, including Change Orders, duly delivered after execution of Agreement.

ARTICLE 7. MISCELLANEOUS

7.1 Terms used in this Agreement which are defined in Article 1 of the General Conditions shall have the meanings indicated in the General Conditions.

7.2 No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on any other party without the written consent of the party sought to be bound; and specifically but without limitation, monies that may become due and monies that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

7.3 OWNER and CONTRACTOR each binds himself, his partners, successors, assigns and legal representatives to the other party hereto, his partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

7.4 Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon OWNER and CONTRACTOR, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

IN WITNESS WHEREOF, the parties hereto have signed this Agreement in _____ counterparts. _____ counterparts each have been delivered to OWNER and CONTRACTOR, one counterpart has been delivered to the ENGINEER. All portions of the Contract Documents have been signed or identified by OWNER and CONTRACTOR.

This Agreement will be effective on _____, _____, 20_____.

OWNER _____

By _____

Attest _____

Address for giving notices

_____

_____

_____

CONTRACTOR _____

By _____

Attest _____

Address for giving notices

_____

_____

_____

License No. _____

Agent for service of process: _____

_____

Section 00 5500
Notice to Proceed

To: _____ Date: _____, 20_____

_____

_____

Attention: _____

Project: Zehnder Drain Improvements

Gentlemen:

Please note that the Contract Time under the above Contract will commence to run on _____, _____, 20_____. Within ten (10) days of this date you are to start performing the Work. The dates of Substantial Completion and Final Completion are set forth in the Agreement: they are August 31, 2016, and September 30, 2016, respectively.

In accordance with paragraph 2.05 of the General Conditions, please submit to the ENGINEER the required schedules prior to the scheduling of a Pre-Construction Meeting.

Also, in accordance with paragraph 2.05 of the General Conditions, please request a Pre-Construction Meeting from the ENGINEER prior to delivery of any materials or start of any construction. A minimum of three (3) full working days notice is required to set up the Pre-Construction Meeting. Also, please notify the ENGINEER three (3) full working days in advance of any staking requirements or other activity on the Project.

Work at the site must be started by _____, _____, 20_____.

Copy to ENGINEER:
Wade Trim, Inc.
1403 South Valley Center Drive
Bay City, MI 48706

_____
(OWNER)

By: _____
(Authorized Signature)

Section 00 6112
Performance Bond

Bond No. _____

KNOW ALL MEN BY THESE PRESENTS, That we, _____, a corporation organized and existing under the laws of the State of _____, and duly authorized to transact business in the State of Michigan, hereinafter called the "Principal," and _____ _____, a corporation organized and existing under the laws of the State of _____ _____, and duly authorized to transact business in the State of Michigan, as Surety, hereinafter called "Surety", are held and firmly bound unto _____, as Obligee, and hereinafter called "Obligee," in the just and full sum of _____ ($_____ _____) Dollars lawful money of the United States of America, to be paid to the said Obligee, to which payment well and truly to be made, we bind ourselves, our heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION is such that, WHEREAS, the above Principal has entered into a contract with the said Obligee, dated the _____ day of _____, _____, for

_____

_____

_____

_____.

Herein referred to and made a part hereof as fully and to the same extent as if the same were entirely written herein, and

WHEREAS, it was one of the conditions of the award of the said Obligee, pursuant to which said contract was entered into, that these presents should be executed.

AND THE SAID SURETY, for value received, hereby stipulates and agrees that no change, extension of time, or any other forbearance, alteration or addition to the terms of the contract or to the work to be performed thereunder or the Contract Documents 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, or any other forbearance, alteration or addition to the terms of the contract or to the Work or to the Contract Documents.

NOW, THEREFORE, if the above Principal shall in all respects comply with the terms and conditions of said contract, and his (their or its) obligations thereunder, including the Contract Documents therein referred to and made a part thereof, and such alteration as may be made in such contract or Contract Documents, as herein or therein provided for, then this obligation shall be void; otherwise, this bond and obligation shall be and remain in full force and effect.

Signed and sealed this _____ day of _____.

Signed, sealed and delivered in the presence of:

_____	_____
Witness for CONTRACTOR	(Principal)
	_____
	(Title)
	By _____
_____	_____
Witness for Surety	(Surety)
	_____
	(Title)
_____	By _____
Attorney-In-Fact (Seal)	
_____	_____
Address	Address of Surety
_____	_____
City Zip Code	City Zip Code
_____	_____
Telephone	Telephone

Section 00 6113
Labor and Material Payment Bond

Bond No. _____

KNOW ALL MEN BY THESE PRESENTS, That we, _____, a corporation organized and existing under the laws of the State of _____, and duly authorized to transact business in the State of Michigan, hereinafter called the "Principal," and _____ _____, a corporation organized and existing under the laws of the State of _____ _____, and duly authorized to transact business in the State of Michigan, as Surety, hereinafter called "Surety", are held and firmly bound unto _____, as Obligee, and hereinafter called "Obligee," in the just and full sum of _____ ($_____ _____) Dollars, lawful money of the United States of America, to be paid to the said Obligee, to which payment well and truly to be made, we bind ourselves, our heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION is such that, WHEREAS, the above Principal has entered into a contract with the said Obligee, dated the _____ day of _____, _____, for

_____

_____

_____,

which contract is herein referred to and made a part hereof as fully and to the same extent as if the same were entirely written herein, and

WHEREAS, it was one of the conditions of the award of the said Obligee, pursuant to which said contract was entered into, that these presents should be executed.

AND WHEREAS, this Bond is given in compliance with and subject to the provisions of Act No. 213 of the Public Acts of Michigan for the year 1963, as amended, including all notices, time limitation provisions and other requirements set forth therein, which are incorporated herein by reference.

AND THE SAID SURETY, for value received, hereby stipulates and agrees that no change, extension of time, or any other forbearance, alteration or addition to the terms of the contract or to the Work to be performed thereunder or the Contract Documents 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, or any other forbearance, alteration or addition to the terms of the contract or to the Work or to the Contract Documents.

NOW, THEREFORE, the condition of this obligation is such that if all claimants as defined in Act No. 213 of the Public Acts of Michigan for the year 1963, as amended, are timely paid for all labor and material used or reasonably required for use in the performance of the contract, then this obligation shall be void; otherwise, it shall remain in full force and effect.

Signed and sealed this _____ day of _____.

Signed, sealed and delivered in the presence of:

_____	_____
Witness for CONTRACTOR	(Principal)
	_____
	(Title)
	By _____
_____	_____
Witness for Surety	(Surety)
	_____
	(Title)
_____	By _____
Attorney-In-Fact (Seal)	
_____	_____
Address	Address of Surety
_____	_____
City Zip Code	City Zip Code
_____	_____
Telephone	Telephone

Section 00 6275
Engineer's Certificate for Payment

Job Number: _____ Certificate Number: _____ Date: _____

OWNER: _____

CONTRACTOR: _____

Project: _____

Contract Date: _____

Completion Date: _____ Extended To: _____

Substantial Completion Date : _____ Extended To: _____

Original Contract Price		Total Earned To Date	
Adjustments to Quantities		Retention	
Extras		Deductions	
Total Change Orders		Total Withheld	
Amended Contract Price		Total Net Due	
Less Total Net Due		Less Previous Certificates	
Balance on Contract		Total Balance Due this Certificate	

ENGINEER'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on the data comprising the above application, the ENGINEER to the best of his knowledge, information, and belief and subject to the limitations stated in the Contract Documents certifies to the OWNER that: (1) Work has progressed to the point indicated, (2) that the quality of the Work is in accordance with the Contract Documents, and (3) the CONTRACTOR is entitled to payment of the Total Balance Due This Certificate.

Certified _____ Recommended _____

ENGINEER Date Date

Section 00 6276
Contractor's Application for Payment

Job No. _____ Application No. _____ Date _____

OWNER: _____

CONTRACTOR: _____

Project: _____

Period of this Application for Payment and Declaration _____ to _____

Contract Dated _____

CONTRACTOR'S CERTIFICATION

Total Earned to Date ..... $ _____

Less Total Earned to Date ..... $ _____
Previous Certificate No. _____

Total Earned This Application ..... $ _____

The undersigned CONTRACTOR certifies that to the best of his knowledge, information, and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by him for Work for which previous Certificates for Payment were issued and payments received from the OWNER, and that current payment shows herein is now due.

_____
(CONTRACTOR)

By: _____

Title: _____

CONTRACTOR'S DECLARATION

I hereby declare that I have not, during the period covered by this Application, performed any work, furnished any material, sustained any loss, damage, or delay for any reason, including soil conditions encountered or created, or otherwise done anything for which I shall ask, demand, sue for, or claim compensation from the OWNER, or its agents, and the ENGINEER, or its agents, in addition to the regular items set forth in the Contract as dated above executed between myself and the OWNER, and in the Change Orders for Work issued by the OWNER in writing as provided thereunder, except as I hereby make claim for additional compensation and/or extension of time, as set forth on the itemized statement attached hereto.

_____
(CONTRACTOR)

By: _____

Title: _____

Section 00 6277
Payment Schedule

Job No. _____ Application No. _____ Date _____

Project: _____ Period: _____

Item of Work	Unit	Original Estimated Quantity	Unit Price	Period Quantity	Period Amount	Total Quantity to Date	Total Amount to Date

Section 00 6325
Substitution Request Form

Specification Section # _____

Article # _____

Specified Product _____

Proposed Substitution _____

A.	Does specified product exceed, in any respect proposed substitution?	☐ Y ☐ N
B.	Does substitution affect dimensions shown on Plans?	☐ Y ☐ N
C.	Does substitution affect other trades more than original product?	☐ Y ☐ N
D	Does warranty differ from that specified?	☐ Y ☐ N
E.	Does substitution affect cost to OWNER?	☐ Y ☐ N
F.	Does substitution result in any license fee or royalty?	☐ Y ☐ N

If you indicated "Yes" to any of the items above, attach thorough explanation on your Company letterhead, as follows:

1. Explain any differences between proposed substitution and specified product.
2. Summarize experience with product and manufacturer in Project area.
3. Attach complete technical data and literature.

The undersigned states that the function, appearance, and quality of the proposed substitution is equivalent or superior to the specified item, and that all information above and attached is true and correct.

Submitted by: _____ Date Submitted: _____

Company: _____

Address: _____

Telephone: _____ Fax: _____

Signature: _____

For use by ENGINEER

ENGINEER'S RESPONSE		RESPONSE REQUIRED OF CONTRACTOR	
No Exceptions Taken	☐	None	☐
Note Markings	☐	Confirm	☐
Comments Attached	☐	Resubmit	☐
Rejected	☐		

Engineer's review is for general conformance with the design concept and contract documents. Markings or comments should not be construed as relieving the contractor from compliance with the project plans and specifications, nor departures therefrom. The contractor remains responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selecting fabrication processes, for techniques of assembly, and for performing his work in a safe manner.

By _____ Date _____

Section 00 6349
Work Change Directive

No.: Date of Issuance: Effective Date:

OWNER:

CONTRACTOR:

Contract:

Project Name:

OWNER's Contract No.: ENGINEER's Contract No.:

You are directed to proceed promptly with the following change(s):

Description of Work:

Purpose of
Work Change Directive:

Attachments:
(Documents Supporting Change)

If OWNER or CONTRACTOR believe that the above change has affected Contract Price, any Claim for a Change Order based thereon will involve one or more of the following methods as defined in the Contract Documents:

☐ Unit Prices ☐ Lump Sum ☐ Cost of the Work _____

Estimated increase (decrease) in Contract Price:

$ _____

Estimated increase (decrease) in Contract Time:

Substantial Completion _____ days;

Final Completion _____ days

If the change involves an increase, the estimated amount is not to be exceeded without further authorization.

Recommended:	Authorized:	Acknowledged:
_____	_____	_____
ENGINEER	OWNER	CONTRACTOR
By: _____	By: _____	By: _____

DO NOT PRINT

Work Change Directive Instructions

A. GENERAL INFORMATION

This document was developed for use in situations involving changes in the Work which, if not processed expeditiously, might delay the Project. These changes are often initiated in the field and may affect the Contract Price or the Contract Times. This is not a Change Order, but only a directive to proceed with Work that may be included in a subsequent Change Order.

For supplemental instructions and minor changes not involving a possible change in the Contract Price or the Contract Times a Field Order may be used.

B. COMPLETING THE WORK CHANGE DIRECTIVE FORM

ENGINEER initiates the form, including a description of the items involved and attachments.

Based on conversations between ENGINEER and CONTRACTOR, ENGINEER completes the following:

> METHOD OF DETERMINING CHANGE, IF ANY, IN CONTRACT PRICE: Mark the method to be used in determining the final cost of Work involved and the estimated net effect on the Contract Price. If the change involves an increase in Contract Price and the estimated amount is approached before the additional or changed Work is completed, another Work Change Directive must be issued to change the estimated price or CONTRACTOR may stop the changed Work when the estimated price is reached. If the Work Change Directive is not likely to change the Contract Price, the space for estimated increase (decrease) should be marked "Not Applicable."
>
> METHOD OF DETERMINING CHANGE, IF ANY, IN CONTRACT TIMES: Mark the method to be used in determining the change in Contract Times and the estimated increase or decrease in Contract Times. If the change involves an increase in the Contract Times and the estimated times are approached before the additional or changed Work is completed, another Work Change Directive must be issued to change the times or CONTRACTOR may stop the changed Work when the estimated times are reached. If the Work Change Directive is not likely to change the Contract Times, the space for estimated increase (decrease) should be marked "Not Applicable."

Once ENGINEER has completed and signed the form, all copies should be sent to OWNER for authorization because ENGINEER alone does not have authority to authorize changes in Price or Times. Once authorized by OWNER, a copy should be sent by ENGINEER to CONTRACTOR. Price and Times may only be changed by Change Order signed by OWNER and CONTRACTOR with ENGINEER's recommendation.

Once the Work covered by this directive is completed or final cost and times are determined, CONTRACTOR should submit documentation for inclusion in a Change Order.

THIS IS A DIRECTIVE TO PROCEED WITH A CHANGE THAT MAY AFFECT THE CONTRACT PRICE OR THE CONTRACT TIMES. A CHANGE ORDER, IF ANY, SHOULD BE CONSIDERED PROMPTLY.

Section 00 6363
Change Order Form

Project: Date

Contractor: Project No.

This Change Order, when approved, will constitute authority for [Change in Plans] [Extra Work] as indicated below:

Description of Work and Reason	Unit	Est. Quant.	Unit Price	Amount of Increase	Amount of Decrease
Recommend changes and extras, up to and including this recommendation, are equal to a net [increase] [decrease] of _____ of the Contract Price.			Totals:		
			Net Decrease:		

Do Not Pay From This Document

Approved: _____ Accepted: _____

By: _____ Approved By: _____

Section 00 6516
Certificate of Substantial Completion

Project: _____

Owner: _____

Contractor: _____

Contract Date: _____ Project No.: _____

Date of Issuance: _____

Project or Designated Portion Shall Include: _____

_____

The Work performed under this Contract has been reviewed and found to be Substantially Complete. The date of Substantial Completion of the Project or portion thereof designated above is hereby established as _____ which is also the date of commencement of applicable warranties required by the Contract Documents except as stated below.

DEFINITION OF DATE OF SUBSTANTIAL COMPLETION

The date of Substantial Completion of the Work or designated portion thereof, is the date certified by ENGINEER when construction is sufficiently complete, in accordance with the Contract Documents, so OWNER can occupy or utilize the Work or designated portion thereof for the use for which it is intended, as expressed in the Contract Documents.

A list of items to be completed or corrected, prepared by ENGINEER is attached hereto. The failure to include any items on such list does not alter the responsibility of CONTRACTOR to complete all Work in accordance with the Contract Documents. The date of commencement of warranties for items on the attached list will be the date of final payment unless otherwise agreed to in writing.

The responsibilities of OWNER and CONTRACTOR for security, maintenance, heat, utilities, damage to the Work, and insurance shall be as follows:

1.
2.

(Note: OWNER's and CONTRACTOR's legal and insurance counsel should determine and review insurance requirements and coverage; CONTRACTOR shall secure consent of surety company, if any.)

OWNER shall have forty-five (45) days after receipt of this certificate during which he may make written objection to ENGINEER and CONTRACTOR as to any provisions of the certificate or attached list. Such objection may be cause for this Certificate of Substantial Completion to be null and void.

Wade Trim, Inc.	_____	_____
Engineer	Authorized Representative	Date

Section 00 6520
Sworn Statement

STATE OF MICHIGAN

COUNTY OF _____}

_____ being duly sworn, deposes and says:

That _____ is the (CONTRACTOR) (Subcontractor) for an improvement to the following described real property situated in _____ County, Michigan described as follows: _____

_____

_____

_____

(Insert Legal Description of Property)

That the following is a statement of each Subcontractor and Supplier and laborer, for which the payment of wages or fringe benefits and withholdings is due but unpaid, with whom the (CONTRACTOR) (Subcontractor) has (contracted) (subcontracted) for performance under the contract with the OWNER or lessee thereof, and that the amounts due to the persons as of the date hereof are correctly and fully set forth opposite their names, as follows:

Name of Subcontractor, Supplier, or Laborer	Type of Improvement Furnished	Total Contract Price	Amount Already Paid	Amount Currently Owing	Balance to Complete (optional)	Amount of Laborer Wages Due but Unpaid	Amount of Laborer Fringe Benefits and Withholdings Due But Unpaid
	TOTALS:						

(Some columns are not applicable to all persons listed)

(CONTINUED)

That the CONTRACTOR has not procured material from, or subcontracted with, any person other than those set forth on the reverse side and owes no money for the improvement other than the sums set forth on the reverse side.

Deponent further says that he or she makes the foregoing statement as the (CONTRACTOR) (Subcontractor) or as _____ of the (CONTRACTOR) (Subcontractor) for the purpose of representing to the OWNER or lessee of the described on the reverse side premises and his or her agents that the property described on the reverse side is free from claims of construction liens, or the possibility of construction liens, except as specifically set forth on the reverse side and except for claims of construction liens by laborers which may be provided pursuant to section 109 of the construction lien act, Act No. 497 of the Public Acts of 1980, as amended, being section 570.1109 of the Michigan Compiled Laws.

WARNING TO OWNER: AN OWNER OR LESSEE OF THE PROPERTY DESCRIBED ON THE REVERSE SIDE MAY NOT RELY ON THIS SWORN STATEMENT TO AVOID THE CLAIM OF A SUBCONTRACTOR, SUPPLIER, OR LABORER WHO HAS PROVIDED A NOTICE OF FURNISHING OR A LABORER WHO MAY PROVIDE A NOTICE OF FURNISHING PURSUANT TO SECTION 109 OF THE CONSTRUCTION LIEN ACT TO THE DESIGNEE OR TO THE OWNER OR LESSEE IF THE DESIGNEE IS NOT NAMED OR HAS DIED.

_____

(Deponent)

WARNING TO DEPONENT: A PERSON, WHO WITH INTENT TO DEFRAUD, GIVES A FALSE SWORN STATEMENT IS SUBJECT TO CRIMINAL PENALTIES AS PROVIDED IN SECTION 110 OF THE CONSTRUCTION LIEN ACT, ACT NO. 497 OF THE PUBLIC ACTS OF 1980, AS AMENDED, BEING SECTION 570.1110 OF THE MICHIGAN COMPILED LAWS.

Subscribed and sworn to before me this _____ day of _____, 20_____.

_____

Notary Public

_____ County, Michigan

My Commission Expires _____

INSTRUCTIONS

1. A Sworn Statement in the preceding form must be provided before any CONTRACTOR or Subcontractor can file a Complaint, Cross-Claim, or Counter-Claim to enforce a construction lien.
2. An OWNER or lessee may withhold payment to a CONTRACTOR or Subcontractor who has not provided a Sworn Statement. An OWNER or lessee may withhold from a CONTRACTOR or Subcontractor who has provided a Sworn Statement the amount sufficient to pay all sums shown on the statement as owing Subcontractors, Suppliers, and laborers, or the amount shown to be due to lien claimants who have provided Notices of Furnishing pursuant to the Construction Lien Act of 1980.
3. An OWNER or lessee may rely on a Sworn Statement to avoid a lien claim unless the lien claimant has provided the OWNER or lessee with a Notice of Furnishing pursuant to the Construction Lien Act of 1980.
4. If the contract provides for payments by the OWNER to the general contractor, if any, in the normal course of construction, but the OWNER elects to pay lien claimants directly, the first time the OWNER elects to make payment directly to a lien claimant he or she shall provide at least 5 business days' notice to the general contractor of the intention to make direct payment. Subsequent direct disbursements to lien claimants need not be preceded by the 5-day notice provided in this section unless the OWNER first returns to the practice of paying all sums to the general contractor.

Section 00 7200
General Conditions

Article 1 Definitions

1.01 Defined Terms

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

Addenda - Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the Contract Documents.

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

Application and Certificate for Payment - The form included in the Contract Documents which is to be used by CONTRACTOR in requesting progress or final payment and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

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

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

Bidding Requirements - The Advertisement for Bids, Instructions to Bidders, Supplemental Instructions to Bidders, Proposal, Legal Status of Bidder, Bid Bond, and any other documents identified in the Proposal, to be submitted with the Bid.

Bonds - Bid, Performance and Payment bonds and other instruments of security.

Change Order - A written order to the CONTRACTOR signed by the OWNER and the ENGINEER, issued after execution of the Contract, authorizing a change in the Work or an adjustment in the Contract Price or the Contract Time. The Contract Price and Contract Time may be changed only by Change Order. A Change Order signed by the CONTRACTOR indicates his agreement therewith, including the adjustment in the Contract Price or Contract Time.

Construction Change Requisition - A written directive issued by the ENGINEER which clarifies or interprets the Contract Documents or requests a change in the Work and may initiate a Work Order and/or Change Order. In no circumstances shall a Construction Change Requisition be construed as an order to proceed with the Work.

Contract Documents - The Bidding Requirements, Agreement, Performance and other Bonds, Notice of Award, Notice to Proceed, Contract Forms, Conditions of the Contract, Specifications, Plans, Addenda, Documentation submitted by CONTRACTOR prior to Notice of Award and any Written Amendments, including Change Orders, Work Orders or Construction Change Requisitions duly delivered after execution of Agreement.

Contract Price - The monies or other considerations payable by OWNER to CONTRACTOR for completion of acceptable Work in accordance with the Contract Documents as stated in the Agreement.

Contract Time - The number of days or the date stated in the Agreement: (i) to achieve Substantial Completion, and (ii) to complete the Work so that it is ready for final payment as evidenced by ENGINEER's written recommendation of final payment in accordance with Article 14 subparagraph 11.

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

Day - A calendar day of 24 hours measured from midnight to the next midnight.

Defective - An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty or deficient, in that it does not conform to the Contract Documents or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER's recommendation of final payment.

Drawings - That part of the Contract Documents prepared or approved by ENGINEER which graphically shows the scope, extent, and character of the Work to be performed by CONTRACTOR. Shop Drawings and other Contractor submittals are not Drawings as so defined.

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

ENGINEER - The person, firm, or corporation identified in the Supplemental Instructions to Bidders.

Field Order - A written order issued by ENGINEER which clarifies or interprets the Contract Documents or orders minor changes in the Work in accordance with Article 9 subparagraph 4 and 5 but which does not involve a change in the Contract Price or the Contract Time.

General Requirements - Specification Sections in Division 1 of the Specifications.

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

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

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

Notice to Proceed - A written notice given by OWNER to CONTRACTOR (with a copy to ENGINEER) fixing the date on which the Contract Time will commence to run and on which CONTRACTOR shall start to perform his obligation under the Contract Documents.

OWNER - The public body or authority, public agency as defined by Act 254 of PA 1980 (MCLA 125.1651 et seq.), corporation, limited liability company, association, partnership, or individual with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be provided and as identified in the Supplemental Instructions to Bidders.

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

Plans - The Drawings which show the extent, character and Scope of the Work to be furnished and performed by CONTRACTOR and which have been prepared or approved by the ENGINEER or OWNER.

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

Project Manual - The volume assembled for the Project which includes: Part I - Bidding Requirements, Part II - Contract Forms, Part III - Conditions of the Contract and Part IV - Specifications.

Proposal - The offer or bid of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

Radioactive Material - Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 as amended.

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

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

Shop Drawings - All drawings, diagrams, illustrations, schedules and other data or information required by the Contract Documents which are specifically prepared or assembled by or for CONTRACTOR and submitted by CONTRACTOR to illustrate material or equipment for some portion of the Work.

Specifications - Part IV of the Contract Documents which consist of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.

Project Specifications are those portions of Part IV of the Contract Documents which have been prepared specifically for this Project and which are identified by the job number in the lower right hand corner of each page and are in single column format.

Standard Specifications are all other portions of Part IV of the Contract Documents and which are in double column format.

Standard Specification Section Revisions - Section 00 9120 of the Specifications which amends or supplements the Standard Specification Sections.

Subcontractor - An individual, firm or corporation having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the site.

Substantial Completion - The Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER as evidenced by his definitive Certificate of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it was intended; or if no such certificate is issued, when the Work is complete and ready for final payment as evidenced by ENGINEER's written recommendation of final payment in accordance with Article 14 subparagraph 11. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

Supplemental General Conditions - The part of the Contract Documents which amends or supplements these General Conditions.

Supplemental Instructions to Bidders - The part of the Contract Documents which amends or supplements the Instructions to Bidders.

Supplier - A manufacturer, fabricator, supplier, distributor, material man, or vendor having a direct contract with CONTRACTOR, or with any Subcontractor, or with OWNER, to furnish materials or equipment to be incorporated in the Work by CONTRACTOR or any Subcontractor.

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

Unit Price Work - Work to be paid for on the basis of unit prices.

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

Work Order - A written directive to CONTRACTOR, issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER, ordering an addition, deletion or revision in the Work, or responding to differing or unforeseen physical conditions under which the Work is to be performed as provided in Article 4 subparagraph 3 or to emergencies under Article 6 subparagraph 18. A Work Order will not change the Contract Price or Contract Time, but is evidence that the parties expect that the change directed or documented by a Work Order will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Time as provided in Article 10 subparagraph 1.

Written Amendment - (a) A written amendment of the Contract Documents signed by OWNER and CONTRACTOR (b) a Change Order, or (c) a Field Order. A Written Amendment may only be issued after the effective date of the Agreement and normally deals with non-engineering or non-technical rather than strictly construction related aspects of the Contract Documents.

1.02 Terminology

The following words, terms, or phrases are not defined but, when used in the Contract Documents, have the following meaning:

Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed," "as approved" or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper" or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of ENGINEER as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate, in general, the completed Work for compliance with the technical requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Article 9 subparagraph 10 or any other provision of the Contract Documents.

The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

Article 2 Preliminary Matters

2.01 Delivery of Bonds and Insurance

When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds and Insurance Certificates and other evidence of Insurance requested as CONTRACTOR may be required to furnish in accordance with Article 5.

2.02 Copies of Documents

OWNER shall furnish to CONTRACTOR up to five (5) copies of the Contract Documents as are reasonably necessary for the execution of the Work. Additional copies will be furnished, upon request, at the cost of reproduction.

2.03 Commencement of Contract Time; Notice to Proceed

Time is of the essence in the performance of the Work. The Contract Time will commence to run on the 30th day after the effective date of the Agreement, or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within thirty days after the effective date of the Agreement. In no event will the Contract Time commence to run later than the thirtieth day after the effective date of the Agreement. All time limits stated in the Contract Documents are of the essence of the Agreement.

2.04 Starting the Project

CONTRACTOR shall start to perform the Work within ten (10) days of when the Contract Time commences to run, but no Work shall be done at the site prior to the date on which the Contract Time commences to run. CONTRACTOR shall notify the ENGINEER at least three (3) working days in advance of the time he intends to start Work.

2.05 Preconstruction Meeting

Prior to the delivery of materials or the start of any construction, CONTRACTOR shall request a Preconstruction Meeting from the ENGINEER. A minimum of three (3) full working days' notice shall be required.

Prior to the scheduling of the Preconstruction Meeting, CONTRACTOR shall submit to ENGINEER for review:

A. A preliminary progress schedule indicating the starting and completion dates of the various stages of the Work, including any Milestones specified in the Contract Documents;

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

C. An estimated monthly payment schedule, and a preliminary schedule of values for all of the Work.

The Preconstruction Meeting will be held for review and acceptance of the schedules, to establish procedures for handling Shop Drawings and other submittals, for processing Applications for Payment, and to establish a working understanding among the parties as to the Work.

Article 3 Contract Documents Intent and Reuse

3.01 Intent

The Contract Documents comprise the entire Contract between OWNER and CONTRACTOR concerning the Work and supersede all prior representations and/or negotiations. They may be altered only by a Written Amendment.

The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be governed by the Laws and Regulations of the place of the Project.

3.02 Reference to Standards and Specifications of Technical Societies

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

It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result shall be furnished and performed whether or not it is specifically called for. When words or phrases which have a well-known technical or construction industry or trade meaning are used to describe Work, materials or equipment, such words or phrases shall be interpreted in accordance with that meaning. Clarifications and interpretations shall be issued by ENGINEER as provided in Article 9 subparagraph 4.

No provision of any standard, specification, manual, code or instruction shall be effective to change the duties and responsibilities of OWNER, CONTRACTOR or ENGINEER, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall it be effective to assign to OWNER, ENGINEER or any of ENGINEER's Consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of Article 9 subparagraph 10 or any other provision of the Contract Documents.

3.03 Reporting and Resolving Discrepancies

Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error, ambiguity, or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby.

If, during the performance of the Work, CONTRACTOR discovers any conflict, error, ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, CONTRACTOR shall report it to ENGINEER in writing at once, and, CONTRACTOR shall not proceed with the Work affected thereby (except in an emergency as authorized by Article 6. Subparagraph 8). However, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any such conflict, error, ambiguity or discrepancy unless CONTRACTOR knew or reasonably should have known thereof.

Except as otherwise specifically stated in the Contract Documents or as may be provided by amendment or supplement issued by one of the methods indicated in Article 3 subparagraph 5, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity or discrepancy between the provisions of the Contract Documents and;

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

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

3.04 Order of Precedence

In resolving conflicts, errors or discrepancies between Plans and Specifications:

(i) Figured dimensions shall govern over scaled dimensions;
(ii) Plans shall govern over Standard Specifications; and
(iii) Project Specifications shall govern over Standard Specifications and Plans.

3.05 Amending and Supplementing Contract Documents

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

(i) Formal Written Amendment,
(ii) Change Order (pursuant to Article 10 subparagraph 3), or
(iii) Work Order (pursuant to Article 10 subparagraph 1)

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

(i) Field Order (pursuant to Article 9 subparagraph 5),
(ii) ENGINEER's review of a Shop Drawing or Sample (pursuant to Article 6 subparagraph 21),
(iii) ENGINEER's Written interpretation or clarification (pursuant to Article 9 subparagraph 4).

3.06 Reuse of Documents

Neither CONTRACTOR nor any Subcontractor, manufacturer, fabricator, Supplier, distributor, or other person or organization performing or furnishing any of the Work under a direct or indirect contract with OWNER

(i) shall have or acquire any title to or ownership rights in any of the Plans, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER or ENGINEER's Consultant, and

(ii) they shall not reuse any of such Plans, Specification, other documents or copies on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adaptation by ENGINEER.

3.07 Electronic Data

Copies of data furnished by OWNER or ENGINEER to CONTRACTOR or CONTRACTOR to OWNER or ENGINEER that may be relied upon are limited to the printed copies (also known as hard copies).

Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.

When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

Article 4 Availability of Lands; Subsurface & Physical Conditions; Reference Points

4.01 Availability of Lands

OWNER shall furnish, as indicated in the Contract Documents and not later than the established Work Starting Date, the lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of CONTRACTOR. OWNER shall identify any encumbrances or restrictions not of general application but specifically related to use of lands so furnished with which CONTRACTOR will have to comply in performing the Work. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by OWNER, unless otherwise provided in the Contract Documents. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment unless otherwise provided in the Contract Documents.

4.02 Physical Conditions - Investigations and Reports

Reference is made to the Supplemental General Conditions for identification of those reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Work which have been relied upon in preparation of the Contract Documents. Such reports are not guaranteed as to accuracy or completeness and are not part of the Contract Documents.

The locations of utilities or other physical conditions relating to existing surface or subsurface structures at or contiguous to the site as shown on the Plans are taken from drawings from sources believed to be reliable. Neither the OWNER nor the ENGINEER will be responsible for any omissions of, or variations from, the indicated location of existing utilities which may be encountered in the Work.

(i) CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Except for such reliance on such "technical data", CONTRACTOR may not rely upon or make any claim against OWNER, ENGINEER or any of ENGINEER's Consultants with respect to: the completeness of such reports and drawings for CONTRACTOR's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto, or

(ii) Other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings, or

(iii) Any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such data, interpretations, opinions or information.

The cost of all the following will be included in the Contract Price and CONTRACTOR shall have full responsibility for:

(i) Reviewing and checking all such information and data,

(ii) Locating all Underground Facilities during construction,

(iii) Coordination of the Work with the owners of such Underground Facilities, and

(iv) Safety and protection of all such Underground Facilities as provided in Article 6 subparagraph 15 and repairing any damage thereto resulting from the Work.

4.03 Unforeseen Physical Conditions

If CONTRACTOR discovers one or both of the following physical conditions of surface or subsurface at the Project or improvement site, before disturbing the physical condition, the CONTRACTOR shall promptly notify OWNER and ENGINEER of the physical condition in writing:

(i) A subsurface or a latent physical condition at the site differing materially from those indicated in the Contract Documents, or

(ii) An unknown physical condition at the site of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for the improvement project.

Upon receiving notice thereof, OWNER, through ENGINEER, shall promptly investigate the physical condition. If OWNER, through ENGINEER, determines that the physical conditions do materially differ and will cause an increase or decrease in cost or additional time needed to perform the contract, such determination shall be made in writing and an equitable adjustment shall be made and the Contract Documents modified in writing accordingly. CONTRACTOR shall not be entitled to claim for additional costs or time because of a physical condition unless CONTRACTOR has complied with the notice requirements of this provision. CONTRACTOR shall not be entitled to claim an adjustment under the Contract Documents after CONTRACTOR has received final payment under the contract.

4.04 Reference Points

OWNER shall provide engineering surveys for construction to establish property corners, monuments, bench marks and similar reference points which in his judgment are necessary to enable CONTRACTOR to proceed with the Work. CONTRACTOR shall be responsible for the preservation of established reference points and shall make no changes or relocations without the prior written approval of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations. Reference points destroyed by negligence of CONTRACTOR will be replaced by OWNER at the expense of CONTRACTOR. Construction Staking will be furnished by OWNER as provided in Division 01 of the Specifications.

4.05 Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material

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

Upon discovering any such material, CONTRACTOR shall immediately:

(i) Stop all Work in connection with such hazardous condition and in any area affected thereby (except in emergency as required by Article 6 subparagraph 18), and

(ii) Notify OWNER and ENGINEER (and thereafter confirm such notice in writing). OWNER shall promptly consult with ENGINEER concerning the necessity for OWNER to retain a qualified expert to evaluate such hazardous condition or take corrective action, if any.

CONTRACTOR shall not be required to resume Work in connection with such hazardous condition or in any such affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR special written notice:

(i) Specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or

(ii) Specifying any special conditions under which such Work may be resumed safely.

If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Terms as a result of such Work stoppage or such special conditions under which Work is agreed by CONTRACTOR to be resumed, either party may make a claim therefor as provided in Article 10 subparagraph 5.

If after receipt of such special written notice CONTRACTOR does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then OWNER may order such portion of the Work that is in connection with such hazardous condition or in such affected area to be deleted from the Work. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Time as a result of deleting such portion of the Work, then either party may make a claim therefor as provided in Article 10 subparagraph 5. OWNER may have such deleted portion of the Work performed by OWNER's own forces or others in accordance with Article 7.

To the fullest extent permitted by Laws and Regulations, OWNER shall indemnify and hold harmless CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and the officers, directors, employees, agents, other consultants and subcontractors of each and any of them from and against all claims, costs, losses, damages and expenses arising out of or resulting from such hazardous condition per this Article 4 subparagraph 5, provided that:

(i) Any such claim, cost, loss or damage is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, and

(ii) Nothing in this Article 4 subparagraph 5shall obligate OWNER to indemnify any person or entity from and against the consequences of that person's or entity's own negligence.

The provisions of Article 4 subparagraph 3 are not intended to apply to Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material uncovered or revealed at the site.

Article 5 Bonds and Insurance

5.01 Performance and Other Bonds

CONTRACTOR shall furnish performance and payment Bonds, on the form included in the Contract Documents, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one (1) year after the date when final payment becomes due, except as otherwise provided by Laws and Regulations or as specified in the Bond. CONTRACTOR shall also furnish such other Bonds as are required by the Supplemental General Conditions.

All Bonds shall be in the forms prescribed by the Contract Documents and be executed by such Sureties as:

(i) are licensed to conduct business in the state where the Project is located, and

(ii) are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the U.S. Department of Treasury, Financial Management Service, Surety Bond Branch.

All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

If the Surety on any Bond furnished by CONTRACTOR is declared as bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of clauses (i) and (ii) of paragraph 5.01, CONTRACTOR shall within five (5) days thereafter substitute another Bond and Surety, both of which shall be acceptable to OWNER.

5.02 Licensed Insurers and Sureties

All Bonds and insurance required by the Contract Documents to be purchased and maintained by OWNER or CONTRACTOR shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue Bonds or insurance policies for the limits and coverages so required.

5.03 Insurance

The CONTRACTOR shall purchase and maintain during the term of the project such insurance as will protect him, the OWNER(s) and the ENGINEER(s) from claims arising out of the Work described in this Contract and performed by the CONTRACTOR, Subcontractor(s) or Sub-subcontractor(s) consisting of:

A. Workers' Compensation Insurance including Employer's Liability to cover employee injuries or disease compensable under the Workers' Compensation Statutes of the states in which Work is conducted under this Contract; disability benefit laws, if any; or Federal compensation acts such as U.S. Longshoremen or Harbor Workers', Maritime Employment, or Railroad Compensation Act(s), if applicable. Self-insurance plans approved by the regulatory authorities in the state in which Work on this Project is performed are acceptable.

B. An occurrence form Commercial General Liability policy to cover bodily injury to persons other than employees and for damage to tangible property, including loss of use thereof, plus appropriate endorsements to protect OWNER, and ENGINEER against claims, demands, and lawsuits from employees of the CONTRACTOR and Subcontractors, including the following exposures:

(a) All premises and operations.

(b) Explosion, collapse and underground damage.

(c) CONTRACTOR's Protective coverage for independent contractors or Subcontractors employed by him.

(d) Broad form blanket, contractual liability for the obligation assumed in the Indemnification or Hold Harmless agreement found in the General Conditions or Supplementary General Conditions of this Contract.

(e) The usual Personal Injury Liability endorsement with no exclusions pertaining to employment.

(f) Products and Completed Operations coverage. This coverage shall extend through the Contract guarantee period.

(g) Broad form property damage.

(h) Cross liability endorsement.

C. A Comprehensive Automobile Liability policy to cover bodily injury and property damage arising out of the ownership, maintenance or use of any motor vehicle, including owned, nonowned and hired vehicles. The Comprehensive General Liability and the Comprehensive Auto Liability shall be written by the same insurance carrier, though not necessarily in one policy.

D. CONTRACTOR shall purchase for OWNER an OWNER's Protective Liability policy to protect OWNER, ENGINEER, their consultants, agents, employees and such public corporations in whose jurisdiction the Work is located for their liability for Work performed by CONTRACTOR, the Subcontractor(s) or the Sub-subcontractor(s) under this Contract.

E. When a limit of liability is identified in the Supplemental General Conditions, CONTRACTOR shall purchase a Builder's Risk-Installation Floater in a form acceptable to OWNER covering property of the Project for the full cost of replacement as of the time of any loss which shall include, as named insureds,

(a) CONTRACTOR,
(b) all Subcontractors,
(c) all Sub-subcontractors,
(d) OWNER and ENGINEER(s) or Architect(s), as their respective interests may prove to be at the time of loss,

covering insurable property which is the subject of this Contract, whether in place, stored at the job site, stored elsewhere, or in transit at the risk of the insured(s).

Coverage shall be effected on an "All Risk" form including, but not limited to, the perils of fire, wind, vandalism, collapse, theft, flood and earthquake, with removal of passive design error exclusion. Except as may otherwise be required by OWNER, CONTRACTOR may arrange for such deductibles as he deems to be within his ability to self-assume, but he will be held solely responsible for the amount of such deductible and for any co-insurance penalties. Any insured loss shall be adjusted with OWNER and CONTRACTOR and paid to OWNER and CONTRACTOR as Trustee for the other insureds.

F. Umbrella or Excess Liability:

1. CONTRACTOR is granted the option of arranging coverage under a single policy for the full limit required or by a combination of underlying policies with the balance provided by an Excess or Umbrella Liability policy equal to the total limit(s) requested. Umbrella or Excess policy wording shall be at least as broad as the primary or underlying policy(ies) and shall apply both to the CONTRACTOR's General Liability and to his Automobile Liability Insurance and shall be written on an occurrence basis.

G. Railroad Protective Liability:

1. Where any of the Work is within a railroad right-of-way or where a limit of liability is identified in the Supplemental General Conditions, CONTRACTOR will provide coverage in the name of each railroad company having jurisdiction over rights-of-way across which Work under the Contract is to be performed. The form of policy and the limits of liability shall be determined by the railroad company(ies) involved. See the Supplemental General Conditions for limits and coverage requested.

5.04 Limits of Liability

The required limits of liability for insurance coverages required in Article 5 subparagraph 3 shall be not less than those specified in the Supplemental General Conditions.

5.05 Notice of Cancellation or Intent Not to Renew

Policies will be endorsed to provide that at least 30 days written notice shall be given to OWNER and to ENGINEER of cancellation, intent not to renew, or material modification of the coverage.

5.06 Evidence of Coverage

Prior to commencement of the Work, CONTRACTOR shall furnish to OWNER and ENGINEER, Certificates of Insurance in force on the OWNER's Form of Certificate provided in the Contract Documents. Other forms of Certificate are acceptable only if:

(i) they include all of the items prescribed in OWNER's Form of Certificate, including agreement to cancellation provisions outlined in Article 5 subparagraph 5 above and

(ii) they have approval of OWNER and ENGINEER.

Prior to the commencement of the Work, CONTRACTOR shall furnish to OWNER complete "originally signed" copies of OWNER's Protective Liability Policy. The number of copies shall be the same as the number of counterparts of the Agreement. OWNER reserves the right to request complete copies of other policies if deemed necessary to ascertain details of coverage not provided by the certificates. Such policy copies shall be "Originally Signed Copies," and so designated.

5.07 Qualification of Insurers

A. In order to determine financial strength and reputation of insurance carriers, all companies providing the coverages required shall be licensed or approved by the Insurance Bureau of the state in which the Project is located and shall have a financial rating not lower than XI and a policyholder's service rating no lower than B+ as listed in A.M. Best's Key Rating Guide, current edition. Companies with ratings lower than B+:XI will be acceptable only upon written consent of OWNER.

5.08 Damage Claims - Acknowledgment and Reports

CONTRACTOR shall furnish to OWNER an acknowledgment receipt from the insurance carrier for each damage claim against the Project. The receipt shall include the insurance carrier's assigned claim number.

Upon request, CONTRACTOR or his insurance carrier shall also furnish to OWNER a status report on all damage claims. This report shall include inspections made, the disposition of claims, and what action has been taken towards settlement of each claim.

Failure of CONTRACTOR to comply with this paragraph may result in the amount of such damage claims being withheld from CONTRACTOR's monthly pay estimate. Such withholding shall be reimbursed in the monthly pay estimate following compliance with this paragraph.

5.09 Cost of Insurance

The unit cost of the insurance herein specified will not be a specific bid item, but the cost of such insurance will be included by CONTRACTOR in the various unit prices bid.

5.10 Waiver of Rights

OWNER and CONTRACTOR intend that all policies purchased in accordance with Article 5 subparagraph 3 will protect OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and all other persons or entities identified in the Supplemental General Conditions to be listed as insureds or additional insureds in such policies and will provide primary coverage for all losses and damages caused by the perils covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder.

OWNER and CONTRACTOR waive all rights against each other and their respective officers, directors, employees and agents for all losses and damages caused by, arising out of or resulting from any of the perils covered by such policies and any other property insurance applicable to the Work; and in addition, waive all such rights against Subcontractors, ENGINEER, ENGINEER's Consultants and any other persons or entities identified in the Supplemental General Conditions to be listed as insureds or additional insureds under such policies for loss and damages so caused.

None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by OWNER as trustee or otherwise payable under any policy so issued.

5.11 Receipt and Application of Insurance Proceeds

Any insured loss under the policies of insurance required Article 5 subparagraph 3.E will be adjusted with OWNER and made payable to OWNER as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause.

If no other special agreement is reached the damaged Work shall be repaired or replaced, the monies so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order or Written Amendment.

OWNER as fiduciary shall have power to adjust and settle any loss under the policies required by Article 5 subparagraph 3.E with the insurers unless one of the parties in interest shall object in writing within fifteen days after the occurrence of loss to OWNER's exercise of this power. If such objection be made, OWNER as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, OWNER as fiduciary shall adjust and settle the loss with the insurers.

Article 6 CONTRACTOR's Responsibilities

6.01 Supervision and Superintendence

CONTRACTOR shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. CONTRACTOR shall be responsible to see that the finished Work complies accurately with the Contract Documents.

CONTRACTOR shall keep on the Work at all times during its progress a competent superintendent, who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. Any superintendent or foreman who neglects to have Work done in accordance with the Plans and Specifications shall be removed from the Project. The superintendent will be CONTRACTOR's representative at the site and shall have authority to act on behalf of CONTRACTOR. All communications given to the superintendent shall be as binding as if given to CONTRACTOR.

6.02 Labor and Working Hours

CONTRACTOR shall provide competent, suitably qualified personnel in their various duties. CONTRACTOR shall at all times maintain good discipline and order at the site. Except as otherwise required for the safety or protection of persons, the Work, property at the site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all Work at the site shall be performed during regular working hours (7:00 a.m. to 7:00 p.m.), and CONTRACTOR will not permit the performance of Work on Sunday or any legal holiday without OWNER's written consent given after prior written notice to ENGINEER.

6.03 Services, Materials and Equipment

Unless otherwise specified in Section 01 1100, Summary of Work, CONTRACTOR shall furnish and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work. All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Contract Documents shall expressly run to the benefit of OWNER. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence, (including reports of required tests) as to the kind and quality of materials and equipment to be incorporated in the Work. CONTRACTOR shall not use material in the Work until the necessary sampling and testing has been performed. All materials which do not meet the requirements of the Specifications at the time they are to be used will be rejected, and unless otherwise permitted by ENGINEER, shall be plainly marked and removed immediately from the Work.

All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable manufacturer, fabricator, supplier or distributor, except as otherwise provided in the Contract Documents.

6.04 Substitutes and "Or-Equals"

Whenever an item of materials or equipment is specified or described in the Contract Documents for installation in the Work by using the name of a proprietary item or the name of a particular manufacturer, fabricator, supplier or distributor, the specification or description is intended to establish the type, function and quality required. Unless the specification or description contains or is followed by words indicating that no like, equivalent or "or-equal" item or no substitution is permitted, other items of material or equipment or materials or equipment of other manufacturers, fabricators, suppliers or distributors may be accepted by ENGINEER under the following circumstances:

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

B. Substitute Items: If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR does not qualify as an "or-equal" item under Article 6 subparagraph 4.A, it will be considered a proposed substitute item.

CONTRACTOR shall submit sufficient information as provided below to allow ENGINEER to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. The procedure for review by ENGINEER will include the following, as supplemented in the General Requirements, and as Engineer may decide is appropriate under the circumstances. Requests for review of substitute items of material and equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR.

If CONTRACTOR wishes to furnish or use a substitute item of material or equipment CONTRACTOR shall make written application to ENGINEER on the Substitution Request Form provided for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified and be suited to the same use and capable of performing the same function as that specified. The application will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not acceptance of the proposed substitute for use in the Work will require a change in the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) to adapt the design to the proposed substitute, and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty.

All variations of the proposed substitute from that specified shall be identified in the application and available maintenance, repair and replacement service shall be indicated. The application shall also contain an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which shall be considered by ENGINEER in evaluating the proposed substitute. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute.

All data to be provided by CONTRACTOR in support of any proposed "or-equal" or substitute item will be at CONTRACTOR's expense. ENGINEER will be the sole judge of acceptability, and no "or-equal" or substitute shall be ordered, installed or utilized without ENGINEER's prior written acceptance. OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any "or-equal" or substitute.

ENGINEER will record time required by ENGINEER and ENGINEER's consultants in evaluating substitutions proposed by CONTRACTOR and in making changes in the Contract Documents occasioned thereby. Whether or not ENGINEER accepts a proposed substitute, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's consultants for evaluating any proposed substitute and in making any changes in the Contract Documents.

6.05 Concerning Subcontractors

CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organizations, including those who are to furnish the principal items of materials or equipment, whether initially or as a substitute, against whom OWNER or ENGINEER may have reasonable objection. CONTRACTOR shall furnish ENGINEER a complete list of any Subcontractor, Supplier or other person or organization furnishing principal items of material or equipment within four (4) days of request. Failure to object to any Subcontractor, Supplier, other person or organization by OWNER or ENGINEER shall not constitute a waiver of any right of OWNER or ENGINEER to reject defective Work.

If OWNER or ENGINEER after due investigation has reasonable objection to any Subcontractor, Supplier, other person or organization proposed by CONTRACTOR after the Notice of Award, CONTRACTOR shall submit an acceptable substitute and the Contract Price shall be increased or decreased by the difference in cost occasioned by such substitution, and an appropriate Change Order shall be issued. CONTRACTOR shall not be required to employ any Subcontractor, Supplier, other person or organization against whom CONTRACTOR has reasonable objection. CONTRACTOR shall not award Work to Subcontractor(s), in excess of 50% of the Contract Price, without prior written approval of the OWNER.

CONTRACTOR shall be fully responsible for all acts and omissions of his Subcontractors, Suppliers and of persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier of other person or organization any contractual relationship between OWNER or ENGINEER and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any Subcontractor, Supplier or other person or organization. OWNER or ENGINEER may furnish to any Subcontractor, Supplier or other person or organization, to the extent practicable, evidence of amounts paid to CONTRACTOR on account of specific Work done.

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

If the amount of the subcontract or the nature of the Work to be performed thereunder warrants, OWNER may require the Subcontractor to furnish, for the benefit of CONTRACTOR, Bonds in an amount proportioned to the amount of his subcontract, and for the same purpose and under the same specifications as those of the general contract. The Surety on the general contract shall not be eligible to furnish such Subcontract Bonds.

All Work performed for CONTRACTOR by a Subcontractor or Supplier will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER. Whenever any such agreement is with a Subcontractor or Supplier who is listed as and additional insured on the property insurance provided in Article 5 subparagraph 3.E, the agreement between the CONTRACTOR and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against OWNER, CONTRACTOR, ENGINEER, ENGINEER's Consultants and all other additional insureds for all losses and damages caused by, arising out of or resulting from any of the perils covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, CONTRACTOR will obtain the same. CONTRACTOR shall file a true copy of such agreement with the OWNER.

6.06 Patent Fees and Royalties

CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of OWNER or ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by OWNER in Contract Documents.

To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER and ENGINEER and anyone directly or indirectly employed by either of them from and against all claims, costs, losses, damages and expenses arising out of or resulting from any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product or device not specified in the Contract Documents, and shall defend all such claims in connection with any alleged infringement of such rights.

6.07 Permits and Licenses

CONTRACTOR shall obtain and pay for all construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall pay all governmental charges, permit, review, and inspection fees necessary for the prosecution of the Work, which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility owners for connections to the Work.

6.08 Laws and Regulations

CONTRACTOR shall give all notices and comply with all laws, ordinances, rules, and regulations applicable to furnishing and performance of the Work. Neither OWNER nor ENGINEER shall be responsible for monitoring CONTRACTOR's compliance with any Laws, ordinances, rules, and Regulations.

If CONTRACTOR performs any Work that is contrary to such laws, ordinances, rules and regulations, CONTRACTOR shall bear all claims, costs, losses, damages and expenses caused by, arising out of, or resulting therefrom. However, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Plans are in accordance with such laws, ordinances, rules, and regulations, but this shall not relieve CONTRACTOR of CONTRACTOR's obligations under Article 3 subparagraph 3.

6.09 Taxes

CONTRACTOR shall pay all sales, consumer, use and other similar taxes required to be paid by CONTRACTOR in accordance with Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.10 Use of Premises

CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Project site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and Regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area or to the owner or occupant thereof or of any adjacent land or areas resulting from the performance of the Work. Should any claim be made by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly settle with any such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law. CONTRACTOR's continuing obligations under Article 6 subparagraph 24 shall be applicable to any claim hereunder.

6.11 Removal of Debris and Cleaning

During the progress of the Work, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work CONTRACTOR shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials, and shall leave the site clean and ready for occupancy by OWNER at Substantial Completion of the Work. CONTRACTOR shall restore to their original condition all property not designated for alteration by the Contract Documents. If the CONTRACTOR shall fail to keep the above noted areas cleaned of dust or debris resulting from his operations, he shall be so notified in writing by the ENGINEER. If within 24 hours after receipt of such notice the CONTRACTOR shall fail to clean such areas satisfactorily, the OWNER may have such other agency as he shall designate, perform the work and all costs of such cleaning shall be paid for by the CONTRACTOR.

6.12 Loading Structures

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

6.13 Protection of Utilities

When it is possible for construction operations to endanger any public or private utility, conduit, or structure, the CONTRACTOR shall notify the utility owner of this possibility, and safeguard and support such utilities, conduits, or structures. Where it is the policy of any utility owner to make its own repairs to damaged conduit or other structures, the CONTRACTOR shall cooperate to the fullest extent with the utility, and he shall see that his operations interfere as little as possible with these operations, and the CONTRACTOR shall assume the cost of any charge against the OWNER therefor. In cases where existing sewers, drains, gas, electric, telephone, cable TV and water service connections are encountered, the CONTRACTOR shall perform his operations in such a manner that service will be uninterrupted, and the cost thereof shall be at the CONTRACTOR's expense, unless otherwise provided.

6.14 Record Documents

CONTRACTOR shall maintain in a safe place at the site one (1) record copy of all Specifications, Plans, Addenda, Written Amendments, Change Orders, Work Orders, Construction Change Requisitions, and Field Orders, in good order and annotated to show all changes made during construction. These record documents together with all Samples and all Shop Drawings shall be available to ENGINEER for examination and shall be delivered to ENGINEER for OWNER upon completion of the Work.

6.15 Safety and Protection

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

(1) persons on the Work site or who may be affected by the Work.

(2) the Work and materials or equipment to be incorporated therein, whether in storage on or off the site, and

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

CONTRACTOR shall comply with all applicable Laws and Regulations and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and utility owners when prosecution of the Work may affect them.

CONTRACTOR shall restore, at his own expense, any public or private property damaged or injured in consequence of any act or omission on his part, or on the part of his employees or agents, to a condition equal or better than that existing before such injury or damage was done. If CONTRACTOR neglects to restore or make good such damages or injury OWNER may upon 48 hours' notice, proceed to restore or make good such damage or injury and to order the cost thereof deducted from any monies that are due or may become due CONTRACTOR for this Work. CONTRACTOR's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with Article 14 subparagraph 11 that the Work is Acceptable.

6.16 Safety Representative

CONTRACTOR shall be responsible to designate for itself and its employees, and its subcontractors a qualified and experienced safety representative at the site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.17 Hazard Communication Program

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

6.18 Emergencies

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

6.19 Shop Drawings and Samples

CONTRACTOR shall submit Shop Drawings required by the Contract Documents to ENGINEER for review, in accordance with an accepted schedule. All submittals will be identified as ENGINEER may require and in the number of copies specified in the General Requirements. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to show ENGINEER the materials and equipment CONTRACTOR proposes to provide and to enable ENGINEER to review the information for the limited purposes required by Article 6 subparagraph 21.

CONTRACTOR shall also submit all samples required by the Contract Documents to ENGINEER for review in accordance with an accepted schedule. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers, the use for which intended, and other data as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by Article 6 subparagraph 21. The number of each sample to be submitted will be as specified in the Specifications.

6.20 Submittal Procedures

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

(i) all field measurements, quantities, dimension, specified performance criteria, installation requirements, manufacturer's recommendations, material, catalog numbers and similar information with respect thereto,

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

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

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

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

At the time of each submission, CONTRACTOR shall in writing call ENGINEER's attention to any deviations that the Shop Drawings or samples may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawing's or Sample Submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to ENGINEER for review and approval of each such variation.

6.21 ENGINEER's Review

ENGINEER will review Shop Drawings and Samples in accordance with the schedule of Shop Drawing and Sample submittals accepted by ENGINEER as required by Article 2 subparagraph 5. ENGINEER's review shall be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, sequences, techniques or procedures of construction or to safety precautions or programs incident thereto. The review of a separate item as such will not indicate review of the assembly in which the item functions.

CONTRACTOR shall make any corrections required by ENGINEER and shall return the required number of corrected copies of Shop Drawings and resubmit new samples for review. CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by ENGINEER on previous submittals. ENGINEER's costs for review of any Shop Drawing after the same Shop Drawing has been rejected twice or more shall be paid for by the CONTRACTOR.

CONTRACTOR's stamp of approval on any Shop Drawing or sample shall constitute a representation to OWNER and ENGINEER that CONTRACTOR has either determined and verified all quantities, dimensions, field construction criteria, manufacturer's recommendations, materials, catalog numbers, and similar data or assumes full responsibility for doing so, and that CONTRACTOR has reviewed or coordinated each Shop Drawing or sample with the requirements of the Work and the Contract Documents.

ENGINEER's review of Shop Drawings or samples shall not relieve CONTRACTOR from responsibility for any variations from the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to such variation at the time of submission and ENGINEER has given written concurrence to the specific variation, nor shall any concurrence by ENGINEER relieve CONTRACTOR from responsibility for errors or omissions in the Shop Drawings. ENGINEER's review shall not relieve CONTRACTOR from responsibility for complying with the requirements of Article 6 subparagraph 20.

Where a Shop Drawing or sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submissions accepted by ENGINEER per Article 2 subparagraph 5, no related Work shall be commenced until the submittal has been reviewed by the ENGINEER.

6.22 Continuing the Work

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

6.23 CONTRACTOR's General Warranty and Guarantee

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

(i) abuse, modification, or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors, Suppliers, or their employees, agents, or representatives, or any person or entity for whom CONTRACTOR is responsible; or

(ii) normal wear and tear under normal usage.

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

(i) observations by ENGINEER;

(ii) recommendation of any progress or final payment by ENGINEER;

(iii) the issuance of a certificate of Substantial Completion or any payment by OWNER to CONTRACTOR under the Contract Documents;

(iv) use or occupancy of any part of the Work by OWNER;

(v) any acceptance by OWNER or failure to do so;

(vi) any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER per Article 14 subparagraph 11;

(vii) any inspection, test or approval by others; or

(viii) any correction of defective Work by OWNER.

6.24 Indemnification

CONTRACTOR shall indemnify, defend, and save harmless the OWNER, and the ENGINEER, their consultants, agents, officers, directors and employees (the "Indemnified Parties"), from and against all claims, costs, losses, damages and expenses by reason of any liability asserted or imposed upon any one or more of the Indemnified Parties for damages because of bodily injury, including death at any time resulting therefrom, sustained by any person or persons, or on account of damage to property, including loss of use thereof, arising out of or in consequence of the performance of this Work, whether such injuries to persons or damage to property are due, or claimed to be due, to the negligence of CONTRACTOR, his Subcontractors, or any one or more of the Indemnified Parties, except this indemnification shall not extend to any Indemnified Party if such injury or damage shall be occasioned by the sole negligence of such Indemnified Party.

In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors or employees by any employee (or the survivor or personal representative of such employee) of CONTRACTOR, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Article 6 subparagraph 24 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for CONTRACTOR or any such Subcontractor, Supplier or other person or organization under worker's compensation acts, disability benefit acts, or other employee benefit acts.

All representations, indemnifications, warranties and guarantees made in, required by or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion and acceptance of the Work and termination or completion of the Agreement.

Article 7 Work by Others

7.01 Related Work at Site

OWNER may perform additional Work related to the Project by himself, or have additional Work performed by a utility owner, or let other direct contracts therefor which shall contain General Conditions similar to these.

If any part of CONTRACTOR's Work depends for proper execution or results upon the work of any such other contractor or utility owner, CONTRACTOR shall inspect and promptly report to ENGINEER in writing any latent or apparent defects or deficiencies in such work that render it unsuitable for such proper execution and results. CONTRACTOR's failure to so report shall constitute an acceptance of the other work as fit and proper for integration with CONTRACTOR's Work except for latent or non-apparent defects and deficiencies in the other work.

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

If the performance of additional work by other contractors or utility owner or OWNER was not noted in the Contract Documents, written notice thereof shall be given to CONTRACTOR prior to starting any such additional work. If CONTRACTOR believes that the performance of such additional work by OWNER or others involves additional expense to CONTRACTOR or requires an extension of the Contract Time, CONTRACTOR may make a claim therefor as provided in Article 10 subparagraph 5. Claims for delay or inconveniences due to operations of such other parties for work noted in the Contract Documents will not be allowed.

Article 8 OWNER's Responsibilities

8.01 Communication to CONTRACTOR

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

8.02 Replacement of ENGINEER

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

8.03 Furnishing Data

OWNER shall furnish the data required of OWNER under the Contract Documents promptly.

8.04 Pay When Due

OWNER shall make payments to CONTRACTOR promptly after they are due as provided in Article 14 subparagraphs 4 and 11.

8.05 Lands and Easements; Reports and Tests

OWNER's duties in respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Article 4 subparagraphs 1 and 4. Article 4 subparagraph 2 refers to OWNER's identifying and making available to CONTRACTOR copies of reports of investigations and tests of subsurface and latent physical conditions at the site.

8.06 Insurance

OWNER's responsibilities in respect of purchasing and maintaining insurance are set forth below:

(1) The OWNER shall assume responsibility for such boiler and machinery insurance as may be required or considered to be necessary by the OWNER in the course of construction, testing or after completion.

(2) The OWNER shall assume responsibility for such insurance as will protect the OWNER against any loss of use of the OWNER's property due to those perils insured pursuant to Article 8 subparagraph 6(1).

8.07 Change Orders

In connection with OWNER's rights to request changes in the Work in accordance with Article 10, OWNER (especially in certain instances as provided in Article 10 subparagraph 3) is obligated to execute Change Orders.

8.08 Inspections, Tests, and Approvals

OWNER'S responsibility in respect to certain inspections, tests and approvals is set forth in Article 13 subparagraph 3.

8.09 Limitation on OWNER’s Responsibility

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

8.10 Undisclosed Hazardous Materials

OWNER’s responsibility in respect of undisclosed Asbestos, PCB’s, Petroleum, Hazardous Waste or Radioactive Materials uncovered or revealed at the site is set forth in Article 4 subparagraph 5.

Article 9 ENGINEER's Status During Construction

9.01 OWNER's Representative

ENGINEER will be OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as OWNER'S representative during construction shall be as set forth in the Contract Documents.

9.02 Visits to Site

ENGINEER may make visits to the site at intervals appropriate to the various stages of construction to observe the progress and quality of the executed Work and to determine solely for the benefit of the OWNER, in general, if the Work is proceeding in accordance with the Contract Documents.

It will not be the responsibility of the ENGINEER to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work.

9.03 Resident Project Representative

If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project Representative to assist ENGINEER in providing more continuous observation of the Work. A Resident Project Representative will act as directed by and under the supervision of ENGINEER, and will confer with ENGINEER regarding his actions. Resident Project Representative's dealings in matters pertaining to the on-site Work shall in general be only with ENGINEER and CONTRACTOR, and dealings with Subcontractors shall only be through or with the full knowledge of CONTRACTOR. The Resident Project Representative's duties and responsibilities include:

(1) Schedules

Review the progress schedule, schedule of Shop Drawing submissions and schedule of values prepared by CONTRACTOR.

(2) Conferences

Arrange a schedule of progress meetings and other job conferences as required in consultation with ENGINEER and notify those expected to attend in advance.

(3) Liaison

Serve as ENGINEER's liaison with CONTRACTOR, working principally through CONTRACTOR's superintendent and assist him in understanding the intent of the technical aspects of the Contract Documents. Assist ENGINEER in serving as OWNER's liaison with CONTRACTOR when CONTRACTOR's operations affect OWNER's on-site operations.

(4) Shop Drawings and Samples

Advise ENGINEER and CONTRACTOR or its superintendent immediately of the commencement of any Work requiring a Shop Drawing or Sample submission if the submission was identified on the schedule and has not been reviewed by ENGINEER.

(5) Review of Work, Rejection of Defective Work, Inspections, and Tests:

a. Conduct on-site observations of the Work and report to ENGINEER whenever he believes that technical aspects of any executed Work is unsatisfactory, faulty or defective or does not meet the requirements of any inspections, tests or approval required to be made or has been damaged prior to final payment; and advise ENGINEER when he believes that any partially completed portion of the Work should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.

b. Observe, record and report to ENGINEER appropriate details relative to test procedures and startups.

c. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the outcome of these inspections and report to ENGINEER.

(6) Modifications:

Consider CONTRACTOR's suggestions for modifications in Plans or Specifications and report them with recommendations to ENGINEER.

(7) Reports:

Prepare periodic reports as required of progress of the Work and CONTRACTOR's compliance with the approved progress schedule and schedule of Shop Drawing submissions.

(8) Completion:

Verify that all items on final list of items requiring completion or correction have been completed or corrected and make recommendations to ENGINEER concerning acceptance.

(9) Exceptions:

Resident Project Representative:

a. Shall not authorize any deviation from the Contract Documents or approve any substitute materials or equipment.

b. Shall not approve or accept any portion of the completed Work.

c. Shall not undertake any of the responsibilities of CONTRACTOR, Subcontractors or CONTRACTOR's superintendent, or expedite the Work.

d. Shall not advise on or issue directions relative to any aspect of the means, methods, techniques, sequences or procedures of construction unless such is specifically called for in the Contract Documents.

e. Shall not advise on or issue directions as to safety precautions and programs in connection with the Work.

f. Shall not advise on or issue directions regarding CONTRACTOR’s failure to comply with Laws and Regulations applicable to the furnishing or performance of the Work.

9.04 Clarifications and Interpretations

ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the Contract Documents as ENGINEER may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents.

9.05 Authorized Variations in Work - Field Order

ENGINEER may authorize minor adjustments in the Work to avoid obstructions or interferences which do not involve an adjustment in the Contract Price or the Contract Time, and which are consistent with the overall intent of the Contract Documents. These may be accomplished by a Field Order and shall be binding on OWNER, and also on CONTRACTOR who shall perform the change promptly. If OWNER or CONTRACTOR believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a claim may be made therefore as provided in Article 10 subparagraph 5.

9.06 Rejecting Defective Work

ENGINEER will have authority to disapprove or reject completed portions of the Work which ENGINEER believes to be defective, and will also have authority to require special inspection or testing of the Work as provided in Article 13 subparagraph 4, whether or not the Work is fabricated, installed or completed.

9.07 Shop Drawings, Change Orders, and Payments

ENGINEER's responsibility for Shop Drawings and samples are set forth in Article 6 subparagraphs 19 through 21, inclusive.

ENGINEER's responsibilities as to Change Orders are set forth in Articles 10, 11, and 12.

ENGINEER's responsibilities in respect of Applications for Payment are set forth in Article 14.

9.08 Determinations for Unit Price Work

ENGINEER will determine the actual quantities and classifications of Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR the ENGINEER's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). ENGINEER's written decision thereon will be final and binding (except as modified by ENGINEER to reflect changed factual conditions or more accurate data) upon OWNER and CONTRACTOR, subject to the provisions of Article 10 subparagraph 5.

9.09 Decisions on Disagreements, Claims

ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work performed thereunder. Claims, disputes and other matters relating to the acceptability of the Work, or the interpretation of the requirements of the Contract Documents pertaining to the execution and progress of the Work, shall be referred initially to ENGINEER in writing with a request for a formal decision in accordance with this paragraph.

ENGINEER will, with reasonable promptness, render a written decision on the issue referred. If OWNER or CONTRACTOR believe that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Article 10 subparagraph 5. Date of ENGINEER's decision shall be the date of the event giving rise to the issues referenced for the purposes of Article 10 subparagraph 5.

ENGINEER's written decision on the issue referred will be final and binding on OWNER and CONTRACTOR, subject to the provisions of Article 10 subparagraph 5.

In this capacity ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. Provisions of Article 9 subparagraph 10 will govern ENGINEER's liability to CONTRACTOR under this paragraph.

9.10 Limitations on Engineer's Responsibilities

Neither ENGINEER's authority to act under this Article 9 or elsewhere in the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of ENGINEER to CONTRACTOR, any Subcontractor, any manufacturer, fabricator, Supplier, distributor, or any other person or to any surety for or employee or agent of any of them.

ENGINEER will not supervise, direct, control or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the furnishing or performance of the Work. ENGINEER will not be responsible for CONTRACTOR's failure to perform the Work in accordance with the Contract Documents. These limitations on authority and responsibility shall also apply to ENGINEER's Consultant's, Resident Project Representative and assistants.

ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractors, Suppliers, or of the agents or employees of any CONTRACTOR, Subcontractor, Supplier or of any other persons at the site or otherwise performing any of the Work.

ENGINEER will not be responsible to CONTRACTOR, Subcontractors, or Suppliers, or to their agents or employees for injuries, damages, claims, losses, or expenses (including attorney's fees) of whatsoever kind resulting from or caused by any act or omission of ENGINEER in preparation for, arising from, relating to or concerning the Project. Such acts or omissions include, but are not limited to, ENGINEER's negligence, tortuous conduct, errors, omissions, strict liability, breach of contract, or breach of warranty. ENGINEER makes no representations to CONTRACTOR, Subcontractors, Suppliers, or their agents or employees regarding or respecting any work performed by ENGINEER in preparation for, arising from, relating to or concerning the Project. Neither CONTRACTOR, its agents or employees, nor any Subcontractors or Suppliers or their agents or employees, are intended beneficiaries of ENGINEER's agreement with OWNER, nor are such parties intended beneficiaries of ENGINEER's duties or responsibilities arising therefrom. ENGINEER disclaims all duties to CONTRACTOR, Subcontractors, Suppliers or their agents or employees arising from, relating to or concerning ENGINEER's involvement in the Project. OWNER and CONTRACTOR further agree to notify CONTRACTOR's, Subcontractors or Suppliers of this disclaimer of ENGINEER's liability and require them to abide by this disclaimer.

Article 10 Changes in the Work; Claims

10.01 Authorized Changes in the Work

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

If OWNER and CONTRACTOR are unable to agree as to the extent, if any, of an adjustment in the Contract Price or an adjustment of the Contract Time that should be allowed as a result of a Work Order, a claim may be made as provided in Article 10 subparagraph 5.

10.02 Unauthorized Changes in the Work

Additional Work performed without authorization will not entitle CONTRACTOR to an increase in the Contract Price or an extension of the Contract Time, except in the case of an emergency as provided in Article 6 subparagraph 18 and except for uncovering Work as provided in Article 13 subparagraph 4.

10.03 Execution of Change Orders

Changes in the Work which are required by OWNER, or emergencies, or because of uncovering Work found not to be defective, or as provided in Article 10 subparagraph 1, Article 11

subparagraphs 2 and 3, Article 13 subparagraphs 8 and 9, or because of any other claim for a change in the Contract Time or the Contract Price which are agreed to by the parties shall be accomplished by means of a Change Order recommended by the ENGINEER and duly executed by the OWNER and CONTRACTOR.

10.04 Notification to Surety

If notice of any change affecting the general scope of the Work or change in the Contract Price is required by the provisions of any Bond to be given to the Surety, it shall be CONTRACTOR's responsibility to so notify the Surety, and the amount of each applicable Bond shall be adjusted accordingly. CONTRACTOR shall furnish proof of such adjustment to OWNER.

10.05 Claims

The rendering of a decision by ENGINEER with respect to any claim, dispute or other matter, except any which have been waived by the making or acceptance of final payment as provided in Article 14 subparagraph 13, will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or at law in respect of any such claim, dispute or other matter. Any claim, dispute, or other matter by CONTRACTOR shall additionally be subject to the provisions set forth in Article 9 subparagraph 10.

Written notice of each such claim, dispute and other matter shall be delivered by the claimant to ENGINEER and the other party to the Agreement within 15 days of the occurrence of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with written supporting data will be submitted to ENGINEER and the other party within 45 days of such occurrence unless ENGINEER allows an additional period of time to ascertain more accurate data. A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Article 12 subparagraph 1. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Article 12 subparagraph 2. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to ENGINEER and the claimant within 30 days after receipt of the claimant's last submittal (unless ENGINEER allows additional time).

ENGINEER will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part,

2. approve the Claim, or

3. notify the parties that the ENGINEER is unable to resolve the Claim if, in the ENGINEER's sole discretion, it would be inappropriate for the ENGINEER to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

In the event that ENGINEER does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

ENGINEER's action under Article 10 subparagraph 5 will be final and binding upon OWNER and CONTRACTOR.

No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Article 10 subparagraph 5.

Article 11 Cost of the Work; Allowances; Unit Price Work

11.01 Cost of the Work

The term Cost of the Work means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to CONTRACTOR will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in Article 11 subparagraph 1.B:

1. Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise and payroll taxes, workers' or workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and manufacturers' field services required in connection therewith.

3. Payments made by CONTRACTOR to the Subcontractors for Work performed by Subcontractors. If required by OWNER, CONTRACTOR shall obtain competitive bids from Subcontractors acceptable to OWNER and CONTRACTOR and shall deliver such bids to OWNER who will then determine, with the advice of ENGINEER, which bids if any, will be accepted.

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

5. Supplemental costs including the following:

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

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

   (c) Rentals of all construction equipment and machinery and the parts thereof whether rented from CONTRACTOR or others. The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the Work.

The rental rate established for each piece of CONTRACTOR owned equipment, including appurtenances and attachments to equipment, used will be determined by use of the Rental Rate Blue Book for Construction Equipment, Volume 1, 2, or 3, as applicable; the edition which is current at the time the Work was started will apply. The established rental rate will be equal to the "Monthly" rate divided by 176; modified by the rate adjustment factor and the applicable map adjustment factor, plus the "Estimated Operating Costs per Hour."

For equipment not listed in the Rental Rate Blue Book, Volume 1, 2, or 3, the rental rate will be determined by using the rate listed for a similar piece of equipment or by proportioning a rate listed so that the capacity, size, horsepower, and age are properly considered.

For equipment for which there are no comparables in the Rental Rate Blue Book, Volume 1, 2, or 3, the monthly rate shall be reasonable, but not more than 5 percent of the current list price, or invoice, of the equipment. The base hourly rate shall then be determined by dividing the monthly rate by 176 to which sum 20 percent will be added. The 20 percent includes adjustments and operating costs.

(d) Sales, consumer use or similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by any governmental authority.

(e) Deposits lost for causes other than negligence of CONTRACTOR, any Subcontractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

(f) Losses and damages (and related expenses) to the Work, not compensated by insurance or otherwise, sustained by CONTRACTOR in connection with the performance and furnishing of the Work (except losses and damages within the deductible amounts of property insurance established by OWNER in accordance with Article 5 subparagraph 3), provided such losses and damages have resulted from causes other than the negligence, other tortuous conduct or breach of contract of CONTRACTOR, any Subcontractor, Supplier or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR's Fee. If, however, any such loss or damage requires reconstruction and CONTRACTOR is placed in charge thereof, CONTRACTOR shall be paid for services a fee proportionate to that stated in Article 12 subparagraph 1.A.2.

(g) The cost of utilities, fuel, and sanitary facilities at the site.

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

(i) Cost of premiums for additional bonds and insurance required because of changes in the Work and premiums for property insurance coverage within the limits of the deductible amounts established by OWNER in accordance with Article 5 subparagraph 3.

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

1. Payroll costs and other compensation of CONTRACTOR's officers, executives, principals, general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters,

timekeepers, clerks and other personnel employed by CONTRACTOR, whether at the site or in his principal or a branch office for general administration of the Work.

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

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

4. Cost of premiums for all Bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same except for additional Bonds and insurance required because of changes in the Work.

5. Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including, but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied and making good any damage to property.

6. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Article 11 subparagraph 1.A.

C. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, CONTRACTOR's fee shall be determined as set forth in Article 12 subparagraph 1.A.

D. Whenever the Cost of the Work for any purpose is to be determined pursuant to Article 11 subparagraphs 1.A and 1.B, CONTRACTOR will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

11.02 Cash Allowances

A. It is understood that CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be done by such Subcontractors or Suppliers and for such sums within the limit of the allowances as may be acceptable to ENGINEER. CONTRACTOR agrees that:

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

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

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

11.03 Unit Price Work

Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of

the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Proposal.

The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER subject to the provisions of Article 9 subparagraph 8.

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

OWNER or CONTRACTOR may make a Claim for an adjustment in the Contract Price in accordance with Article 10 subparagraph 5 if:

> Where the quantity of a major item of Work that is covered by a unit price differs by more than 25% from the quantity of such Work indicated in the Contract Documents, an adjustment in unit price shall be considered and if appropriate, a Change Order will be issued. A major item of Work is defined as any item whose total cost, determined by multiplying the original proposal quantity and the Contract Unit Price, is equal to or greater than 5 percent of the original total Contract Price.

Article 12 Change of Contract Price; Change of the Contract Times

12.01 Change of Contract Price

The Contract Price may only be changed by a Change Order. Any claim for an adjustment in the Contract Price shall be based on written notice by the party making the claim, to the ENGINEER and the other party to the Agreement in accordance with the provisions of Article 10 subparagraph 5. Where a Change Order diminishes the quantity of Work to be done, this shall not constitute a basis for a claim for damages or anticipated profits on the Work that may be dispensed with.

The value of any Work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

(1) Where the Work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved subject to the provisions of Article 11 subparagraph 1.B.

(2) By a supplemental schedule of prices contained in the CONTRACTOR's original bid and incorporated in the Contract.

(3) By mutual acceptance of a lump sum or unit price proposal from the CONTRACTOR.

(4) If none of the above methods is agreed upon, the value shall be determined on the basis of the Cost of the Work and a percentage for overhead and profit. Cost of the Work shall be determined as provided in Article 11 subparagraphs 1.A and 1.B. The CONTRACTOR's fee shall be determined as provided in Article 12 subparagraph 1.A.

12.01.A CONTRACTOR's Fee

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

(1) A mutually acceptable fixed fee; or if none can be agreed upon,

(2) a fee based on the following percentages of the various portions of the Cost of the Work:

(a) for costs incurred under Article 11 subparagraphs 1.A.1 and 1.A.2, the CONTRACTOR's Fee shall be 15%;

(b) for costs incurred under Article 11 subparagraph 1.A.3, the CONTRACTOR's Fee shall be five (5) percent; and if a Subcontract is on the basis of the Cost of the Work plus a fee, the maximum allowable to all Subcontractor(s) in total as a fee for overhead and profit shall be 15%; and,

(c) no fee shall be payable on the basis of costs itemized under Article 11 subparagraphs 1.A.4, 1.A.5, and 1.B.

(d) The amount of credit to be allowed by CONTRACTOR to OWNER for any change which results in a net decrease in cost will be the amount of the actual net decrease plus a deduction in CONTRACTOR's Fee by an amount equal to ten (10) percent of the net decrease; and,

(e) when both additions and credits are involved in any one change, the adjustment in CONTRACTOR's Fee shall be computed on the basis of the net change in accordance with Article 12 subparagraphs 1.A.2.a through 1.A.2.d, inclusive.

12.02 Change of Contract Time

The Contract Time may only be changed by a Change Order. Any claim for an adjustment in the Contract Time shall be based on written notice submitted by the claimant and delivered to the ENGINEER and the other party to the Agreement in accordance with the provisions of Article 10 subparagraph 5.

Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 Delays

Where the CONTRACTOR is prevented from completing any part of the Work within the Contract Time due to delay beyond the control of CONTRACTOR, the Contract Time will be extended in an amount equal to time lost due to delays beyond the control of CONTRACTOR if a claim is made therefor as provided in Article 12 subparagraph 1. Such delays shall include, but not be limited to, acts or neglect by OWNER or others performing work as contemplated by Article 7, or to fires, floods, epidemics, abnormal weather conditions, or acts of God. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

Where CONTRACTOR is prevented from completing any part of the Work within the Contract Time due to any delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Time in an amount equal to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay.

OWNER, ENGINEER and the related entities of each of them shall not be liable to CONTRACTOR for any claims, costs, losses, damages or expenses sustained by CONTRACTOR on or in connection with any other project or anticipated project.

CONTRACTOR shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of CONTRACTOR.

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

Article 13 Tests and Inspection; Correction, Removal or Acceptance of Defective Work

13.01 Notice of Defects

A. Prompt notice of all defective work of which OWNER or ENGINEER have actual knowledge shall be given to CONTRACTOR. All defective Work, whether or not in place, may be rejected, corrected or accepted as provided in this Article 13.

13.02 Access to Work

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

13.03 Tests and Inspections

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

If any Law and Regulation, code, or order of any public body having jurisdiction requires any Work or part thereof to specifically be inspected, tested or approved, CONTRACTOR shall assume full responsibility therefor, pay all costs in connection therewith and furnish ENGINEER the required certificates of inspection, testing or approval.

CONTRACTOR shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with OWNER's or ENGINEER's acceptance of a manufacturer, fabricator, Supplier or distributor of materials or equipment proposed to be incorporated in the Work, or of materials or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work.

The cost of all other inspections, tests and approvals required by the Contract Documents shall be paid by OWNER unless otherwise specified.

All inspections, tests or approvals other than those required by law, ordinance, rule, regulation, code or order of any public body having jurisdiction shall be performed by organizations acceptable to OWNER and CONTRACTOR or by ENGINEER if so specified.

Cost of materials to be used in inspection and transportation costs shall be paid for by the CONTRACTOR.

Neither observations by ENGINEER nor inspections, tests or approvals by others shall relieve CONTRACTOR from his obligations to perform the Work in accordance with the Contract Documents.

13.04 Uncovering Work

If any Work that is to be tested, inspected or approved is covered without written concurrence of ENGINEER, or contrary to the written request of ENGINEER, it shall, if requested by ENGINEER, be uncovered for ENGINEER's observation. Such uncovering shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely written notice of his intention to cover such Work and ENGINEER has not acted with reasonable promptness in response to such notice.

If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, CONTRACTOR, at ENGINEER's request, shall uncover, expose or otherwise make available for observation, inspection or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment. Except as otherwise specified in Article 13 subparagraph 4, the cost of Work shall be paid for as follows:

(i) If it is found that such Work is defective, CONTRACTOR shall bear all the expenses of such uncovering, exposure, observation, inspection and testing, and of satisfactory reconstruction, (including, but not limited to, fees and charges of engineers, architects, attorneys, and other professionals) and an appropriate deductive Change Order shall be issued. If the parties are unable to agree as to the amount or extent of any change in Contract Price or Contract Time, OWNER may make a claim as provided in Article 10 subparagraph 5.

(ii) If, however, such Work is not found to be defective, CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time or both, directly attributable to such uncovering, exposure, observation, inspection, testing, and reconstruction. If the parties are unable to agree as to the amount or extent of any change in Contract Price or Contract Time, CONTRACTOR may make a claim as provided in Article 10 subparagraph 5.

13.05 Owner May Stop the Work

If the Work is defective, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, OWNER may order CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of OWNER to stop the Work shall not give rise to any duty on the part of OWNER to exercise this right for the benefit of CONTRACTOR, any Subcontractor, Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 Correction or Removal of Defective Work

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

13.07 One Year Guarantee Period

If within one (1) year after the date of Substantial Completion (or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions:

(i) repair defective land or areas; or

(ii) correct such defective Work, or,

(iii) if the defective Work has been rejected by OWNER, remove it from the site and replace it with Work that is not defective, and

(iv) satisfactorily correct or repair or remove and replace any damage to other Work or the work of others or other land or areas resulting therefrom.

If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the defective Work corrected or the rejected Work removed and replaced, and all claims, costs, losses, damages and expenses caused by or resulting from such removal and replacement (including but not limited to all costs of repair or replacement or work of others) shall be paid by CONTRACTOR.

Repair or replacements made under the guarantee shall bear an additional one (1) year guarantee dated from the acceptance of repair or replacement.

13.08 Acceptance of Defective Work

If, instead of requiring correction or removal and replacement of defective Work, OWNER (and, prior to ENGINEER'S recommendation of final payment, also ENGINEER) prefers to accept it, OWNER may do so. CONTRACTOR shall pay all claims, costs, losses, damages and expenses attributable to OWNER's evaluation of and determination to accept such defective Work (such costs to be approved by ENGINEER as to reasonableness). In such case, if acceptance occurs prior to ENGINEER'S recommendation of final payment, a Change Order shall be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate reduction in the Contract Price. If the acceptance occurs after such recommendation, an appropriate amount shall be paid by CONTRACTOR to OWNER.

13.09 Owner May Correct Defective Work

If CONTRACTOR fails within a reasonable time after written notice from ENGINEER to correct defective Work or to remove and replace rejected Work as required by ENGINEER in accordance with Article 13 subparagraph 6, or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents (including any requirements of the progress schedule), OWNER may, after 48 hours' written notice to CONTRACTOR and his Surety without prejudice to any other remedy he may have, correct and remedy any such deficiency.

In exercising his rights under this Article OWNER shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the site, take possession of all or part of the Work, and suspend CONTRACTOR's services related thereto, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the site and incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow OWNER, OWNER's representatives, agents and employees such access to the site as may be necessary to enable OWNER to exercise his rights under this paragraph.

All claims, costs, losses, damages and expenses incurred or sustained by OWNER in exercising such rights shall be charged against CONTRACTOR and a Change Order shall be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate reduction in the Contract Price. Such claims, costs, losses, damages and expenses will include but not be limited to all costs of repair or replacement of work of others destroyed or damaged by correction, removal or replacement of CONTRACTOR's defective Work.

CONTRACTOR shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by OWNER of OWNER's rights hereunder.

Article 14 Payments to CONTRACTOR and Completion

14.01 Schedules

At least ten (10) days prior to submitting the first Application for a progress payment, CONTRACTOR shall submit to ENGINEER a final schedule of Shop Drawing submission and where applicable a schedule of values of the Work. These schedules shall be satisfactory in form and substance to ENGINEER.

The schedule of values shall include quantities and unit prices aggregating the Contract Price, and shall subdivide the Work into component parts. Each unit cost so established shall include its proportionate share of the CONTRACTOR's general operating charges such as profit, overhead, supervision, insurance, bond premiums, interest, equipment cost, depreciation and rental, contingencies, expendable tools, equipment and supplies.

The total cost of the items and quantities the CONTRACTOR lists in the schedule of values shall equal the total Contract Price established in the Proposal. The schedule of values shall include a complete set of detailed work sheets on bid take off and bid summary covering estimated general conditions expense (field overhead), general overhead, profit mark ups and revisions leading to the final bid amount.

When the schedule of values is approved by the ENGINEER, it shall become part of the Agreement and shall be used as the basis for CONTRACTOR progress payments, and to establish unit prices at which extra work may be authorized or deducted from the original Agreement.

Progress Payments based upon Unit Price Work will be based upon the number of units completed.

14.02 Application for Progress Payment

At least ten (10) days before each progress payment falls due (but not more often than once a month), CONTRACTOR shall submit to ENGINEER for review an Application for Payment, Contractor's Declaration, Payment Schedule, and updated Progress Schedules indicating the anticipated completion dates of the various stages of the Work and estimated payments during the next three (3) months. The Contractor's Application for Payment and Contractor's Declaration shall be filled out on the forms provided in the Contract Documents and signed by CONTRACTOR covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents and also as ENGINEER may reasonably require. The Payment Schedule shall be on the form provided in the Contract Documents or in a format acceptable to the ENGINEER. On the second and all subsequent payments, partial waivers of lien and a sworn statement shall also be required for all Work completed and paid for on previous certificates.

If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall also be accompanied by such data, satisfactory to OWNER, as will establish OWNER's title to the material and equipment and protect OWNER's interest therein, including applicable insurance. A receipted vendor's invoice showing the quantities of materials and the amounts paid will be required.

Retainage with respect to progress payments will be in accordance with Article 14 subparagraph 3, and it will be retained until after completion of the entire Work and its final acceptance. When the amount to be retained is reduced to less than ten (10) percent, the CONTRACTOR shall file with the OWNER the written consent of the Surety to such reduction and shall furnish an affidavit that all his indebtedness by reason of the Contract has been paid.

14.03 Retainage

On Contracts with a dollar value of $30,000 and greater or on Contracts that provide for more than three (3) progress payments, progress payments and retainage shall be governed by the provisions of PA 1980, No. 524 (MCLA 125.1561 et seq.). That Act is incorporated herein by reference and made a part of this Contract. Without excluding any provisions of the Act from this Contract, but in order to comply therewith and summarize certain provisions, unless otherwise determined by the public agency or its representative, when that portion of the Act applies, retainage shall be ten (10) percent of the dollar value of all Work in place until Work is 50% in place, as certified by the ENGINEER.

After the Work is 50% in place, no additional retainage shall be withheld unless the OWNER determines that the CONTRACTOR is not making satisfactory progress, or for other specific cause relating to the CONTRACTOR'S performance. If such a determination is made, additional retentions may be withheld, up to ten (10) percent of the dollar value of Work more than 50% in place, as determined by the ENGINEER.

In the event a dispute arises relative to progress payments or retentions, the provisions of Section 4 of Act 524 PA 1980 shall apply, and the public agency/OWNER shall designate an agent to resolve any such dispute, pursuant to the provisions of said Act.

When the above retainage provisions do not apply, retainage shall be ten (10) percent, or such part as the OWNER deems necessary.

14.04 Review of Applications for Progress Payment

ENGINEER will, within ten (10) days after receipt of each Contractor's Application for Payment, Contractor's Declaration and Payment Schedule, either indicate in writing a recommendation of payment and present an Engineer's Certificate for Payment to the OWNER, or may return the Application to CONTRACTOR indicating in writing ENGINEER's reasons for refusing to recommend payment. In the latter case, CONTRACTOR may make the necessary corrections and resubmit the Application.

ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based on ENGINEER's review of the Contractor's Application for Payment and Certificate for Payment and the accompanying data and schedules, that to the best of ENGINEER's knowledge, information and belief;

(i) the Work has progressed to the point indicated;

(ii) the quality of the Work is in accordance with the Contract Documents subject to an evaluation of the Work as a functioning Project upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents and any qualifications stated in the recommendation; and

(iii) that CONTRACTOR is entitled to payment of the amount recommended.

However, by recommending any such payment ENGINEER will not thereby be deemed to have represented that:

(i) exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents or

(ii) that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by OWNER or entitle OWNER to withhold payment to CONTRACTOR.

Neither ENGINEER's review of CONTRACTOR's Work for the purpose of recommending payments nor ENGINEER's recommendation of any payment, including final payment, will impose responsibility on ENGINEER:

(i) to supervise, direct or control the Work, or

(ii) for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

(iii) for the failure of CONTRACTOR to comply with Laws and Regulations applicable to the furnishing or performance of Work, or

(iv) for any failure of CONTRACTOR to perform or furnish Work in accordance with the Contract Documents or

(v) to make any examination to ascertain how or for what purposes CONTRACTOR has used the moneys paid on account of the Contract Price, or

(vi) to determine that title to any Work, materials, or equipment has passed to OWNER free and clear of liens.

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

(1) the Work is defective, or completed Work has been damaged requiring correction or replacement;

(2) the Contract Price has been reduced because of Change Orders

(3) OWNER has been required to correct defective Work or complete the Work in accordance with Article 13 subparagraph 9;

(4) ENGINEER has actual knowledge of the occurrence of any of the events enumerated in Article 15 subparagraph 2.

14.05 Payment Becomes Due

Thirty (30) days after presentation of the Application for Payment to OWNER with ENGINEER's recommendation, the amount recommended will (subject to the provisions of Article 14 subparagraph 5.A) become due, (or only if OWNER is a public agency, within 15 days after OWNER receives the funds which are to be provided by a department or agency of the federal or state government, whichever is later) and when due will be paid by OWNER to CONTRACTOR.

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

(a) claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the Work;

(b) Liens have been filed in connection with the Work, except where CONTRACTOR has delivered a specific bond satisfactory to OWNER to secure the satisfaction and discharge of such Liens;

(c) there are other items entitling OWNER to a set-off against the amount recommended; or

(d) OWNER has actual knowledge of the occurrence of any of the events enumerated in Article14 subparagraphs 4.A.1 through 4.A.3.

If OWNER refuses to make payment of the full amount recommended by ENGINEER, OWNER will give CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action and promptly pay CONTRACTOR any amount remaining after deduction of the amount so withheld. OWNER shall promptly pay CONTRACTOR the amount so withheld, or any adjustment thereto agreed to by OWNER and CONTRACTOR, when CONTRACTOR corrects to OWNER's satisfaction the reasons for such action.

If it is subsequently determined that OWNER's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Article 14 subparagraph 5.

14.06 Contractor's Warranty of Title

CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER at the time of payment free and clear of all liens, claims, security interests and encumbrances (hereafter in these General Conditions referred to as "Liens").

14.07 Substantial Completion

When CONTRACTOR considers the entire Work ready for its intended use CONTRACTOR shall, in writing to OWNER and ENGINEER, certify that the entire Work is substantially complete and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of the Work to determine the status of completion.

If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving his reasons therefor. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and deliver to OWNER a certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a list of items to be completed or corrected before final payment.

OWNER shall have 45 days after receipt of the certificate during which he may make written objection to ENGINEER and CONTRACTOR as to any provisions of the certificate or attached list. Such objection will be cause for the certificate of Substantial Completion to be null and void.

As a part of delivery of the certificate of Substantial Completion ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, heat, utilities and insurance.

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

14.08 Partial Utilization

Use by OWNER of completed portions of the Work may be accomplished prior to Substantial Completion of all the Work subject to the following:

(1) OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any part of the Work which OWNER believes to be substantially complete and which may be so used without significant interference with construction of the other parts of the Work. If CONTRACTOR agrees, CONTRACTOR will certify to OWNER and ENGINEER that said part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time thereafter OWNER, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion.

(a) If ENGINEER does not consider that part of the Work to be substantially complete, ENGINEER will notify OWNER and CONTRACTOR in writing giving his reasons therefor.

(b) If ENGINEER considers that part of the Work to be substantially complete, ENGINEER will execute and deliver to OWNER and CONTRACTOR a certificate to that effect, fixing the date of Substantial Completion for that part of the Work, attaching thereto a punch list of items to be completed or corrected before final payment.

Prior to issuing a certificate of Substantial Completion for that part of the Work, ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to the division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, utilities and insurance for that part of the Work, which shall become binding upon OWNER and CONTRACTOR at the time of issuing the definitive certificate of Substantial Completion for that part of the Work unless OWNER and CONTRACTOR shall have otherwise agreed in writing and so informed ENGINEER.

OWNER shall have the right to exclude CONTRACTOR from any part of the Work which ENGINEER has so certified to be substantially complete, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the punch list.

(2) In lieu of the issuance of a certificate of Substantial Completion as to part of the Work, OWNER may take over operation of a facility constituting part of the Work whether or not it is Substantially Complete if such facility is functionally and separately usable; provided that prior to any such takeover, OWNER and CONTRACTOR have agreed as to the division of responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, correction period, heat, utilities and insurance with respect to such facility.

14.09 Final Inspection

Upon written notice from CONTRACTOR that the Work is complete, ENGINEER will make a final inspection with OWNER and CONTRACTOR and will notify CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.10 Final Application for Payment

After CONTRACTOR has completed all such corrections to the satisfaction of ENGINEER and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, marked up record documents and other documents-all as required by the Contract Documents, and after ENGINEER has indicated that the Work is acceptable, subject to the provisions of Article 14 subparagraph 13, CONTRACTOR may make application for final payment following the procedure for progress payments.

The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents and such other data and schedules as ENGINEER may reasonably require, consent of surety, if any, to final payment, together with complete and legally effective releases or waivers, satisfactory to OWNER, of all Liens arising out of or filed in connection with the Work.

In lieu of the releases or waivers of Lien, and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full; an affidavit of CONTRACTOR that the releases and receipts include all labor, services, material and equipment for which a Lien could be filed, and that all payrolls, material and equipment bills, and other indebtedness connected with the Work for which OWNER or his property might in any way be responsible, have been paid or otherwise satisfied.

If any Subcontractor, manufacturer, fabricator, supplier or distributor fails to furnish a release or receipt in full, CONTRACTOR may furnish a Bond or other collateral satisfactory to OWNER to indemnify OWNER against any Lien.

14.11 Final Payment and Acceptance

If, on the basis of ENGINEER's observation of the Work during construction and final inspection, and ENGINEER's review of the final Application for Payment and accompanying documentation-all as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR has fulfilled all of his obligations under the Contract Documents, ENGINEER will, within ten (10) days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application to OWNER for payment. At that time ENGINEER will give written notice to OWNER and CONTRACTOR that the Work is acceptable subject to the provisions of Article 14 subparagraph 13.

Otherwise, ENGINEER will return the Application to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application.

If the Application and accompanying documentation are appropriate as to form and substance, OWNER shall, within 45 days after receipt thereof pay CONTRACTOR the amount recommended by ENGINEER. If the OWNER rejects the Application, he shall do so in writing stating the appropriate sections of the Contract Documents upon which the rejection is based. The CONTRACTOR may take the necessary remedial actions and resubmit the Application.

14.12 Final Completion Delayed

If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in Article 5 subparagraph 1, the

written consent of the Surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

14.13 Waiver of Claims

The making and acceptance of final payment shall constitute:

(1) a waiver of all claims by OWNER against CONTRACTOR, except claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Article 14 subparagraph 9 or from failure to comply with the Contract Documents or the terms of any special guarantees specified therein; however, it shall not constitute a waiver by OWNER of any rights in respect of CONTRACTOR's continuing obligations under the Contract Documents; and,

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

14.14 Late Payments

All monies not paid when due hereunder, except monies involving Federal and/or State Loans or Grants or other sources which are delinquent because of no fault of the OWNER, shall bear interest at the maximum rate allowed by law at the place of the Project.

Article 15 Suspension of Work and Termination

15.01 OWNER May Suspend Work

OWNER may, at any time and without cause, suspend the Work or any portion thereof for a period as he may deem necessary by notice in writing to CONTRACTOR and ENGINEER. If it should become necessary to stop work for an indefinite period, the CONTRACTOR shall store all materials in such manner that they will not become an obstruction, nor become damaged in any way, and he shall take every precaution to prevent damage or deterioration of the Work performed; provide suitable drainage by opening ditches and drains, and erect temporary structures where necessary. CONTRACTOR may request an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if he makes a claim therefor as provided in Article 10 subparagraph 5.

15.02 OWNER May Terminate for Cause

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

(1) if CONTRACTOR commences a voluntary case under any chapter of the Bankruptcy Code (Title 11, United States Code), as now or hereafter in effect, or if CONTRACTOR takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such time relating;

(2) If a petition is filed against CONTRACTOR under any chapter of the Bankruptcy Code as now or hereinafter in effect at the time of filing, or if a petition is filed seeking any such equivalent or similar relief against CONTRACTOR under any other federal or state law in effect at the time relating to bankruptcy or insolvency;

(3) if CONTRACTOR makes a general assignment for the benefit of creditors;

(4) if a trustee, receiver, custodian or agent of CONTRACTOR is appointed under applicable law or under contract, whose appointment or authority to take charge of property of CONTRACTOR is for the purpose of enforcing a Lien against such property or for the purpose of general administration of such property for the benefit of CONTRACTOR's creditors;

(5) if CONTRACTOR admits in writing an inability to pay its debts generally as they become due;

(6) if CONTRACTOR persistently fails to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under Article 2 subparagraph 5 as revised from time to time);

(7) if CONTRACTOR disregards Laws and Regulations of any public body having jurisdiction;

(8) if CONTRACTOR disregards the authority of ENGINEER; or,

(9) if CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents;

OWNER may, after giving CONTRACTOR (and the surety, if there be one) seven (7) days' written notice and to the extent permitted by Laws and Regulations, terminate the services of CONTRACTOR, exclude CONTRACTOR from the site and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment, and machinery at the site and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient.

In such case, CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, damages and expenses sustained by OWNER arising out of or resulting from completing the Work such excess will be paid to CONTRACTOR. If such claims, costs, losses, damages and expenses exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such claims, costs, losses, damages and expenses incurred by OWNER will be reviewed as to reasonableness by ENGINEER and when so approved, incorporated in a Change Order, but when exercising any rights or remedies under this paragraph, OWNER shall not be required to obtain the lowest price for the Work Performed.

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

15.03 Termination for Convenience

Upon seven (7) days' written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy, elect to terminate the Agreement. In such case, CONTRACTOR shall be paid (without duplication of any items):

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

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

(4) for all claims, costs, losses, damages and expenses incurred in settlement of terminated contracts with Subcontractors, Suppliers and others; and

(5) for reasonable expenses directly attributable to termination.

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

15.04 CONTRACTOR May Stop Work or Terminate

If ENGINEER has failed to act on an Application for Payment or OWNER has failed to pay CONTRACTOR any sum finally determined to be due in accordance with the time limits specified in Article 14 subparagraph 4, CONTRACTOR may upon seven (7) days notice to OWNER and ENGINEER, stop the Work until payment of all amounts then due.

If through no act or fault of CONTRACTOR, the Work is suspended for a period of more than 90 days by OWNER or under an order of court or other public authority, then CONTRACTOR may, upon seven (7) days written notice to OWNER and ENGINEER, and provided OWNER or ENGINEER do not remedy such suspension or failure within that time, terminate the Agreement and recover from OWNER payment on the same terms as provided in Article 15 subparagraph 3. The provisions of this paragraph shall not relieve CONTRACTOR of his obligations under Article 6 subparagraph 22 to carry on the Work in accordance with the progress schedule and without delay during disputes and disagreements with OWNER.

Article 16 Miscellaneous

16.01 Giving Notice

Whenever any provision of the Contract Documents requires the giving of written notice it shall be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at, or sent by registered or certified mail postage prepaid to, the last business address known to the giver of the notice.

16.02 Computation of Time

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

16.03 General

Should OWNER or CONTRACTOR suffer injury or damage to his person or property because of any error, omission or act of the other party or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim shall be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The provisions of this Article 16 subparagraph 3shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose.

The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and shall not be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Law or Regulation, by special warranty or guarantee or by other provisions of the Contract Documents. The provisions of this paragraph shall be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply.

All representations, warranties and guarantees made in the Contract Documents shall survive final payment and termination or completion of this Agreement.

16.04 Professional Fees and Court Costs Included

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

16.05 Nondiscrimination of Employment

The CONTRACTOR shall covenant not to discriminate against any employee or applicant for employment, to be employed in the performance of this Contract, with respect to his hire, tenure, terms, conditions or privileges of employment, or any matter directly, or indirectly related to employment, because of his race, color, sex, age, religion, national origin or ancestry, height, weight, or marital status, or any other classification protected by law, and to require a similar covenant on the part of any Subcontractor employed in the performance of the Contract.

16.06 Post Completion Date Engineering and Inspection Costs

All engineering and inspection costs incurred after the specified completion date shall be paid by the CONTRACTOR to the OWNER prior to final payment authorization. However, the CONTRACTOR shall not be charged with any post completion date engineering and inspection costs when the delay in completion of the Work is due to the following and the CONTRACTOR has promptly given written notice of such delay to the OWNER or ENGINEER;

(1) to any preference, priority or allocation order duly issued by the OWNER;

(2) to unforeseeable causes beyond the control and without the fault or negligence of the CONTRACTOR, including but not restricted to, acts of God, or of the public enemy, acts of the OWNER, acts of another contractor in the performance of a Contract with the OWNER, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather; and,

(3) to any delays of subcontractors occasioned by any of the causes specified in Items 1 and 2 of this Article.

Charges after the specified completion date shall be made at such times and in such amounts as the ENGINEER shall invoice the OWNER, provided, however said charges shall be in accordance with the ENGINEER's current rate schedule at the time the costs are incurred. The engineering and inspection costs so incurred shall be deducted from the CONTRACTOR's progress payments.

End of Section

Section 00 7300
Supplementary Conditions

These Supplementary Conditions amend or supplement Section 00 7200, General Conditions, as indicated below. All provisions which are not amended or supplemented by this section remain in full force and effect. The terms used in these Supplementary Conditions have the meanings assigned to them in the General Conditions.

SGC-1.01 Defined Terms

Delete the definition for "Substantial Completion" in paragraph 1.01 of the General Conditions, and insert the following in its place:

> Substantial Completion - The Work has progressed to the point where, in the opinion of the ENGINEER as evidenced by his definitive Certificate of Substantial Completion, it is sufficiently complete in accordance with the Contract Documents such that clearing and grubbing is complete; open channel excavation is complete; culverts have been installed and drive/road crossing have been restored; riprap has been placed and temporary soil erosion and sedimentation control measures have been removed; slope restoration is complete and only grass growth and general cleanup is remaining.
>
> The terms "Substantially Complete" and "Substantially Completed" as applied to any Work refer to Substantial Completion thereof.

SGC-5.03.D Additional Insured

Add the following language at the end of Article 5.03.D. of the General Conditions:

> The name insured on OWNER's and CONTRACTOR's Protective Policy shall be: Saginaw County Public Works Commissioner
>
> Additional named insured on OWNER's and CONTRACTOR's Protective Policy shall include:
>
> 1. Wade Trim, Inc.
> 2. Saginaw County Public Works Commissioner
> 3. Saginaw County Board of Road Commissioners and Road Commission
> 4. Michigan Department of Transportation
> 4. Birch Run Township
> 5. Frankenmuth Township
> 6. Zehnder Drain Drainage District

SGC-5.04 Insurance Limits of Liability

The required limits of liability for insurance coverages requested in Section 5.03 shall be not less than the following:

SGC-5.04.A Worker's Compensation

Coverage A – Compensation	Statutory
Coverage B – Employer's Liability	
Each Accident	$ 100,000
Disease – Policy Limit	$ 100,000
Disease – Each Employee	$ 100,000

SGC-5.04.B Comprehensive General Liability

General Aggregate	$1,000,000
Products – Com/Ops Aggregate	$1,000,000
Personal and Advertising Injury	$ 500,000
Each Occurrence	$ 500,000
Fire Damage (any one fire)	$ 50,000
Medical Expense (any one person)	$ 5,000

SGC-5.04.C Comprehensive Automobile Liability

Bodily Injury	$ 500,000
Property Damage	$ 500,000
or combined single limit	$1,000,000

SGC-5.04.D OWNER's Protective – Coverage shall be Occurrence Form

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

SGC-5.04.E Builder's Risk-Installation Floater

Cost to Replace at Time of Loss

SGC-5.04.F. Umbrella or Excess Liability $2,000,000

SGC-17 Liquidated Damages

Liquidated damages, if applicable, are referenced in the Proposal and Agreement. The requirements for liquidated damages should be included herein.

Article 17 – Liquidated Damages

If CONTRACTOR shall fail to Substantially Complete the Work within the Contract Time, or extension of time granted by OWNER, then CONTRACTOR will pay to OWNER the amount for liquidated damages as specified in the Agreement for each calendar day that CONTRACTOR shall be in default after the time stipulated in the Contract Documents. The liquidated damages charged shall be deducted from CONTRACTOR's progress payments.

CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in Substantial Completion of the Work is due to the following and CONTRACTOR has given written notice of such delay within seven (7) calendar days to OWNER or ENGINEER.

A. To any preference, priority or allocation order duly issued by the OWNER.

B. To unforeseeable causes beyond the control and without the fault or negligence of the CONTRACTOR, including but not restricted to, acts of God, or of the public enemy, acts of the OWNER, acts of another CONTRACTOR in the performance of a Contract with the OWNER, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather; and

C. To any delays of subcontractors occasioned by any of the causes specified in Items A and B of this article.

End of Section

Division 01
General Requirements

Section 01 1100
Summary of Work

Part 1 General

1.01 Work Covered By Contract Documents

A. Zehnder Drain Improvements

A drain physically located in Section 33 of Frankenmuth Township, Town 11 North, Range 06 East, and Sections 4 and 9 of Birch Run Township, Town 10 North, Range 06 East, Saginaw County, Michigan includes approximately 2.8 miles of Drain Improvements. Work includes, but is not limited to: open channel excavation, tree clearing and grubbing, culvert improvements and replacements, road reconstruction, riprap drain bank protection, field tile outlet repair, seeding, traffic control, project cleanup and restoration.

1.02 Work by Others

A. There is no other work in the Project area, known to OWNER, which would affect this Contract.

1.03 Right-of-Way Jurisdiction/Permits

A. CONTRACTOR shall secure any permits required by the agency having jurisdiction, shall abide by all rules and regulations of each, and shall pay all costs in connection with the permits. CONTRACTOR shall pay for all permit and inspection fees as the agencies may charge to insure compliance with their requirements.

B. The Zehnder Drain is under the jurisdiction of Saginaw County Public Works Commissioner. A permit for construction is not required.

C. Warnick Road, Townline Road, Lange Road, and Busch Road are under the jurisdiction of the Saginaw County Road Commission. A permit for construction/reconstruction of the two road crossings must be obtained.

D. The Dead Creek is under the jurisdiction of the Saginaw County Public Works Commissioner.

E. Soil erosion and sedimentation control is under the jurisdiction of the Saginaw County Public Works Commissioner. The OWNER is a Soil Erosion and Sedimentation Control Authorized Public Agency. Because of this, a Soil Erosion and Sedimentation Control Permit is not required. The CONTRACTOR shall submit a SESC plan and schedule to the OWNER to keep on file. The CONTRACTOR must also apply for the Notice of Coverage (NOC) from the MDEQ. This shall include payment of the $400 fee. The CONTRACTOR is responsible for all inspections by a certified storm water operator as required by the NOC.

1.04 Coordination

A. It shall be the responsibility of CONTRACTOR to coordinate his operations and those of his subcontractors in such a manner so as to avoid interference and delays in the areas of common construction activities.

1.05 CONTRACTOR's Use of Premises

A. CONTRACTOR shall maintain his construction operations within the presently existing road rights-of-way and easements throughout the Project area. In the event that CONTRACTOR deems it necessary or advisable to operate beyond the limits of the existing rights-of-way or easements, he shall be responsible for making special written agreements with the property owners and shall furnish such copies of agreement to OWNER.

1.06 Photographs (Not Used)

1.07 Audio/Video Route Survey (Not Used)

1.08 ENGINEER's Field Office (Not Used)

1.09 Project Sign (Not Used)

Part 2 Products (Not Used)

Part 3 Execution (Not Used)

End of Section

Section 01 2200
Unit Prices

Part 1 General

1.01 Scope

A. This Section describes the method of measurement and basis of payment for all items of Work included in the Contract and specified in the Proposal. CONTRACTOR shall provide labor, material, tools, equipment and services required to complete the Work specified herein and indicated on the Plans.

B. OWNER WILL MAKE NO ALLOWANCES FOR ITEMS NOT INCLUDED IN THE PROPOSAL.

1.02 Items of the Proposal

Item 1
Open Channel Excavation, to the width specified, will be paid for at the Contract Unit Price per Linear Foot, excluding culvert lengths. Price paid shall be payment in full for labor, material, and equipment necessary for the open channel excavation and shall include, but is not limited to, removing and neatly piling fences, removing and salvaging topsoil, excavation to the required grades, clearing and grubbing, placement of spoil banks on working side of drain (limited to 2' in height of suitable material), the removal and disposal of unsuitable materials, the removal of sediment, silt, rubbish, debris, brush, roots, stumps, sticks, concrete, excess unsuitable and miscellaneous objects (once 2' height of spoil bank is reached), the preparation of the new Work to accept slope protection, the furnishing, installation, and maintenance of the slope protection, the furnishing construction and maintenance of sedimentation controls, the excavation and stockpiling of topsoil, the spreading of topsoil from stockpiles to spoil banks, grading, shaping, excavating, filling, and compacting the drain, and other items necessary to complete the job, whether specifically mentioned or implied.

Spoil leveling will be included in this pay item as determined in the plans. Includes removal of debris from leveled spoils in agricultural and wooded areas, and root raking of spoils in agricultural areas.

Measurement for open channel excavation will be in linear feet determined by field measurement along the centerline of the open drain, excluding culvert lengths.

Item 2
Restricted Open Channel Excavation, to the width specified, will be paid for at the Contract Unit Price per Linear Foot, excluding culvert lengths. Price paid shall be payment in full for labor, material, and equipment necessary for the open channel excavation and shall include, but is not limited to, removing and re-installing fences, removing and salvaging topsoil, excavation to the required grades, clearing and grubbing, the removal and disposal of unsuitable materials, the removal of sediment, silt, rubbish, debris, brush, roots, stumps, sticks, concrete, excess unsuitable and miscellaneous objects, the preparation of the new Work to accept slope protection, the furnishing, installation, and maintenance of the slope protection, the furnishing construction and maintenance of sedimentation controls, the excavation and stockpiling of topsoil, the spreading of topsoil from stockpiles, grading, shaping, excavating, filling, and compacting the drain, and other items necessary to complete the job, whether specifically mentioned or implied.

Measurement for restricted open channel excavation will be in linear feet determined by field measurement along the centerline of the open drain, excluding culvert lengths. This Work is similar to Open Channel Excavation, except that all spoils shall be hauled away. Work and costs associated with hauling excavation shall be inclusive to this pay item.

Item 3

Clearing and Grubbing, Debris Disposal will be paid for at the Contract Unit Price on a Lump Sum basis. Price paid shall be payment in full for all labor, material, and equipment necessary for clearing and grubbing and shall include, but is not limited to, cutting, chipping, removing and disposing of all trees, stumps, and brush (per the chart below); treatment of stumps at ground elevation when not designated for removal, protection of trees marked for saving (as determined by ENGINEER/LANDOWNER); removing and disposing of all hedges, roots, corduroy, logs, matted roots, other vegetation and debris, also the protection of plant life, existing structures and improvements not designated for removal, also the backfill, backfilling of holes, miscellaneous restoration, and for all items necessary to complete the job, whether specifically mentioned or implied.

Stumps and debris shall be chipped, burned, or hauled away. Burning shall be permitted by local ordinance and happen in open areas and not in wooded areas. Trees within drain banks wanted by landowner shall be placed outside of drain right-of-way at written discretion of landowner.

Clearing & Grubbing Schedule

Within the Top of Drain Bank Limits a) Regardless of diameter	Remove trees, stumps, brush, shrubs, hedges, roots, corduroy, logs and debris to ground level elevation
Outside Top of Drain Bank Limits but within Clearing and Grubbing Limits a) Less than 6-inch Diameter	Remove to ground level elevation and treat stumps
Outside Top of Drain Bank Limits but within Clearing and Grubbing Limits a) 6-inch or greater Diameter b) within Contractor's work influence	Remove to ground level elevation and treat stumps as required to complete drain work, as determined by CONTRACTOR
Outside Top of Drain Bank Limits but within Clearing and Grubbing Limits a) 6-inch or greater Diameter b) Not within Contractor's work influence	Tree / Stump may remain in place as determined by CONTRACTOR

Items 4 and 5

Culvert Crossing and Road Reconstruction, of the type, length and diameter specified on the Plans in open cut trench, will be paid for at the Contract Unit Price per Each as indicated in the Proposal. Price paid shall be payment in full for labor, material, and equipment necessary for culvert and road approach removal, installation, compaction, replacement or reuse of culvert and road reconstruction as specified on plans and shall include, but is not limited to, excavation, material removal, sheeting, shoring, bracing, and dewatering, construction, protection of existing improvements, sand backfill, sand or stone pipe bedding, end sections (as specified), barricading, saw cutting, excavation, removal and disposal of existing pavement and unsuitable material, furnishing, placing, and compacting materials, protection of existing improvements, culvert cleanout after construction, restoration to previous conditions, cleanup, and other items necessary to complete the job, whether specifically mentioned or implied. Supply and install riprap at ends of culvert as specified on the Plans, payment to be included in this pay item.

Item 6

Demolition and Disposal of Existing Bridge will be paid for at the Contract Unit Price on a Lump Sum basis. Price paid shall be payment in full for materials, labor, tools, equipment, transportation, and other expenses necessary to complete this work in accordance with the plans and specifications that shall consist of, but not be limited to, the excavation, removal of bridge deck, abutments, footings and wing wall materials, disposal of all debris, concrete, steel, wood or other material from the site; furnishing and compaction of backfill material; grading of disturbed areas; and any other items not specifically mentioned or implied. (Note that this work item may be deleted from the contract and completed by others.)

Item 7

Culvert Crossing and Private Drive Reconstruction, of the type, length and diameter specified on the Plans in open cut trench, will be paid for at the Contract Unit Price per Each as indicated in the Proposal. Price paid shall be payment in full for labor, material, and equipment necessary for culvert installation, compaction, replacement, driveway surface reconstruction as specified on plans and shall include, but is not limited to, excavation, material removal, sheeting, shoring, bracing, and dewatering, construction, protection of existing improvements, sand backfill, sand or stone pipe bedding, end sections (as specified), barricading, saw cutting, excavation, removal and disposal of existing unsuitable material, furnishing, placing, and compacting materials, protection of existing improvements, culvert cleanout after construction, restoration to previous conditions, cleanup, and other items necessary to complete the job, whether specifically mentioned or implied. Supply and install riprap at ends of culvert as specified on the Plans, payment to be included in this pay item.

Item 8

Culvert Cleanout will be paid for at the Contract Unit Price per Each. Price paid shall be payment in full for labor, material, and equipment required for cleanout of all existing culverts and shall include, but is not limited to, removal and disposal of rocks, sticks, bricks, sand, sediment, dirt, and debris, final inspection, barricading, protection of existing improvements, and other items necessary to complete the job, whether specifically mentioned or implied. Add riprap at ends of culvert for protection as specified on the Plans, payment to be included in this pay item.

Items 9 and 10

Maintenance Access Road Culvert and Stone Ford, will be paid for at the Contract Unit Price per Each. Price shall be payment in full for all labor, material, and equipment for a complete installation per the plans. This work will provide access across side drains, ditches or swales by either culvert or stone ford and placing of Plain Riprap on slope of the Drain for maintenance access by ENGINEER, as directed, or indicated on the plans.

Item 11

Temporary SESC Control Measures will be paid for at the Contract Unit Price on a Lump Sum basis. Price paid shall be payment in full for all labor, material, and equipment required for furnishing, installing, and maintaining temporary erosion control devices as shown on the plans or as determined by the ENGINEER and shall include, but is not limited to, furnishing, installing, and maintaining temporary erosion control measures including, but not limited to, check dams, sediment sumps, temporary seeding, stone mat construction entrance, and all other items necessary to complete the job, whether specifically mentioned or implied.

Item 12

Plain Riprap Spillways, will be paid for at the Contract Unit Price per Each. Includes materials, labor, and equipment for installation of filter fabric, placement of riprap, excavation, and grading to required contours. Riprap shall be a minimum width of 8 feet and bowl shaped determined by field measurement along the centerline of the drain.

Item 13
Grass Spillways, will be paid for at the Contract Unit Price per Each. Includes all labor, materials, and equipment necessary to install grass spillways for this project, as specified with minimum width of 8 feet and/or shown on the Plans determined by field measurement along the centerline of the drain.

Item 14
Riprap Toe of Slope Protection, will be paid for at the Contract Unit Price per Linear Foot. Includes material, labor, and equipment for installation of filter fabric, placement of riprap, excavation, and grading to provide required contours. Toe of slope riprap is paid based on placement on banks determined by field measurement along the centerline of the drain, three (3) feet high above toe of slope.

Item 15
Plain Riprap Splash Pad, will be paid for at the Contract Unit Price per Each. Includes material, labor, and equipment for installation of filter fabric, placement of riprap, excavation, and grading to provide required splash pad, as specified, including three feet minimum width and one foot height.

Item 16
Seeding, Fertilizing, and Mulching, will be paid for at the Contract Unit Price per Lump Sum. Includes labor, equipment, and material necessary to seed this project complete, which includes daily hand-seeding or hydroseeding of all disturbed drain areas and turf establishment with mulch and fertilizer or hydroseeding in lawn areas to provide for uniform grass growth and any re-seeding and erosion repair. Re-seeding and erosion repair is included to provide for uniform grass growth at the completion of the project and up to a one-year period after final completion.

Item 17
Cleanup and Restoration, will be paid for at the Contract Unit Price per Lump Sum. Includes all labor, equipment, and material necessary to clean up and restore work areas to preconstruction conditions or better, includes final grading, topsoil placement as specified in lawn areas, and removal of rocks, roots and other debris from the project area.

Items 18 and 19
Field Tile Outlet Repair, will be paid for at the Contract Unit Price per Each. Includes material, labor, equipment for installation, connection to existing field tile, 16 feet of pipe, and filter fabric.

Item 20
Surface Water Inlet, will be paid for at the Contract Unit Price per Each. Includes all labor, equipment, and material necessary to install inlet pipe according to the detail in the Plans as directed in the field by the ENGINEER.

Item 21
Traffic Control, will be paid for at the Contract Unit Price on a Lump Sum basis. Price paid shall be payment in full for all labor, material, and equipment required for maintaining traffic at crossings and detour routes in accordance with an approved County Road Commission Traffic Control and Detour Plan, and shall include, but is not limited to, furnishing, installing, operating, and maintaining all barricades, lighted arrow boards, drums, traffic control devices, signs, channeling devices, cones, flagmen, flag control, pavement markings, warning flashers, concrete barriers, minor traffic devices, and all other items necessary to complete the job, whether specifically mentioned or implied.

End of Section

Section 01 3119
Project Meetings

Part 1 General

1.01 Preconstruction Meeting

A. Prior to the delivery of materials or the start of any construction, CONTRACTOR shall request a Preconstruction Meeting from ENGINEER. A minimum three (3) working days' notification to meeting participants shall be required.

B. Schedule:

1. ENGINEER will establish the meeting place, time and date, distribute agenda, notify participants, and administer the meeting. CONTRACTOR shall notify major Subcontractors.

C. Attendance:

1. OWNER
2. ENGINEER
3. CONTRACTOR
4. Major Subcontractors
5. Utility Companies
6. Safety Representatives
7. Governmental Agencies

D. Agenda:

1. Distribution by CONTRACTOR and discussion, review and acceptance of:

    a. List of names and telephone numbers for superintendent, foreman and other key personnel.

    b. List of major Subcontractors and Suppliers.

    c. Projected construction preliminary progress schedules.

    d. Preliminary schedule of Shop Drawings and Sample submittals.

    e. Estimated monthly payment schedule and schedule of values

2. Critical Work sequencing.
3. Major equipment deliveries and priorities.
4. Project coordination.
5. Responsibilities of OWNER, ENGINEER, CONTRACTOR and other agencies.
6. Procedures and processing of:

    a. Field decisions.
    b. Proposal requests.
    c. Submittals.
    d. Change Orders.
    e. Applications for Payment.

7. Adequacy of distribution of Contract Documents.
8. Procedures for maintaining Record Documents.
9. Use of premises.
10. Construction facilities, controls and construction aids.
11. Temporary utilities.
12. Safety and first aid procedures.
13. Security procedures.
14. Housekeeping procedures.
15. Testing

E. Minutes:

1. ENGINEER will prepare and distribute copies to participants within seven (7) days of meeting. Participants shall report corrections and comments within ten (10) days of receipt of minutes.

1.02 Progress Meetings

A. Periodic Progress Meetings will be held as required by the progress of the Work.

B. Schedule:

1. ENGINEER will establish the meeting place, time and date, distribute agenda, notify participants and administer the meeting. CONTRACTOR shall notify major Subcontractors.

C. Attendance:

1. ENGINEER
2. CONTRACTOR
3. Subcontractor as appropriate to the agenda.
4. Suppliers as appropriate to the agenda.
5. Others

D. Agenda:

1. Review minutes of previous meeting.
2. Review of work progress since previous meeting.
3. Review field observations, problems, conflicts.
4. Review problems which impede Construction Schedules.
5. Review of off-site fabrication, delivery schedules.
6. Review corrective measures and procedures to regain projected schedule.
7. Review revisions to Construction Schedules.
8. Review plan progress, schedule, during succeeding Work period.
9. Review coordination of schedules.
10. Review submittal schedules; expedite as required.
11. Review maintenance of quality standards.
12. Review proposed changes for:

    a. Effect on Construction Schedule and on completion date.
    b. Effect on other Contracts of the Project.

13. Other business.

E. Minutes:

1. ENGINEER will prepare and distribute copies to participants and OWNER within seven (7) days of meeting for review at the next meeting.

Part 2 Products (Not Used)

Part 3 Execution (Not Used)

End of Section

Section 01 3300
Submittal Procedures

Part 1 General

1.01 General Requirements

A. CONTRACTOR shall submit Shop Drawings, product data, and Samples, as required by the individual Specification Sections, to ENGINEER for review in accordance with the provisions of General Conditions.

1.02 Progress Schedules

A. CONTRACTOR shall submit 2 copies of Progress Schedules indicating the starting and completion dates of the various stages of the Work and estimated payments during the next 3 months to ENGINEER.

1. Proposed Progress Schedules shall be submitted to ENGINEER prior to the preconstruction meeting.

2. CONTRACTOR shall distribute copies of the Progress Schedules during the preconstruction meeting for discussion.

3. Progress Schedules shall be updated by CONTRACTOR and submitted to ENGINEER, as a part of applications for progress payments, through completion of the Work. Failure to update progress schedule may be the basis for rejection of applications for progress payments.

1.03 Shop Drawing Schedule

A. CONTRACTOR shall submit 2 copies of Shop Drawing Schedules indicating the individual items and submission dates to ENGINEER.

1. A preliminary Schedule in accordance with the requirements in the General Conditions shall be submitted by CONTRACTOR prior to the preconstruction meeting.

2. Copies of this preliminary Schedule shall be made available by CONTRACTOR during the preconstruction meeting.

3. A final Schedule shall be submitted by CONTRACTOR at least 10 days prior to submitting the first Application for a Payment.

1.04 Schedule of Values

A. CONTRACTOR, if applicable, shall submit 2 copies of Schedules of Value of the Work to ENGINEER.

1. A preliminary Schedule of Values shall be submitted by CONTRACTOR prior to the preconstruction meeting.

2. A final Schedule of Values, prepared in accordance with the General Conditions and presented in sufficient detail to serve as the basis for payments during construction, shall be submitted to ENGINEER for approval at least 10 days prior to submitting the first Application for Payment.

1.05 Staking Schedule

A. CONTRACTOR shall submit 2 copies of the Staking Schedule, in accordance with the "Construction Layout" specification section prior to the Start of Construction.

1. The Staking Schedule should be updated as outlined in the specifications and submitted by the CONTRACTOR to ENGINEER through completion of the Work.

1.06 Applications for Payment

A. CONTRACTOR shall submit Applications for Payment to ENGINEER in accordance with the provisions of Article 14 of the General Conditions.

B. Applications for Payment shall be made on forms provided by or approved by ENGINEER.

1. Sample CONTRACTOR's Application/Declaration, Payment Schedule and ENGINEER's Certificate forms for this purpose are included in the Contract Documents.

C. Copies of these forms, with Project specific information completed by ENGINEER, will be given to CONTRACTOR at the preconstruction meeting or, if applicable, after approval of the final Schedule of Values.

D. CONTRACTOR shall submit a completed Payment Schedule with an executed Contractor's Application for Payment and Contractor's Declaration to ENGINEER not more often than once per month.

E. ENGINEER will certify payments with the use of Engineer's Certificate for Payment.

1.07 Shop Drawings

A. Shop Drawings shall be presented in a clear and thorough manner. Details shall be identified by reference to Plan Sheet Number and Detail, and Specification Section Number and Page Number.

1.08 Product Data

A. Product data shall be presented in a clear and thorough manner identified the same as the Shop Drawings. Included with the information shall be performance characteristics and capacities depicting dimensions and clearances required.

B. Manufacturer's standard schematic drawings and diagrams shall be modified to delete information which is not applicable to the Work. Manufacturer's standard information shall be supplemented to provide information specifically applicable to the Work.

1.09 Samples

A. Samples shall be of sufficient size and quantity to clearly illustrate functional characteristics of the product with integrally related parts and attachment devices depicting full range of color, texture and pattern.

1.10 Submission Requirements

A. CONTRACTOR shall make submittals in accordance with the approved schedule, and in such sequence as to cause no delay in the Work or in the work of any other Contractor.

No damages will be awarded or extension of time granted due to the Shop Drawing and product data review process.

B. CONTRACTOR shall submit an entire package of Shop Drawings and product data information for major items of Work so that ENGINEER can review the package as a unit.

C. The number of submittals required shall be 2 reproducibles and 2 prints per Shop Drawings and 7 copies of each product data information sheet. Submittals shall contain the following information:

1. Field dimensions, clearly identified as such.

2. Relation to adjacent or critical features of the Work or materials.

3. Applicable standards, such as ASTM or Federal Specification Numbers.

4. Identification of deviations from Contract Documents.

5. Identification of revisions on resubmittals.

6. CONTRACTOR's stamp indicating as a minimum the Project Title, Date of Submission, Date of Previous Submission, and Specification Section number.

D. CONTRACTOR's stamp shall be initialed or signed, certifying CONTRACTOR's review and approval of submittal per the General Conditions, verification of products, field measurements, field construction criteria, and coordination of the information within the submittal with requirements of the Work and of Contract Documents.

E. ENGINEER shall affix a stamp and initials or signature and indicate confirmation or requirements for resubmittal. ENGINEER shall return to CONTRACTOR one (1) set of reproducible of the product data information and 3 copies for distribution or for resubmission.

1.11 Resubmission Requirements

A. CONTRACTOR shall make all corrections or changes in the submittals required by ENGINEER and resubmit. CONTRACTOR shall indicate any changes which have been made other than those requested by ENGINEER.

1.12 Specification Section Requirements

A. Miscellaneous schedules, field reports, test reports, affidavits, certificates, permits, agreements and other items identified in the Specification Sections, or as requested by ENGINEER shall be submitted to ENGINEER in duplicate.

B. As a minimum, these submittals should be identified with the Project title, date of submission, and Specification section reference.

1.13 Manufacturer's Operation and Maintenance Data

A. CONTRACTOR shall furnish 4 copies of all operation and maintenance data required per the various Specification Sections.

1. Prior to 50% completion of the Project, CONTRACTOR shall have submitted one (1) acceptable copy to ENGINEER for review.

B. Operation and maintenance data shall be bound in a suitable number of 3-inch or 4-inch, 3-ring hard cover binders. Permanently imprinted on the cover shall be the words "Manufacturer's Operation and Maintenance Data", Project title, location of the Project, and the date. A table of contents shall be provided in the front of each binder to list the various sections in the manual.

C. The information to be provided in each section of the manual, for each piece of equipment and project component shall include, but not be limited to, detailed equipment drawings; sections cut through all of the major equipment and subassemblies; installation and operational procedures; complete wiring and piping schematics; lubrication materials and procedures; maintenance procedures; and parts lists complete enough to permit identification of parts by nomenclature, manufacturer's part number and use.

D. At the front of each section a maintenance schedule shall be provided for each piece of equipment in the section.

1. The schedule shall display the daily, weekly, monthly, semi-annual, annual or fraction thereof, lubrication and preventative maintenance required in order to meet warranty conditions and the manufacturer's recommendations for optimum performance and life of the unit.

2. A common schedule format is to be developed and used for all of the sections. Photocopies or reproductions of the manufacturer's literature will not be accepted.

Part 2 Products (Not Used)

Part 3 Execution (Not Used)

End of Section

Section 01 4500
Quality Control

Part 1 General

1.01 General Requirements

A. Sampling of materials will be made by ENGINEER in accordance with the methods designated by the Specifications. CONTRACTOR shall furnish such facilities as ENGINEER may require for collecting, storing, and forwarding samples to the Laboratory. CONTRACTOR in all cases shall furnish the required samples to OWNER without charge.

1.02 Tests of Materials

A. Materials in the Work shall meet the requirements of the Contract Documents.

B. Tests of materials will be made as specified herein. ENGINEER shall have access to materials intended for use in the Work as well as to the plants where such materials are produced. Plant inspection may be made if the quantities are sufficient to warrant such inspection and if it is to the best interest of OWNER. In any case materials may be either inspected or tested when received on the Project.

C. Materials shall not be used until approval has been received from ENGINEER. Approval of materials at the producing plant does not constitute a waiver of ENGINEER's right for re-examination at the Project site.

D. Standards for testing materials, unless otherwise specified, shall be as established by the American Society for Testing and Materials (ASTM). Tests of materials will be made in accordance with the methods described or designated in the Specifications.

E. Sampling and testing of materials not specifically mentioned shall be done by generally accepted methods, unless otherwise specified by ENGINEER.

1.03 Certification of Materials

A. At the request of ENGINEER, CONTRACTOR shall provide ENGINEER with certification that the various materials to be used conform to the standards referred to in the Contract Documents.

1.04 Source Quality Control

A. Testing identified in the Specifications as Source Quality Control, which is required to establish quality of materials, equipment or fabricated items, shall be paid for by CONTRACTOR.

B. Unless the Resident Project Representative is notified at least 24 hours in advance, 4 hours of show-up time will be charged to the CONTRACTOR when a Resident Project Representative appears on a project and CONTRACTOR decides not to work.

C. A separate Inspector Day or a partial Inspector Day shall be charged for each and every Resident Project Representative working on a project for monitoring purposes.

Part 2 Products (Not Used)

Part 3 Execution (Not Used)

End of Section

Section 01 5000
Temporary Facilities and Controls

Part 1 General

1.01 Site Access and Parking

A. CONTRACTOR shall locate roads, drives, walks and parking facilities to provide uninterrupted access to construction offices, mobilization, Work, storage areas, and other areas required for execution of the Contract. Access drives and parking areas shall be hard surfaced unless otherwise approved by ENGINEER.

B. CONTRACTOR shall maintain driveways a minimum of 15 feet (5 m) wide between and around combustible materials in storage and mobilization areas.

C. CONTRACTOR shall maintain traffic areas as free as possible of excavated materials, construction equipment, products, snow, ice, and debris.

D. CONTRACTOR shall not utilize existing parking facilities for construction personnel or for CONTRACTOR's vehicles or equipment, unless written permission from owner of parking facility is obtained.

1.02 Trucking Route and Public Road Maintenance

A. Prior to the start of construction, CONTRACTOR shall submit for review a schedule and list indicating the streets and roads within the municipality that his equipment will use off the Project site.

B. CONTRACTOR shall comply with all safety requirements, weight restrictions and speed limits.

C. Gravel and dirt roads or streets used shall be maintained by grading, placing dust palliatives and maintenance gravel in sufficient quantities to eliminate dust and maintain traffic.

D. Paved streets shall be maintained in a reasonable state of cleanliness and CONTRACTOR shall remove accumulations of debris, dirt or mud caused by his operations. Removal shall be done in such a manner as to prevent the release of dust. This shall be done at least every day at the close of each day's operation or additionally when requested by ENGINEER.

E. Roads or streets damaged by CONTRACTOR’s operations, shall be repaired or removed and replaced to satisfactions of the agency having jurisdiction at no additional cost to the Project.

F. In order to insure adequate street maintenance and restoration as outlined above, CONTRACTOR may be required to deposit with the Agency having jurisdiction a cash Road Protection Bond.

1. This Bond, if required, will be held in escrow until final release is given by the Agency having jurisdiction. In the event CONTRACTOR fails or neglects to maintain or restore the streets to the satisfaction of the Agency having jurisdiction, the Agency having jurisdiction shall have the required maintenance or restoration work done and the cost incurred shall be deducted from the Road Protection Bond.

2. At the completion of the Project, the Agency having jurisdiction shall return the Road Protection Bond less any monies expended by the Agency having jurisdiction and shall render to CONTRACTOR an accounting of all monies so expended.

G. CONTRACTOR shall not store any equipment, supplies, construction material or excess excavated material on any roads or streets unless otherwise approved by ENGINEER.

1.03 Emergency Access

A. CONTRACTOR shall provide emergency access to property in the vicinity of the construction for police vehicles, fire equipment, ambulances or other emergency vehicles to protect life, health and property. Any areas damaged by emergency vehicles shall be restored by CONTRACTOR at no additional cost to OWNER.

1.04 Private or Public Roads, Sidewalks, and Parking Areas

A. Where public roads, driveways, parking areas and sidewalks are encountered throughout the community, CONTRACTOR shall maintain those portions affected by the construction operations in a passable condition until such time as final restoration of these improvements can be made as specified.

1. If, in the opinion of ENGINEER, the public safety is in danger or the necessity exists for maintaining traffic, ENGINEER may direct that backfilling be completed immediately.

2. In the event that the necessary backfill material and equipment are not available when direction is given for immediate backfill, the trench shall be backfilled with native material to provide for the necessary maintenance of traffic and safety; however, the native material shall be removed within 48 hours and the trench properly backfilled as specified.

B. Where private roads are encountered throughout the community, CONTRACTOR shall maintain those portions affected by its construction operations in a passable condition. These roads shall be maintained by the use of 21A road maintenance gravel, stone or slag.

1. In the event the original subbase has been destroyed, CONTRACTOR shall furnish and install 1-inch to 2-inch (25 to 50 mm) aggregate to stabilize the existing subbase.

2. Upon completion of the construction activities, CONTRACTOR shall shape and regrade these roads leaving them in a condition as good as or better then original, and adequate for normal travel.

1.05 Work Within Railroad Company Right-of-Way

A. CONTRACTOR shall be responsible for complying with the requirements of the Railroad Company for Work of the Project and/or temporary crossings for trucking routes.

B. Unless otherwise provided by an item of these Specifications, CONTRACTOR shall bear costs and expenses incidental thereto, including, but not limited to, protection, flagmen, construction engineering inspection by the railroad, and incidental work such as drainage facilities and removal, alteration and replacement of railroad fences.

1.06 Road Closing

A. No street, road or section thereof shall be closed to through traffic unless otherwise provided for on the Plans, Specifications, or authorized by the agency with jurisdiction over the roads. Prior to closing a street, road, or section thereof, CONTRACTOR shall confirm with ENGINEER that a detour plan has been approved by the agency having jurisdiction over the roads.

B. In the event roads or streets are to be closed, CONTRACTOR shall notify the local fire department, police department, local road authority, ambulance and emergency services, Department of Public Works, public transit authority and public school system daily as to what streets will be partly blocked or closed, the length of time the streets will be blocked or closed and when the streets will be reopened to traffic. CONTRACTOR shall designate one responsible employee to carry out the requirements of this condition.

C. During the time that the road is closed, CONTRACTOR shall make provision for trash, leaf, and rubbish pickup.

1.07 Maintaining Traffic

A. CONTRACTOR shall provide access for local traffic to property along the Project by means of temporary roads, drives, culverts or other means approved by ENGINEER. CONTRACTOR shall grade, add surfacing materials, and dust palliatives to such temporary roads and drives as necessary for the proper maintenance of traffic.

B. Where the shoulder is used to maintain traffic, the shoulder shall be graded, surfaced, treated for dust, constructed, or reconstructed, as specified herein or as shown on the Plans.

1. If the construction work is suspended due to weather conditions, winter shut down or for any other reason, sufficient labor, materials and equipment shall be ready for immediate use at all times for the proper maintenance of traffic.

2. Surfacing materials and dust palliatives shall be applied at such times and locations and in such amounts as necessary to safely maintain traffic and as determined by ENGINEER.

C. Where shoulders are low, high, soft or rough, adequate provisions shall be taken to inform and protect the traveling public by means such as construction warning signs, barricades, lighted devices, etc. Such shoulder hazards shall be eliminated as soon as practicable.

D. CONTRACTOR shall furnish, erect and maintain all signs, barricades, lights, and traffic regulators, in accordance with the requirements of the current "Michigan Manual of Uniform Traffic Control Devices." Furnish flagmen and watchmen as are necessary to maintain and safeguard traffic along the entire Project.

1. Failure to comply with these requirements may be cause for the OWNER to issue a stop Work Order, which shall remain in effect until all necessary devices are in place and operational.

2. The issuance of a stop Work Order shall not be reason for granting additional compensation or an extension to the Contract Time.

3. Furnishing, installing, and maintaining traffic control devices shall be incidental to the Project unless otherwise provided for in the Proposal.

1.08 Existing Signs

A. No stop sign, traffic control or warning device or sign shall be taken down until the agency having jurisdiction over the roads has been notified and arrangements for the immediate reinstallation has been made.

B. CONTRACTOR shall provide temporary signs, traffic control devices, warning devices, or watchmen continuously from the time the item is removed until it is reinstalled.

C. Signs removed shall be replaced with signs meeting requirements of the agency having jurisdiction over the roads.

1.09 Temporary Electricity and Lighting

A. CONTRACTOR shall be responsible for and pay all costs for the installation and removal of circuit and branch wiring, with area distribution boxes located so that power and lighting is available throughout the construction by the use of construction-type power cords and shall pay all costs of electrical power used.

B. Electrical wiring and distribution shall conform to the National Electrical Code as adopted by the State of Michigan.

1.10 Telephone

A. CONTRACTOR is required by MIOSHA regulations to provide telephone service for contacting emergency services. Such emergency telephone service shall also be available for the use of OWNER and ENGINEER whether or not a field office is required for the Project. Emergency phone numbers are required to be posted per MIOSHA regulations.

B. CONTRACTOR shall pay all costs for installation, maintenance and removal, and service charges for local calls to provide service for his construction site office as well as for ENGINEER's field office. Toll charges for calls relating to Project business shall be at CONTRACTOR'S expense.

1.11 Use of Water

A. CONTRACTOR shall acquire any and all permits, post any bonds and pay all fees required by the local agency having jurisdiction prior to using any hydrant or any other source of water. CONTRACTOR shall reimburse the local community for water consumed during course of the Project at the current rate as set by the agency having jurisdiction.

1.12 Sanitary Provisions

A. CONTRACTOR shall be responsible for installation, maintenance and removal of temporary sanitary facilities per MIOSHA regulations for use of construction personnel including OWNER and ENGINEER. All rules and regulations of the State and local health officials shall be observed, with precautions taken to avoid creating unsanitary conditions.

1.13 Potable Water

A. CONTRACTOR shall furnish a supply of potable water per MIOSHA requirements, available for use of construction personnel including OWNER and ENGINEER.

1.14 Medical Services and First Aid

A. CONTRACTOR shall furnish first aid supplies and a person trained in first aid with a valid first aid certificate, per MIOSHA requirements, available for use of construction personnel including OWNER and ENGINEER. CONTRACTOR shall also furnish a communication system for contacting emergency services. Telephone numbers of the physician, hospital, or emergency services shall be conspicuously posted at the job site.

1.15 Postal Service

A. Several or all residents of this Project area may receive their mail at roadside mailboxes. Since the postal service will not deliver mail to a resident without a mailbox or a mailbox that is not in its proper position, CONTRACTOR shall relocate, replace and repair all mailboxes and posts in a condition and height acceptable to the post office within 24 hours of the removal.

B. If required, CONTRACTOR shall furnish new posts for the mailboxes if the existing posts are broken or rotted to the extent that they cannot be reused.

C. Mailbox damaged by CONTRACTOR while carrying out his operations or by anyone else while the box is down due to CONTRACTOR's operation, shall be replaced by CONTRACTOR with a new mailbox meeting the postal officials' specifications and the resident's name and address neatly lettered with paint or other acceptable means to the satisfaction of the resident and postal authorities. Cost for relocating mailboxes shall be incidental to the Project unless otherwise specified in the Proposal.

1.16 Newspaper Delivery

A. Residents of this Project area may receive their newspapers at roadside tubes. Since the resident arranges for newspaper delivery, CONTRACTOR shall notify the resident 24 hours prior to removal of any newspaper tube. Newspaper tubes damaged by CONTRACTOR while carrying out his operations or by anyone else while the tube is down due to CONTRACTOR's operation, shall be replaced as agreed between CONTRACTOR and the newspaper who owns the damaged tube. Cost shall be incidental to the Project.

1.17 Bus Stops and Shelters

A. Prior to the start of any construction, CONTRACTOR shall notify the transit authority that has any bus stops within the area of the Work. Removal, relocation and/or replacement of signs and/or benches shall be the responsibility of CONTRACTOR in accordance with any requirements of the transit authority. Cost shall be incidental to the Project.

1.18 ENGINEER's Field Office (Not Used)

1.19 Bypass Pumping

A. CONTRACTOR shall maintain flow in existing culverts and drains at all times by pumping, bypassing, or fluming as necessary.

1. During wet weather events, the flow in the sewer will rise rapidly and may become surcharged.

2. CONTRACTOR shall maintain flow in such a manner as the existing flow can be adequately transported including wet weather flow.

3. CONTRACTOR shall furnish, install, operate, and maintain temporary pumping facilities to service the upstream area including piping, temporary channels, pumps, sumps, controls, temporary plugs, and bulkheads.

B. CONTRACTOR shall also furnish and have available onsite, redundant pumping facilities in case of any failure of the pumping system including pumps, piping, electrical, connections, etc.

1. Redundant pumping facilities also include having a backup power generator in case the primary power source fails.

2. CONTRACTOR shall provide an adequate labor force to oversee the by-pass pumping including providing labor to maintain 24 hour per day operation and emergency backup service.

C. Costs for pumping and bypassing flow shall be included in the unit price bid for other items of Work unless otherwise specified in the Proposal.

Part 2 Products

2.01 Barricades, Arrow Boards, Temporary Pavement Markings, and Temporary Signs

A. Barricades, Arrow Boards, Temporary Pavement Markings, Temporary Signs, and other traffic control devices shall be in accordance with the current edition of the MDOT Standard Specifications for Construction, and the current edition of the Michigan Manual of Uniform Traffic Control Devices.

Part 3 Execution (Not Used)

End of Section

Section 01 5713
Temporary Erosion and Sediment Control

Part 1 General

1.01 Scope of Work

A. This Section includes furnishing, installing, maintaining, and removing at project completion, Soil Erosion and Sedimentation Control devices. Devices include temporary gravel construction entrance/exits, inlet filters, ditch sediment traps, etc.

1.02 Related Work Specified Elsewhere

A. Section 01 2200: Unit Prices
B. Section 01 8900: Site Construction Performance Requirements
C. Section 31 2200: Grading
D. Section 31 2333: Trenching and Backfilling
E. Section 31 3500: Slope Protection
F. Section 32 9219: Seeding
G. Section 33 4100: Storm Utility Drainage Piping

1.03 Reference Standards

A. ASTM American Society for Testing and Materials

1.04 Requirements of Regulatory Agencies

A. Comply with requirements of the agency having jurisdiction. OWNER may withhold payment to CONTRACTOR equivalent to any fines resulting from non-compliance with applicable regulations.

1.05 Performance Requirements

A. Employ Best Management Practices as defined by standard EPA 832-R-92-005.

B. Put preventative measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.

C. Control increased storm water runoff due to disturbance of surface cover due to construction activities for this Project.

D. Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this Project.

E. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall event that might occur in 10 years.

F. Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this Project. Prevent windblown soil from leaving the project site. Comply with fugitive dust ordinances of agencies having jurisdiction. Prevent tracking or flowing of mud and sediment onto public or private roads, sidewalks or pavements outside of the site.

G. Prevent sedimentation of waterways on or off the project site, including rivers, streams, lakes, ponds, open drainage ditches, storm sewers, and sanitary sewers. If sedimentation occurs, install or correct preventative measures immediately at no cost to OWNER. Comply with requirements of agencies having jurisdiction.

H. Maintain temporary preventative measures until permanent measures have been established. Remove temporary measures when permanent measures have been established.

I. If erosion or sedimentation occurs due to non-compliance with these requirements, remove deposited sediment or restore eroded areas at no cost to OWNER.

1.06 Submittals

A. Submit schedule of Soil Erosion and Sedimentation Control activities to OWNER (agency having jurisdiction). Include major milestones (with days and/or dates of the various activities) for review and approval prior to beginning work.

Part 2 Products (Not Used)

Part 3 Execution

3.01 Examination

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to the greatest extent possible.

B. Except in areas to be cleared, do not remove, cut, deface, injure or destroy trees or shrubs without ENGINEER's approval. Protect existing trees or shrubs that are to remain and which may be injured, bruised, defaced, or otherwise damaged by construction operations, with suitable fences or other means as approved by ENGINEER.

3.02 Preparation

A. Review the drawings and Soil Erosion and Sedimentation Control Plan.

B. Revise Soil Erosion and Sedimentation Control Plan as necessary to address potential pollution from site identified during construction at no additional cost to Owner.

C. Conduct storm water pre-construction meeting with Site Contractor, all ground-disturbing Subcontractors, site Engineer of record or someone from their office familiar with the site, and state or local agency personnel in accordance with requirements of the special conditions.

D. Schedule work so that the soil surfaces are left exposed for the minimum amount of time. Place permanent soil and sedimentation control measures as soon as practical.

3.03 General

A. Sedimentation control devices shall be installed prior to CONTRACTOR beginning Work. Soil erosion and sedimentation control devices shall be maintained in an effective functioning condition at all times during the course of the Work.

B. Immediately bring earthwork to final grade and daily seed sideslopes and backslopes. Plan and conduct earthwork to minimize duration of exposure of unprotected soils.

3.04 Installation - General

A. Install ditch sediment traps, check dams, temporary gravel construction entrance/exits, and other soil erosion control devices in accordance with the drawings and Soil Erosion and Sedimentation Control Plan, or as may be dictated by site conditions in order to maintain the intent of the specifications and permits.

B. Deficiencies or changes on the drawings or Soil Erosion and Sedimentation Control Plan shall be corrected or implemented as site conditions change. Changes during construction shall be noted on the drawings.

C. OWNER has authority to limit surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and embankment operations and to direct CONTRACTOR to provide immediate permanent or temporary soil erosion and sedimentation control measures.

D. Remove temporary control devices after permanent measure are established. Remove and replace temporary control devices if they become ineffective at no additional cost to OWNER.

E. CONTRACTOR shall incorporate permanent erosion control features, paving, permanent slope stabilization, and vegetation into project at earliest practical time to minimize need for temporary controls.

F. CONTRACTOR shall permanently seed cut slopes as excavation proceeds to extent considered desirable and practical. Also the CONTRACTOR shall establish the lawn areas with mulch, topsoil, and fertilizer as outline in the Seeding Specification.

3.05 Dust Control

A. Keep dust down at all times, including during non-working periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming is not permitted.

3.06 Dewatering Discharge

A. Should it be necessary for CONTRACTOR to do any dewatering during the course of construction, CONTRACTOR shall filter all discharge through a discharge filter bag or other sediment control device that will filter all discharge water.

B. No dewatering discharge shall be allowed to flow unfiltered from the construction site.

3.07 Maintenance

A. Maintain temporary erosion and sedimentation control systems as dictated by site conditions, indicated in the construction documents, or as directed by governing authorities or OWNER to control sediment until final stabilization.

B. CONTRACTOR shall respond to maintenance or additional work ordered by OWNER or governing authorities immediately, but in no case, within not more than 48 hours if required at no additional cost to OWNER.

3.08 Inspection

A. General:

1. Inspections shall be performed by a person familiar with the site, the nature of the major construction activities, and qualified to evaluate both overall system performance and individual component performance.

2. Inspector must either be someone empowered to implement BMPs in order to increase effectiveness to an acceptable level or someone with the authority to cause such things to happen.

3. Inspector must be certified as a "Storm Water Professional" through the MDEQ storm water training program. Additionally, the inspector shall be properly authorized in accordance with the applicable General Permit to conduct the certified site storm water inspections.

4. CONTRACTOR is responsible to obtain and/or serve as the Certified Operator.

B. Inspection Frequency Reduction:

1. Inspection frequency may be reduced under the following conditions:

a. No active onsite construction activities.

b. Temporary cover has been provided across the entire site and no BMPs remain. Situation: waiting for grass to grow, but grass is dormant.

c. Ground is frozen and/or snow covered.

2. Weekly Storm Water Meeting:

a. A weekly storm water meeting will be held by CONTRACTOR with those involved in ground-disturbing activities to review the requirements of the permits, and address any problems that have arisen in maintaining the BMPs.

b. CONTRACTOR shall maintain a log of weekly meetings and document the issues addressed in the meetings on site.

3. Agency Storm Water Inspections:

a. A log of inspections by federal, state, or local storm water or other environmental agencies shall be kept in CONTRACTOR's equipment onsite at all times.

b. The log form should include the date and time of visit and whether a report was issued or will be issued as a result of the inspection.

c. Any reports issued will be sent to ENGINEER within 24 hours.

3.09 Project Completion

A. Remove temporary soil erosion and sedimentation control devices as soon as permanent measures have been established.

End of Section

Section 01 6000
Product Requirements

Part 1 General

1.01 Transportation and Handling

A. CONTRACTOR shall provide for expeditious transportation and delivery of materials and equipment to the Project site in an undamaged condition and on a schedule to avoid delay of the Work. Materials and equipment shall be delivered in original containers or packaging with identifying labels intact and legible.

B. CONTRACTOR shall provide equipment and personnel at the site to unload and handle materials and equipment in a manner to avoid damage. Materials and equipment shall be handled only at designated lifting points by methods to prevent bending or overstressing.

1.02 Storage and Protection

A. CONTRACTOR shall store materials and equipment immediately on delivery, and protect it until installed in the Work.

B. Products subject to damage by elements shall be stored in weather-tight enclosures with temperature and humidity ranges as required by manufacturer's instructions.

C. Loose granular materials shall be stored on solid surfaces to prevent mixing with foreign matter.

D. The place of storage shall be located so as to minimize interference with traffic and to provide easy access for inspection. No material shall be stored closer than five (5) feet (1.5 m) to the edge of a pavement or traveled way open to the public.

E. Materials that have been stored shall be subject to retest and shall meet the requirements of their respective specifications at the time they are to be used in the Work.

F. CONTRACTOR shall provide protection of stored or installed materials and equipment as necessary to prevent damage from traffic and subsequent operations.

1.03 Manufacturer's Instructions

A. When the Contract Documents require that installation of Work shall comply with manufacturer's instructions, CONTRACTOR shall obtain and distribute copies of such instructions to parties involved in the installation including two (2) copies to ENGINEER.

B. CONTRACTOR shall handle, install, connect, clean, condition and adjust products in strict accord with such instructions and in conformity with specified requirements. Should Project conditions or specified requirements conflict with manufacturer's instructions, consult with ENGINEER for further instructions.

1.04 Products List

A. Within four (4) days of request, CONTRACTOR shall submit a complete list of major products proposed to be used, with the name of the manufacturer and the installing subcontractor, if applicable, to ENGINEER.

1.05 CONTRACTOR's Product Options

A. For products specified only by reference standard, CONTRACTOR shall select any product meeting that standard.

B. For products specified by naming several products or manufacturer's CONTRACTOR shall select any one of the products or manufacturers named, which complies with the specifications.

C. For products specified by naming one or more products or manufacturers and "or equal," CONTRACTOR must submit a Substitution Request Form for any product or manufacturer not specifically named, in accordance with the General Conditions.

D. For products specified by naming only one product and manufacturer, there is no option.

1.06 Equipment Startup and Testing

A. CONTRACTOR shall perform a comprehensive startup and demonstration of equipment performance and compliance with the design requirements. When there is more than one mode of operation, the equipment shall be operated in every mode to verify proper operation.

B. When equipment is to operate in conjunction with other equipment as a system, each piece of equipment shall be operated both by itself and automatically as a system to verify its proper operation.

C. CONTRACTOR is to provide to ENGINEER, in advance of startup, a schedule and listing of startup and testing procedures for review by ENGINEER. Checklists and diagrams may be required to ensure adequate startup and testing. ENGINEER may recommend changes to the startup procedure as necessary.

D. Equipment is to be inspected prior to operation for debris or other obstructions. Equipment is to be properly lubricated and calibrated prior to operation. CONTRACTOR shall make all adjustments necessary to assure correct operation. When required, equipment installation and operation is to be witnessed and checked by manufacturer.

E. When required, CONTRACTOR shall train OWNER's operation and maintenance personnel in the proper operation and maintenance of each piece of equipment and the system as a whole.

F. Equipment startup is to be witnessed by OWNER and ENGINEER.

Part 2 Products (Not Used)

Part 3 Execution (Not Used)

End of Section

Section 01 7124
Construction Layout

Part 1 General

1.01 Responsibility for Staking

A. OWNER will set stakes and markers showing the locations on the surface of various parts of the Work as outlined herein. Additional stakes shall be provided at the expense of CONTRACTOR.

B. CONTRACTOR shall furnish such labor and assistance as OWNER may require in setting the same.

C. It shall be the responsibility of CONTRACTOR to transfer surface line and grade to the bottom of any tunnel or to the bottom of any other subsurface operations where ordinary surface line and grade is not feasible.

D. CONTRACTOR shall utilize lasers, or surveying instruments run by qualified competent personnel to control the construction installation Work. If the method being used by CONTRACTOR fails to give proper alignment and grade control to the Work, OWNER shall be empowered to order CONTRACTOR to use such other method(s) as will provide adequate control.

E. ENGINEER may require CONTRACTOR, at CONTRACTOR's expense, to provide such masts, scaffolds, batter-boards, straightedges, templates, or other devices as may be necessary to facilitate laying out, observing and constructing the Work.

1.02 Staking Schedule

A. CONTRACTOR shall submit a completed staking schedule on the form provided by ENGINEER showing the order in which CONTRACTOR proposes to conduct the construction operation prior to the preconstruction meeting. The schedule shall be submitted to ENGINEER a minimum of three (3) working days prior to the start of construction.

B. During construction CONTRACTOR shall to the extent possible, limit unnecessary staking requests and coordinate his construction schedule to provide for the efficient and effective use of the survey crew and eliminate excessive survey crew trips to the site.

1.03 Relocation and Re-Establishment

A. Construction Stakes:

1. Where change of location of stakes has been requested by CONTRACTOR, or where CONTRACTOR fails to properly preserve construction survey stakes, such resetting or relocations of stakes shall be done by ENGINEER and paid for by CONTRACTOR on the basis of time and materials for such re-staking.

B. Survey Control Points:

1. CONTRACTOR shall bear all expense involved in re-establishing and/or resetting any survey control point, land survey point or monument lost or disturbed during his construction operation. Such Work shall be done under the direct supervision of a licensed land surveyor. Such survey control points shall be marked and flagged by ENGINEER prior to construction.

1.04 Staking Pipelines Laid to Grade (Not Used)

A. One (1) staking: Line and grade points at each structure with benchmarks at maximum 1/4 mile (400 m) intervals.

1.05 Staking Bores (Not Used)

A. One (1) staking: Line and grade points at each end.

1.06 Staking Existing Drainage

A. Unless otherwise indicated on the Plans or specified herein, CONTRACTOR shall bear all expenses including the staking of line and grade required for clearing and grubbing and to restore proper grading of surface drainage, including adjacent swales and ditches discharging into the County drains disturbed during the construction operation.

1.07 Staking Open Drains

A. Drain Cleanouts:

1. One (1) staking of grade points at 300-foot (100 m) intervals, angle points, grade changes, and structures.

1.08 Staking Roadway Without Curb and Gutter

A. One (1) staking will be provided for each of the following:

1. Clearing Limits:

a. Clearing limits will be staked if required with wood lath and /or ribbon on trees at 50-foot (20 m) interval or greater as site conditions dictate.

2. Slope Staking:

a. Slope stakes will be set right and left of centerline at 50-foot (20 m) intervals.

b. Ditch cut, cut or fill, slope and ditch information, and distance from centerline will be provided on the stake.

c. Stakes will be set at the slope intersection point.

3. Finish Grade:

a. After the subbase is placed or prior to placing aggregate base course as appropriate, finish grade will be provided as follows:

(1) Stakes will be placed at 50-foot (20 m) intervals on tangent sections and on curves or spiral curves with a radius of 200-feet (60 m) or greater.

(2) Stakes will be placed at 25-foot intervals on curves or spiral curves with a radius less than 200-feet (60 m).

B. CONTRACTOR shall be responsible for protecting these stakes, installing additional stakes, and transferring the information provided on the stakes by ENGINEER to other stakes as applicable for his Work.

Part 2 Products (Not Used)

Part 3 Execution (Not Used)

End of Section

Section 01 7700
Closeout Procedures

Part 1 General

1.01 Cleaning

A. CONTRACTOR shall perform periodic cleaning to keep the Work, the site and adjacent properties free from accumulations of waste materials, rubbish and wind-blown debris, resulting from construction operations.

B. Waste material, debris and rubbish shall be periodically removed from the site and disposed of at legal disposal areas away from the site.

C. Prior to OWNER acceptance CONTRACTOR shall conduct an inspection of sight-exposed interior and exterior surfaces, and all Work areas, to verify that the entire Work is clean.

D. CONTRACTOR shall broom clean exterior paved surfaces and rake clean other exterior surfaces of the site.

1.02 Project Record Documents

A. CONTRACTOR shall deliver one (1) copy of all Specifications, Plans, Addenda, Shop Drawings and Samples, annotated to show all changes made during the construction process, to ENGINEER upon completion of the Work. Submittal of the record documents shall be made with a transmittal letter containing:

1. Date
2. Project Title and Number
3. CONTRACTOR's Name and Address
4. Title and Number of each Record Document
5. Certification that each Document as submitted is complete and accurate
6. Documents shall be submitted in good order and in a legible condition.

1.03 Operation and Maintenance Data

A. Prior to final inspection or acceptance, CONTRACTOR shall fully instruct OWNER's designated operating and maintenance personnel in the operation, adjustment and maintenance of all products, equipment and systems specified.

B. Operation and maintenance data required by the individual Specification sections and the manufacturer's operation and maintenance data required in Section 01 3300, Submittal Procedures, shall constitute the basis of such instruction.

1.04 Start Up

A. CONTRACTOR shall coordinate efforts between OWNER, ENGINEER, any equipment manufacturers, subcontractors and governing agencies in the start up of applicable portions of the Work.

1.05 Substantial Completion

A. Certification that the Work is substantially complete shall be in accordance with the General Conditions.

1.06 Final Payment and Acceptance

A. The final inspection, final application for payment and acceptance shall be in accordance with the General Conditions.

Part 2 Products (Not Used)

Part 3 Execution (Not Used)

End of Section

Section 01 8900
Site Construction Performance Requirements

Part 1 General

1.01 Scope of Work

A. This Section includes general performance requirements for earthwork complete with, reimbursement for crop damage, removal and disposal of structures and obstructions, protection of existing sewers, tiles and mains; protection of existing building and improvements, protection of trees and other types of vegetation, protection of utility lines, requirements for pavement replacement, restoration of driveways and parking areas, restoration of sidewalks, restoration of lawns and disturbed areas, transportation, and disposal of excess excavation.

1.02 Related Work Specified Elsewhere

A. Section 01 5713: Temporary Erosion and Sediment Control
B. Section 31 2200: Grading
C. Section 31 2333: Trenching and Backfilling
D. Section 32 9219: Seeding

1.03 Reference Standards

A. Unless otherwise specified, the Work for this Section shall conform to the applicable portions of the following Standard Specifications:

1. MDOT - Michigan Department of Transportation Standard Specifications for Construction, latest edition.

1.04 Requirements of Regulatory Agencies

A. CONTRACTOR shall comply with Section 01 5713, Temporary Erosion and Sediment Control.

B. CONTRACTOR shall provide, maintain and remove such temporary and/or permanent soil erosion and sedimentation control measures as specified on the Plans or as determined by ENGINEER.

1. Measures shall prevent surface runoff from carrying excavated materials into the waterways, to reduce erosion of the slopes, and to prevent silting in of waterways downstream of the Work.

2. Measures should include provisions to reduce erosion by the wind of all areas stripped of vegetation, including material stockpiles.

1.05 Submittals

A. Written permission for the use of all disposal and borrow sites shall be obtained and copies shall be furnished to ENGINEER.

1.06 Protection of Plant Life

A. Trees, shrubs, and other types of vegetation not within the limits of the Work or not designated on the Plans or by ENGINEER to be removed, shall be carefully protected from damage or injury during the various construction operations.

B. Any tree, shrub or other type of vegetation not designated to be removed but which is damaged by CONTRACTOR's operation shall be repaired or replaced by CONTRACTOR, at his expense, as determined by ENGINEER.

1.07 Protection of Existing Structures and Improvements

A. Existing culverts, sewers, drainage structures, manholes, water gate wells, hydrants, water mains, utility poles, overhead lines, underground conduits, underground cables, pavement, or other types of improvements within the construction limits, not designated on the Plans to be removed, shall be carefully protected from damage during the construction operations.

B. Existing structure or improvement not designated to be removed, but which is damaged by CONTRACTOR's operations shall be repaired or replaced by the CONTRACTOR, to the satisfaction of the owner, at his expense.

C. Deposits of dirt or debris in sewers, culverts, tiles, drainage structures, manholes, gate wells, etc. caused by CONTRACTOR shall be cleaned out at the CONTRACTOR's expense.

1.08 Maintaining Drainage

A. Existing open drains, field and roadway ditches, drainage tile, sewers, enclosed drains, natural and artificial watercourses, surface drainage or any other types of drainage within the limits of the Work shall be maintained and free to discharge during construction.

B. Drainage facility not designated to be abandoned, but which is damaged, or any drainage interrupted by the CONTRACTOR's operation shall be immediately repaired, replaced, or cleared by the CONTRACTOR.

C. Costs incurred shall be incidental to the excavating, backfilling and compacting or grading operations.

Part 2 Products

2.01 Granular Material

A. Bank run sand meeting the requirements of MDOT, Granular Material Class II.

2.02 Aggregate for Shoulders, Parking Areas, Driveways or Roads

A. Crushed Limestone, Natural Aggregate or Slag and meeting the requirements of MDOT Section 902.

Part 3 Execution

3.01 Dewatering

A. The area within the vicinity of the new Work shall be dewatered prior to commencing any construction activities. The depth of the dewatering shall be sufficient to allow the Work area to remain in a dry condition during the various construction operations.

B. Costs incurred for furnishing, installing, maintaining and removing the dewatering equipment shall be at CONTRACTOR's expense.

C. Refer to Section 31 2319, Dewatering, for additional requirements.

3.02 General

A. The various construction operations shall be restricted to the existing right-of-way or the areas indicated on the Plans. If CONTRACTOR requires additional area, CONTRACTOR shall furnish the ENGINEER with written permission obtained from the property owner for any part of the operations he conducts outside of the right-of-way or limits indicated.

3.03 Existing Improvements

A. CONTRACTOR shall expose existing sewers and structures to which the new Work is to be connected and notify ENGINEER of same. ENGINEER will verify the vertical and horizontal locations of the existing system and shall inform CONTRACTOR as to the necessary adjustments required to align the new Work with the existing system.

3.04 Existing Utilities

A. When existing utilities are shown on the Plans, their locations are approximate only, as secured in the field investigation and/or from available public records. CONTRACTOR, prior to the start of construction, shall contact Miss Dig and the public agency or utility having jurisdiction to request the verification of all utilities within the construction area.

B. When existing utility lines, structures or utility poles are encountered during the performance of the Work, CONTRACTOR, at his expense, shall perform his operations in such a manner that the service will be uninterrupted.

C. CONTRACTOR shall expose all existing utility lines prior to any excavation operation, to determine any conflict with the proposed improvement. CONTRACTOR shall be responsible for any relocation required as a result of any conflict of existing utilities shown on the plans, with the proposed improvement.

D. Should it become necessary to move any utility structure, line or pole shown on the Plans or otherwise found necessary to be moved, CONTRACTOR shall make all arrangements with OWNER of the utility for the moving. costs incurred for such moving shall be at CONTRACTOR's expense unless indicated otherwise. However, before disturbing a utility line, structure or pole, CONTRACTOR shall furnish ENGINEER with satisfactory evidence, in writing, that proper arrangements have been made with the owner of the utility.

3.05 Utility Poles

A. CONTRACTOR shall be responsible for any removal or relocation required as a result of any conflict of existing utility poles (including street light poles, guy poles, telephone poles, etc.) with proposed improvements.

B. CONTRACTOR shall make all arrangements for removing or relocating utility poles with the owner of the utility pole.

C. Prior to disturbing any utility pole, CONTRACTOR shall provide ENGINEER with written evidence that proper arrangements have been made with the owner of the utility pole.

D. When required by the Work, CONTRACTOR shall temporarily support poles in the vicinity of the Work at no additional cost to OWNER. Support shall be in accordance with and to the satisfaction of the utility company.

3.06 Existing Sewers, Tile, and Mains

A. Existing sanitary sewers, storm sewers, drain tile, septic tank bed tiles, water mains or building services or leads, that are encountered during the performance of the Work that require relocation or are damaged, shall be restored with new materials equal in quality and type to the materials encountered.

B. New material shall be installed as specified in the Contract Documents and per the requirements of the local agencies. Bedding and backfill material, unless otherwise specified, shall be an approved Class II granular material, compacted to 98% of its maximum unit weight.

C. Seepage bed tile and water mains shall be replaced in accordance with the requirement of the agency having jurisdiction.

D. Relocation or protection of existing sewers, tiles, tile field, water mains or building services and leads shall be at CONTRACTOR's expense, unless otherwise indicated in the Contract Documents.

3.07 Existing Structures

A. Existing surface and subsurface structures may be shown on the Plans, in locations considered most probable from information secured in the field investigation or from available public records.

B. Neither the correctness nor completeness of such information is guaranteed or implied.

C. Structures shall be protected, preserved or restored by CONTRACTOR, to the satisfaction of the structure owner, at no additional cost to the Project.

3.08 Existing Buildings

A. Existing buildings or structures may be encountered throughout the Project within limits of the presently established right-of-way or easement. Good construction methods and procedures shall be employed by CONTRACTOR, at his expense, to protect the structures.

B. When it becomes necessary for CONTRACTOR to move one of these buildings or structures in order to proceed with construction, CONTRACTOR, at his expense, shall exercise all due care in moving the building or structure to prevent undue damage.

C. Prior to moving an existing building or structure, CONTRACTOR shall furnish ENGINEER with satisfactory evidence, in writing, that proper arrangements have been made with the owner.

D. Unless otherwise specified in the Contract Documents, the length of the move shall be maintained to a minimum which will allow for construction of the improvement.

3.09 Removal of Culverts

A. Unless otherwise specified in the Contract Documents, CONTRACTOR, at his expense, shall remove and properly dispose of any abandoned culvert, which is to be replaced or rendered useless by the new construction.

B. Removal of a culvert or sewer also includes the removal and disposal of end treatments or headwalls.

3.10 Salvaged Material

A. Salvaged materials shall become the property of CONTRACTOR unless otherwise specified in the Contract Documents, and shall be disposed of by CONTRACTOR, at his expense.

3.11 Trees

A. Trees excepting those specified on the Plans to be removed, shall be effectively protected by CONTRACTOR during his construction operations.

1. If in the opinion of ENGINEER, the methods of protection employed by CONTRACTOR are not adequate, CONTRACTOR shall carry on his operation by tunneling, or by other approved means, which will not cause undue damage to the trees.

B. Where the Plans indicate clearing and grubbing, care should be used to keep damage to adjacent trees to an absolute minimum. Where these areas are specifically indicated on the Plan, they are to be cleared and all trunks and branches shall be disposed of by CONTRACTOR. Debris shall not be bulldozed on to adjacent private property.

C. Trees damaged by the construction operation shall be repaired so not to inhibit growth or replaced at the expense of CONTRACTOR. Repair or replacement shall be contingent upon agreement between the damaged tree owner and CONTRACTOR. In any event, limbs, branches and roots damaged by CONTRACTOR shall be properly pruned to the satisfaction of ENGINEER.

D. Costs incurred for protection of trees, including tunneling, repair and replacement, if necessary, shall be at CONTRACTOR's expense.

3.12 Removing Pavement

A. Removal of concrete and bituminous pavement as called for on the Plans shall consist of removing and disposing of pavement and shall include base courses, surface courses, integral and separate curbs, integral and separate curb and gutters, sidewalks and end headers.

B. Pavement shall be removed to an existing joint or cut parallel to the existing pavement joints.

C. Cutting shall be accomplished by using a power-driven concrete saw approved by ENGINEER. Depth of the saw cut shall be a minimum of 6-inches, to insure that the removal of the old pavement will not disturb or damage the section of pavement remaining in place.

D. Residual concrete pavement shall not be less than five feet measured transversely, nor less than 6 feet longitudinally measured from a joint.

E. In removing a concrete base course, where part of the existing bituminous surface is to remain in place, the bituminous surface shall be cut the full depth by the use of a power-driven saw, approved by ENGINEER along a line parallel to and at least one foot from either side of the base course removal.

F. Old pavement with a concrete cap shall be considered as only one (1) pavement, whether or not there is a separation layer of earth, aggregate, or bituminous material between the old material and the concrete cap.

1. Removal of Curb for Curb Drop:

a. Where curb is to be removed for a curb drop, the operation shall be performed by saw cutting or by cold milling, approved by ENGINEER, so as to leave a neat surface with a maximum 1-inch lip, without damage to the underlying pavement.

2. Removal of Curb and Gutter:

a. Where curb and gutter are to be removed, the operation shall be performed by saw cutting. The limits of the removal shall be as called for on the Plans, or as approved by ENGINEER. However, in no case shall the width of removal be less than 18 inches for sections with rolled or straight curb or less than 24 inches for mountable curbs.

G. If during the pavement removal operation any concrete or bituminous pavement or surfacing is damaged beyond the removal limits designated, the damaged pavement or surfacing shall be removed and replaced at CONTRACTOR's expense.

H. Earth which may be removed during the pavement removal operation shall be replaced by backfilling to the proposed subgrade with a suitable material, approved by ENGINEER, at CONTRACTOR's expense.

3.13 Guardrail

A. Beam guardrail shall be relocated or shall be removed as specified on the Plans or as determined by ENGINEER. If any of the existing material is damaged or destroyed, CONTRACTOR shall replace the material at his expense.

B. Where guardrail is encountered during construction, and its removal was not called for on the Plans, it shall be replaced or restored, at CONTRACTOR's expense, to a condition comparable to that prior to construction.

C. After the guardrail removal or relocation operations are complete, all surplus material shall be removed and disposed of by CONTRACTOR, at his expense, unless otherwise called for in the Contract Documents.

D. Any holes or voids resulting from the guardrail removal operation shall be backfilled with a Class II granular material, approved by ENGINEER.

3.14 Fences

A. Fences shall be removed and neatly placed off of the drain right-of-way, or shall be removed as indicated on the Plans. If any of the existing material is damaged or destroyed, CONTRACTOR shall replace the material at his expense.

B. After the fence removal or relocation operations are complete, all surplus material shall be removed and disposed of by CONTRACTOR, at his expense, unless otherwise called for in the Contract Documents.

C. Any holes or voids resulting from the fence removal operation shall be backfilled with a suitable material, approved by ENGINEER.

D. Where fences are encountered that are being used to confine livestock or to provide security, the fence shall be immediately replaced following construction. During construction, CONTRACTOR, at his expense, shall provide, install and maintain a temporary fence, meeting the approval of ENGINEER.

3.15 Holes

A. Earth removed during any phase of the excavation or removal operations, resulting in a hole or void, shall be replaced by backfilling to the proposed subgrade with a suitable granular material. Material shall be placed by the controlled density method or other effective means having the approval of ENGINEER and shall be compacted to 95% of maximum unit weight.

B. Furnishing, placing and compacting of the backfill material shall be at CONTRACTOR's expense.

3.16 Restoration of Aggregate Surfaces

A. Shoulders:

1. Shoulder shall be regarded as the area between the edge of pavement and the ditch, or the area within 10 feet of the pavement, whichever is the lesser.

2. Backfilling of trenches in the shoulder area shall be carried to within 5 inches of the existing surface as specified under Trench “A" or Trench "B." The remaining depth shall be backfilled with a minimum of 5 inches of compacted 22A or 23A aggregate with calcium chloride applied, at the rate of 6 pounds per Ton of aggregate.

3. CONTRACTOR, at his expense, shall furnish, place and compact all materials necessary to complete the backfilling and restoration operation within the shoulder area.

B. Driveways and Parking Areas:

1. Aggregate driveway areas shall be regarded as the area from the right-of-way line to the edge of the traveled roadway and shall include the shoulder area.

2. Backfilling of trenches crossing aggregate surfaced driveways and parking areas shall be carried to the bottom of the proposed base course as specified under Trench “B”.

   The remaining depth shall be backfilled with a minimum of 6 inches of compacted 22A or 23A aggregate, with calcium chloride applied at the rate of 6 pounds per Ton of aggregate.

3. Aggregate surfaced areas beyond the limits of the actual excavation which are disturbed, as determined by ENGINEER, by such operations as temporary storage of materials or passage of equipment, shall be resurfaced, at CONTRACTOR's expense.

   a. Upper 3 inches of disturbed areas shall be removed as necessary to allow the final elevation of the resurfacing course to be at the elevation of the drive or parking area which existed prior to excavation.

   b. Disturbed area shall be resurfaced with a minimum of 3 inches of compacted 22A or 23A aggregate, with calcium chloride applied at the rate of 6 pounds per Ton of aggregate.

4. CONTRACTOR, at his expense, shall furnish, place, and compact all materials necessary to complete the backfilling and restoration operations within the driveway and parking area.

C. Roads and Streets:

1. Backfilling of trenches crossing aggregate surfaced roads or streets shall be carried to within 12 inches of the existing surface as specified under Trench "B." The remaining depth shall be backfilled with two 6-inch layers of compacted 22A or 23A aggregate, with calcium chloride applied at the rate of 6 pounds per Ton of aggregate.

2. CONTRACTOR, at his expense, shall furnish, place, and compact all materials necessary to complete the backfilling and restoration operations within the roadway or street area.

3. Also, any settlement of the aggregate surface shall be restored by placing additional aggregate, up to the original grade, and shall be done at the CONTRACTOR's expense.

D. Compaction:

1. Compaction of all aggregate shall be performed by a pneumatic-tired roller or a vibratory compactor until the material forms a stable surface.

3.17 Restoration of Paved Surfaces

A. CONTRACTOR, at his expense, shall provide the materials necessary to complete the backfilling and restoration operations, which shall include furnishing, compacting, forming, placing, rolling, floating, jointing, finishing, curing and providing protection against elements.

B. Restoration of any roadways that are partially damaged shall include a minimum replacement of one (1), full width lane of roadway. The length of replacement shall be at least equal to the width.

C. Concrete:

1. Backfilling of trenches crossing concrete driveways, sidewalks, roads, streets or parking areas shall be carried to the bottom of the proposed pavement as specified under Trench "B."

2. Unless otherwise specified on the Plans or as determined by ENGINEER, the concrete removed shall be replaced with 3,500 psi concrete of the thickness removed and shall include reinforcing equal to the existing, if the existing pavement was reinforced.

   a. The construction of concrete pavements shall be in accordance with Section 32 1313, Concrete Paving.

3. Restoration of sidewalks shall also include the construction of sidewalk ramps at the intersection of the curb and shall conform to the current rules and regulations of Act 8, Michigan PA 1973, as amended and to Section 32 1315, Sidewalks and Driveways, and unless otherwise indicated in the Proposal, shall be considered incidental to the Project.

D. Bituminous:

1. Backfilling of trenches crossing bituminous driveways, sidewalks, roads, streets or parking areas shall be carried to the bottom of the base course as specified under Trench "B."

2. Bituminous pavement or bituminous surface course with an aggregate base shall be replaced in accordance with Section 32 1216, Bituminous Paving.

3. Bituminous surfaced areas beyond the limits of the actual excavation which are disturbed by such operations, as temporary storage of materials or passage of equipment, shall be resurfaced with an approved bituminous mixture the same thickness as removed, but in no case less than 2 inches in thickness. Replacement material shall extend to smooth-cut edges, shall be uniform in direction and shall be at an elevation which provides a uniform surface between the undisturbed abutting surfaces.

4. Restoration of any bituminous chip seal shoulders that are damaged or partially damaged, as determined by ENGINEER, shall include complete replacement full width and length (extending a minimum of 25 linear feet beyond the damaged area both ways). Existing bituminous chip seal shoulders shall be brought to proper grade with compacted 22A or 23A aggregate and resurfaced with a double chip seal per Section 32 1216, Bituminous Paving.

3.18 Excess Excavation

A. Excess excavation shall be defined as all surplus earth material realized from the construction that is free of brush, roots, stumps, broken concrete, pipe, debris, and other extraneous material.

B. CONTRACTOR, when requested by OWNER, shall transport all excess excavation to a site(s) designated by OWNER.

1. Excess excavation shall be graded by CONTRACTOR to provide positive surface drainage of the site(s).

2. Grading shall be done such that adjacent properties are not damaged or affected. The grading shall include removal of all surface irregularities to provide a smooth surface (± 0.25 foot).

C. When the excess excavation has not been requested by the OWNER, the CONTRACTOR shall remove and properly dispose of the material at no additional cost to OWNER.

D. Proper disposal of all excess excavation, including transportation, grading, and protection of adjacent properties shall be considered as a final cleanup item. No additional payment will be made for this item.

E. Brush, roots, stumps, broken concrete, pipe, debris, and other extraneous material from the construction shall become the property of CONTRACTOR, and shall be disposed of per all applicable Laws, rules or regulations. Removal and disposal of this material shall be considered as part of final cleanup. No additional payment will be made for this item.

F. OWNER approval of the final site(s) condition in writing will be required prior to final payment authorization.

End of Section

Division 31
Earthwork

Section 31 1100
Clearing and Grubbing

Part 1 General

1.01 Scope of Work

A. This section includes all clearing and grubbing work indicated on the Plans and as required, complete with cutting and removal of trees, shrubs, vegetation, stumps, logs, brush, roots and undergrowth, and disposal of materials.

1.02 Related Work Specified Elsewhere

A. Section 01 2200: Unit Prices
B. Section 01 5713: Temporary Erosion and Sediment Control
C. Section 01 8900: Site Construction Performance Requirements
D. Section 31 2200: Grading

1.03 Soil Erosion and Sedimentation Control

A. CONTRACTOR, at his expense, shall provide, maintain and remove such temporary and/or permanent soil erosion and sedimentation control measures as specified on the Plans or as determined by ENGINEER.

B. Measures shall prevent surface runoff from carrying excavated materials into the waterways, to reduce erosion of the slopes, and to prevent silting in of waterways downstream of the Work.

C. Measures should include provisions to reduce erosions by the wind of all areas stripped of vegetation, including material stockpiles.

D. Comply with requirements of Section 01 5713, Temporary Erosion and Sediment Control.

Part 2 Products

2.01 Herbicide

A. Garlon 4 Ultra, a triclopyr-based product, shall be used on cut stumps per manufacturer's specifications.

B. Garlon 3A shall be used for foliar application per manufacturer's specifications.

Part 3 Execution

3.01 Clearing and Grubbing

A. Trees, stumps, brush, shrubs, hedges, roots, corduroy, logs, matted roots, other vegetation and debris occurring within the contract limits as defined on the Plans or as directed by ENGINEER, shall be completely removed. Depth of removal shall be in accordance with Article 3.04 or 3.05.

B. Selective clearing shall consist of removing and disposing of dead, diseased, poorly formed, or otherwise undesirable trees, undergrowth, stumps, uprooted trees and debris. Trees to be removed and the area where the undergrowth is to be removed will be indicated on the Plans or designated by ENGINEER.

C. Trees and stumps shall be cut off at an elevation not more than four (4) inches (100 mm) above the existing ground level.

3.02 Herbicide Application

A. Apply herbicide(s) at label rates to eliminate existing vegetation. Follow all label directions. Do not spray during heavy winds or within 12 hours of predicted rainfall.

B. Allow at least seven (7) days after herbicide application before disturbing the vegetation with other procedures.

C. During and after each herbicide application, locations designated by OWNER shall be posted with signs stating that herbicide has been applied in the area. Signs shall be posted within 24 hours of application and no longer than 48 hours. CONTRACTOR shall supply the signs.

3.03 Depth of Removal in Excavation Area

A. For excavation areas within roadways, parking lots, and other paved areas, the trees, stumps, and roots shall be removed to a depth of not less than 12 inches (300 mm) below the subgrade elevation.

B. In all other excavation areas, the trees, stumps, and roots shall be removed to a depth of not less than 12 inches (300 mm) below the finish surface elevation, or as indicated on the Plans or as designated by ENGINEER.

3.04 Depth of Removal in Embankment Areas

A. Within embankment areas for roadways, parking lots, and other paved areas where the top of road material is five (5) feet (1.5 m) or less in height above the existing ground, the trees, stumps, and roots shall be removed to a depth of not less than 12 inches (300 mm) below the existing ground.

B. Within embankment areas for roadways, parking lots, and other paved areas where the top of road material is more than five (5) feet (1.5 m) in height above existing ground, the trees and stumps shall be cut off flush with the existing ground surface.

C. For embankment areas other than roadways, parking lots, and other paved areas, the trees and stumps shall be cut off flush with the existing ground surface, or as indicated on the Plans or as designated by ENGINEER.

3.05 Removal of Trees, Stumps, and Other Vegetation

A. Where trees cannot be felled without danger to traffic or injury to other trees, structures or property, they shall be cut down in sections.

B. Removal of stumps and roots may be accomplished by the use of a shredding machine meeting the approval of ENGINEER.

3.06 Removing Corduroy

A. Logs, stumps, poles, brush, and other unsatisfactory material occurring in the contract limits at or below the surface of the ground and within the depth of four (4) feet (1.2 m) below the proposed plan grade shall be removed and shall be disposed of by the CONTRACTOR.

B. When material is disposed of outside of the contract limits, disposal shall be as specified in Section 01 8900, Site Construction Performance Requirements.

C. Burial of trees, stumps and other vegetation, will not be permitted, except at disposal areas indicated on the Plans or as determined by ENGINEER. Trees and stumps buried in these areas shall have a minimum cover of two (2) feet (0.6 m).

3.07 Holes and Trenches

A. Holes and trenches remaining after the clearing or grubbing operations in embankment areas, shall have the sides broken down or leveled, and shall be refilled with acceptable material.

1. Material shall be moistened and properly compacted in layers by tampers or rollers to the density required under roadways, parking areas, and other special areas, as determined by ENGINEER.

2. The same construction procedure shall be applied to all holes and trenches remaining in excavation areas where the depth of holes exceeds the depth of proposed excavation.

3.08 Salvaging Timber

A. Trees required to be removed and having a diameter of four (4) inches (100 mm), or more, are classed as merchantable timber. On right-of-way, fee simple, merchantable timber shall become the property of CONTRACTOR, unless otherwise specified in the Contract Documents. When such material is placed outside of the right-of-way, CONTRACTOR shall obtain and provide ENGINEER with written permission from owner of the property on which the timber is to be placed.

B. The OWNER, prior to the project, will send a letter to the property owner requesting if they would like the salvaged cleared timber. Timber shall be placed in ten (10)-foot long piles, maximum five (5) feet high, twenty (20) feet off of right-of-way for landowner to use.

C. Merchantable timber to be removed from areas outside of right-of-ways, fee simple, shall be cut and piled for the use of property owner, except where CONTRACTOR provides ENGINEER with a written agreement from the property owner that he does not desire the salvaged timber. Where the property owner has signed such an agreement, the salvaged timber will become the property of CONTRACTOR.

D. When such material is placed outside the contract limits, CONTRACTOR shall obtain and provide ENGINEER with written permission from the owner of the property on which the timber is to be placed. Timber from 4 to 12 inches (100 to 300 mm) in diameter may be left in full tree lengths or cut to commercial lengths, at the option of CONTRACTOR. Timber 12 inches (300 mm), or more, in diameter shall be cut into commercial lengths and piled separately from other timber.

End of Section

Section 31 2200
Grading

Part 1 General

1.01 Scope of Work

A. This Section includes site grading as indicated on the Plans, complete with removing and salvaging topsoil, rough grading, finish grading, adjusting structures, and reconstructing structures.

1.02 Related Work Specified Elsewhere

A. Section 01 2200: Unit Prices
B. Section 01 5713: Temporary Erosion and Sediment Control
C. Section 01 8900: Site Construction Performance Requirements
D. Section 31 1100: Clearing and Grubbing
E. Section 32 9219: Seeding

1.03 Soil Erosion and Sedimentation Control

A. CONTRACTOR, at his expense, shall provide, maintain and remove such temporary and/or permanent soil erosion and sedimentation control measures as specified on the Plans or as determined by ENGINEER.

B. Measures shall prevent surface runoff from carrying excavated materials into the waterways, to reduce erosion of the slopes, and to prevent silting in of waterways downstream of the Work.

C. Measures should include provisions to reduce erosion by the wind of all areas stripped of vegetation, including material stockpiles.

D. Comply with requirements of Section 01 5713, Temporary Erosion and Sediment Control.

Part 2 Products (Not Used)

Part 3 Execution

3.01 Site Grading

A. Sites shall be graded as specified on the Plans or as determined by ENGINEER. CONTRACTOR shall carry out the grading operation, including spoil piles, to prevent standing water and soil saturation detrimental to structures and improvements.

B. Provisions shall be made to preserve and protect trees and other vegetation specified on the Plans or determined by ENGINEER as not to be removed.

3.02 Rough Grading

A. Site shall be graded as necessary to comply with the Plans or as determined by ENGINEER. The subgrade shall be roughly established by cut or fill, approximately parallel to proposed finished grades and to elevations which allow for thickness of topsoil and installation of site or roadway improvements.

B. In fill areas all debris shall be removed from the area to be filled. Material detrimental to site improvement shall be removed from the site and acceptably disposed of as specified in Section 01 8900 Site Construction Performance Requirements.

C. Original ground shall be scarified and benched or otherwise treated to provide adequate bond and to prevent slippage of fill.

D. Fill material shall be free of debris or other detrimental material and shall have a moisture content within 2 percent of optimum moisture when placed. All fill shall be compacted to a density not less than 95% of the maximum unit weight and placed in layers no less than nine inches (230 mm) and no greater than 15 inches (380 mm). The maximum unit weight shall be determined by ASTM D698, Method B.

E. If possible fills or embankments shall be constructed when the ground is frost-free and there is favorable weather. However if winter grading is necessary, all ice and snow shall be removed from the surface of the ground before the fill or embankment is placed. No frozen material will be allowed in the fill area or in the embankment being constructed. Any frozen material on a partially completed fill shall be removed before placing any more fill. Frozen material shall be stockpiled outside the grading limits until thawed. Thawed material from the stockpiled frozen material may be used in the fill and embankment areas.

End of Section

Section 31 2333
Trenching and Backfilling (Culverts)

Part 1 General

1.01 Scope of Work

A. This Section includes open trench construction for utility installation, complete with trenching, sheeting, bracing, bedding, bedding materials, backfilling, backfill materials, and compaction.

1.02 Related Work Specified Elsewhere

A. Section 01 5713: Temporary Erosion and Sediment Control
B. Section 01 8900: Site Construction Performance Requirements
C. Section 31 1100: Clearing and Grubbing
D. Section 31 2200: Grading
E. Section 33 4100: Storm Utility Drainage Piping

1.03 Reference Standards

A. Unless otherwise specified, the Work for this Section shall conform to the applicable portions of the following Standard Specifications:

1. ASTM - ASTM International

2. AASHTO - American Association of State Highways and Transportation Officials

3. MDOT - Michigan Department of Transportation, Standard Specifications for Construction, latest edition

1.04 Test Reports

A. Testing laboratory shall provide ENGINEER with two (2) certified copies of the test results of the compaction of the backfill.

B. Testing for compaction and the certification of the test results shall be performed by a testing laboratory approved by ENGINEER.

1.05 Mix Design

A. Submit mix designs for any concrete or flowable fill mixtures to be used on the Project. Include certified test results for seven day and 28 day strengths, together with any technical information for admixtures.

1.06 Soil Erosion and Sedimentation Control

A. CONTRACTOR, at his expense, shall provide, maintain and remove such temporary and/or permanent soil erosion and sedimentation control measures as specified on the Plans or as determined by ENGINEER.

B. Measures shall prevent surface runoff from carrying excavated materials into the drain, to reduce erosion of the slopes, and to prevent silting in of drain downstream of the Work.

C. Measures should include provisions to reduce erosions by the wind of all areas stripped of vegetation, including material stockpiles.

D. Comply with requirements of Section 01 5713, Temporary Erosion and Sediment Control.

Part 2 Products

2.01 Class II Granular Materials

A. Class II granular material gradation shall conform to the grading requirements for granular material Class II, as specified in MDOT, Section 902 except as follows. Class II granular material shall be natural bank run sand with a maximum size of 1½-inches (38 mm).

2.02 Crushed Stone Bedding

A. Crushed, angular, natural stone material, meeting the requirements of MDOT 21AA. Crushed concrete and slag are not allowed.

2.03 Concrete

A. Concrete shall conform to MDOT, Section 701, use grade S3; 3,000 psi (21 MPa) strength; Type I-A cement; 5.5 sacks cement per cubic yard (307 kg/m^3); 6A coarse aggregate; 2NS fine aggregate; 6.5% ± 1.5% air content; 3-inch (75 mm) maximum slump; no admixtures without ENGINEER's review.

Part 3 Execution

3.01 Dewatering

A. Area within the vicinity of the trenching operation shall be dewatered in accordance with Section 31 2319, Dewatering prior to the trenching operation.

B. Depth of the dewatering shall be sufficient to allow the trench excavating operation including backfilling and compacting to proceed in a dry condition.

3.02 Trench Excavation

A. Open cut trench excavation shall include the site clearing and grubbing, the excavating of all materials encountered, the supporting and protecting of all structures and/or utilities encountered above and below the ground surface, and the removal of water from the construction site.

B. Trenching operation shall commence at the downstream or outlet end of the new Work and proceed upstream, unless otherwise specified on the Plans or directed by ENGINEER.

C. Trench shall be excavated in reasonably close conformity with the lines and grades specified on the Plans or as established by ENGINEER.

D. Excavated materials shall be temporarily stored along the trench in a manner that will not cause damage to trees, shrubs, fences, improvements, utilities, private property, public property or traffic. The excavated materials shall not be placed at such locations that will endanger the trench banks by imposing loads thereon.

E. Trench shall be of sufficient width to provide adequate working space to permit the installation of the pipe and the compaction of the bedding material under and around the pipe. However, for rigid pipe, the width of the trench from below the pipe bedding to 12 inches (300 mm) above the top of the pipe shall not exceed the following dimensions:

Diameter of Pipe	**Width of Trench**
6-inch thru 12-inch pipe (150 thru 300 mm)	30 inches wide (750 mm)
15-inch thru 36-inch pipe (375 thru 900 mm)	outside diameter plus 16 inches (400 mm)
42-inch thru 60-inch pipe (1050 thru 1500mm)	outside diameter plus 20 inches (500mm)
over 60-inch pipe (1500mm)	outside diameter plus 24 inches (600 mm)

F. Support the additional load of the backfill when the maximum trench width as specified for rigid pipe is exceeded, CONTRACTOR shall install, at his expense, concrete encasement which shall completely surround the pipe and shall have a minimum thickness at any point of 1/4 of the outside diameter of the pipe or four (4) inches (100mm), whichever is greater, or at his expense, install another type bedding, approved by ENGINEER. Concrete encasement shall consist of 3,000 psi (21 MPa) strength concrete.

G. For flexible pipe, the minimum width shall be not less than the greater of either the pipe outside diameter plus 16 in. (400 mm) or the pipe outside diameter times 1.25, plus 12 in. (300 mm). Maximum trench width for flexible pipe shall not exceed the minimum width by more than 6-inches.

H. To support the additional load of the backfill when the maximum trench width as specified for flexible or semi-rigid pipe is exceeded, CONTRACTOR shall install, at his expense, crushed stone pipe bedding to the full width between undisturbed trench walls or at least 2.5 pipe diameters on each side of the pipe.

I. When through, CONTRACTOR's construction procedure or because of unsuitable existing ground conditions, it becomes impossible to maintain alignment and grade properly, CONTRACTOR, at his expense, shall excavate below the normal trench bottom grade and shall fill the void with a large size aggregate or 3,000 psi (21 MPa) concrete as approved by ENGINEER to ensure that the pipe when laid in the proper bedding will maintain correct alignment and proper grade.

J. Trench excavations, including those for shafts and structures, shall be adequately braced and/or sheeted where necessary to prevent caving or squeezing of the soil.

3.03 Sheeting, Shoring, and Bracing

A. CONTRACTOR shall furnish, place and maintain at all times such sheeting, shoring, and bracing of the trench and/or shaft as may be required for safety of the workmen and for protection of the new Work or adjacent structures, including pavement, curbs, sidewalks, pipe lines, conduits next to or crossing the trench, and the protection and safety of pedestrian and vehicular traffic.

B. CONTRACTOR shall be responsible for the complete design of all sheeting, shoring and bracing Work. The design shall be appropriate for the soil conditions, shall be of such strength, quality, dimension and spacing as to prevent caving or loss of ground or squeezing within the neat lines of the excavation, and shall effectively restrain movement of the adjacent soil. Prior to installing the sheeting, shoring or bracing, CONTRACTOR shall submit Plans for this Work to ENGINEER for informational purposes only.

C. Sheeting, shoring, bracing, and excavation shall conform to the current federal or state regulations for safety.

D. Where indicated on the Plans and where necessary in the Work, install and leave sheeting, shoring, and bracing in place. No extra compensation shall be paid to CONTRACTOR for sheeting, shoring or bracing left in place.

E. Supports for pipes, conduits, etc., crossing the trench shall conform to the requirements of the owners of such facilities, and if necessary, shall be left in place.

F. The furnishing, placing, bracing, maintaining, and removing of sheeting, shoring, and trenching materials shall be at CONTRACTOR's expense. CONTRACTOR shall not remove the trench sheeting, shoring and bracing unless the pipe has been properly bedded, and the trench backfilled to sufficiently support the external loads. Also the sheeting, shoring, and bracing material shall not come in contact with the pipe, but shall be installed so that no concentrated loads or horizontal thrusts are transmitted to the pipe.

3.04 Pipe Bedding

A. Install and compact in six inch layers. Particular care shall be taken to assure filling and tamping all spaces under, around, and above the top of the pipe. Work in and around pipe by hand to provide uniform support.

B. Rigid Pipe Bedding:

1. Rigid pipe bedding shall conform to ASTM C12, except as noted.

a. Class R-A:

(1) Pipe shall be bedded in crushed stone bedding material placed on the trench bottom. Bedding shall have a minimum thickness beneath the pipe of four (4) inches (100 mm) or 1/4 of the outside diameter of the pipe, whichever is greater, and shall extend up the sides of the pipe to the horizontal centerline. The top half of the pipe shall be covered with a monolithic plain concrete arch having a thickness of at least four (4) inches (100 mm) or 1/4 of the inside diameter of the pipe, whichever is greater, at the pipe crown and a minimum width equal to the outside diameter of the pipe plus eight (8) inches (200 mm) or 1-1/4 of the diameter of the pipe, whichever is greater.

b. Class R-B:

(1) Pipe shall be bedded in crushed stone bedding material placed on the trench bottom. Bedding shall have a minimum thickness beneath the pipe of four inches (100 mm) or 1/8 of the outside diameter of the pipe, whichever is greater, and shall extend up the sides of the pipe to the horizontal centerline. Backfill from pipe horizontal centerline to a level not less than 12 inches (300 mm) above the top of the pipe shall be Class II granular material. This material shall be placed in 6-inch (150 mm) layers with each layer thoroughly compacted by mechanical means with the finished compacted material a minimum of 12 inches (300 mm) above the top of pipe.

c. Class R-C:

(1) Pipe shall be bedded in Class II granular material, placed on the trench bottom. Bedding shall have a minimum thickness beneath the pipe of four (4) inches (100 mm) or 1/8 of the outside diameter of the pipe, whichever is greater, and the bedding shall extend to a level not less than 12 inches (300 mm) above the top of the pipe.

This material shall be placed in 6-inch (150 mm) layers with each layer thoroughly compacted by mechanical means with the finished compacted material a minimum of 12 inches (300 mm) above the top of pipe.

C. Flexible Pipe Bedding:

1. Flexible pipe bedding shall conform to ASTM D2321, except as noted. Continuous and uniform bedding shall be provided in the trench for all buried pipe.

a. Class F-I:

(1) Pipe shall be bedded in crushed stone bedding material placed on the trench bottom. Bedding shall have a minimum thickness beneath the pipe of four (4) inches (100 mm), and shall extend up the sides of the pipe until the top of pipe is covered by a minimum thickness of 12 inches (300 mm).

(2) Where allowable trench widths are exceeded, Class F-I bedding shall be used to the full width between undisturbed trench walls. Concrete cradle bedding shall not be used.

b. Class F-II:

(1) Pipe shall be bedded in crushed stone bedding material placed on the trench bottom. Bedding shall have a minimum thickness beneath the pipe of four (4) inches (100 mm), or 1/8 of the outside diameter of the pipe, whichever is greater, and shall extend up the sides of the pipe to the horizontal centerline. Backfill from pipe horizontal centerline to a level not less than 12 inches (300 mm) above the top of the pipe shall be Class II granular material. This material shall be placed in 6-inch (150 mm) layers with each layer thoroughly compacted by mechanical means with the finished compacted material a minimum of 12 inches (300 mm) above the top of pipe.

(2) Where allowable trench widths are exceeded, Class F-I bedding shall be used to the full width between undisturbed trench walls. Concrete cradle bedding shall not be used.

c. Class F-III:

(1) Pipe shall be bedded in Class II granular material, placed on the trench bottom. Bedding shall have a minimum thickness beneath the pipe of four (4) inches (100 mm) or 1/8 of the outside diameter of the pipe, whichever is greater, and the bedding shall extend to a level not less than 12 inches (300 mm) above the top of the pipe.

This material shall be placed in 6-inch (150 mm) layers with each layer thoroughly compacted by mechanical means with the finished compacted material a minimum of 12 inches (300 mm) above the top of the pipe.

(2) Where allowable trench widths are exceeded, Class F-I bedding shall be used to the full width between undisturbed trench walls. Concrete cradle bedding shall not be used.

3.05 Backfilling Trenches

A. Backfill material shall be placed on sections of bedded pipes only after such pipe bedding and backfill materials have been approved by ENGINEER.

B. Trench backfilling shall follow the pipe laying as closely as possible. However, at no time shall the pipe laying in any trench precede backfilling of that trench by more than 100 feet (30 m), unless otherwise directed by ENGINEER.

C. Backfilling shall not be done in freezing weather except by permission of ENGINEER. Frozen materials shall not be used in trench backfilling.

D. Following trench backfill specifications are for use in that portion of the trench beyond the scope of the pipe bedding requirements which normally stops at a point 12 inches (300 mm) above the top of pipe.

1. Backfill material to be placed above pipe bedding shall be free of cinders, ashes, refuse, boulders, roots, stumps, trees, timbers, brush, debris, or other extraneous materials which in the opinion of ENGINEER, are unsuitable.

2. Rocks or stones having a dimension larger than six (6) inches (150 mm) shall not be placed within three (3) feet (1 m) of the top of the pipe.

3. Large stones may be placed in the remainder of the trench backfill only if well separated and arranged so that no interference with backfill settlement will result.

E. The type and method of backfilling is dependent on its location and function and shall conform to the following requirements:

1. Trench "A":

a. All other trenches shall be backfilled with suitable excavated material placed in uniform layers that can be adequately compacted and tested from the surface of that layer. Each layer shall be thoroughly compacted by approved mechanical methods to a density equivalent to the undisturbed adjacent soil or 90% of its maximum unit weight which ever is less.

2. Trench "B":

a. Trenches under road surfaces, pavement, curb, driveway, sidewalk and where the trench edge is within three (3) feet (1m) of the pavement and as noted on the plans shall be backfilled with natural bank run sand meeting the requirements of Class II granular material, unless otherwise indicated on the Plans.

The material shall be placed in uniform layers that can be adequately compacted and tested from the surface of that layer and shall be compacted to 95% of the materials maximum unit weight. Trenches under pavement to be constructed in the near future, as noted or shown on the Plans, shall be backfilled with natural bank run sand, meeting the requirements of Class II granular material, unless otherwise indicated on the Plans, as herein provided.

b. Where a pipe is installed under an existing or proposed utility, the backfill between the two shall be natural bank run sand meeting the requirements of Class II granular material, unless otherwise indicated on the Plans, constructed as herein specified.

F. Unless otherwise specified on the Plans or as directed by ENGINEER, the trench backfill shall be carried to the adjacent existing ground.

G. Where any backfill or bedding as shown on the plans or specified is to be flowable fill, care shall be used to avoid displacing any pipes or structures due to fluid pressure. Pipes in backfill areas may need to be secured to avoid the bouyancy effect.

3.06 Compacting Trench "B" Backfill

A. Trench "B" backfill shall be compacted to 95% of the maximum unit weight, unless otherwise specified on the Plans or authorized by ENGINEER.

B. Compaction of the backfill will not be paid for separately, but shall be considered incidental to the Work of backfilling and shall include all the Work of manipulating the soil, to obtain the specified densities. No additional compensation will be allowed for any delay required to obtain the specified moisture content or the specified density.

3.07 Cleanup

A. Immediately following the placing and compacting of the backfill, the excess material shall be removed and disposed of by CONTRACTOR, at his expense, as specified in Section 01 8900, Site Construction Performance Requirements. The construction area shall be leveled and left in a neat workmanlike condition.

B. At a seasonally correct time, approved by ENGINEER, the disturbed area shall be raked, having topsoil placed thereon, fertilized and seeded per the requirements of Section 32 9219, Seeding, or sodded in accordance with Section 32 9223, Sodding.

3.08 Field Testing

A. During the course of the Work, ENGINEER may require testing for compaction or density of the backfill. Taking of samples and the testing required shall be performed by a testing laboratory suitable to OWNER and approved by ENGINEER. The cost for testing and sampling shall be at the expense of OWNER.

B. Maximum unit weight, when used as a measure of compaction or density of soils, shall be understood to mean the maximum unit weight per cubic foot or per cubic meter as determined by ASTM D1557, Method D.

3.09 Defective Work

A. Any portion of the trench backfill which is deficient in the specified density shall be corrected by methods meeting the approval of ENGINEER.

B. Any extra testing or sampling required because of deficiencies shall be at CONTRACTOR's expense.

End of Section

Section 31 3500
Slope Protection

Part 1 General

1.01 Scope of Work

A. This Section includes riprap and geotextile filter fabric for slope protection.

1.02 Related Work Specified Elsewhere

A. Section 01 2200: Unit Prices
B. Section 01 5713: Temporary Erosion and Sediment Control
C. Section 01 8900: Site Construction Performance Requirements
D. Section 32 9219: Seeding

1.03 Reference Standards

A. Unless otherwise specified, the Work of this Section shall conform to the applicable portions of the following Standard Specifications:

1. ASTM - ASTM International

2. Fed. Spec. - Federal Specifications

3. MDOT - Michigan Department of Transportation, 2012 Standard Specifications for Construction

4. USDC (NBS) - U.S. Department of Commerce, National Bureau of Standards

1.04 Submittals

A. Manufacturer's Literature:

1. Submit manufacturer's literature describing materials and fabrication methods for the type of geotextile filter fabric proposed for use in the Work.

B. Samples:

1. Submit samples of the types of geotextile filter fabric proposed for use in the Work to ENGINEER.

C. Shop Drawings:

1. Submit Shop Drawings of filter fabric in the Work.

1.05 Product Delivery, Storage, and Handling

A. Geotextile Filter Fabric:

1. During delivery, storage, and handling, geotextile filter fabric shall be wrapped in a heavy duty covering which will protect the fabric from direct sunlight, ultraviolet rays, temperatures greater than 140 degrees Fahrenheit, mud, dirt, dust, debris and the elements.

1.06 Job Conditions

A. Temperature:

1. Comply with the requirements for placing slope protection materials due to outside ambient air temperatures as specified under Article 3.06 of this Section.

B. Subbase Conditions:

1. Comply with the requirements for placing slope protection materials on prepared subbase because of frost and freezing conditions as specified under Article 3.06 of this Section.

C. Slope Protection Materials:

1. Comply with the requirements for protection of slope protection materials during curing periods as described under Article 3.06 of this Section.

1.07 Soil Erosion and Sedimentation Control

A. CONTRACTOR, at his expense, shall provide, maintain and remove such temporary and/or permanent soil erosion and sedimentation control measures as specified on the Plans or as determined by ENGINEER.

B. Measures shall prevent surface runoff from carrying excavated materials into the drain, to reduce erosion of the slopes, and to prevent silting in of drain downstream of the Work.

C. Measures should include provisions to reduce erosions by the wind of all areas stripped of vegetation, including material stockpiles.

D. Comply with requirements of Section 01 5713, Temporary Erosion and Sediment Control.

Part 2 Products

2.01 Form Work

A. Forms for concrete shall be metal or wood. Forms shall be straight, free from warps and of sufficient strength to resist springing during depositing of the concrete against the form surfaces.

2.02 Stone Riprap

A. Stone for riprap shall be sound, tough, durable rock, free from structural defects. Stone shall be depth indicated on the plans. The minimum thickness (unless otherwise indicated) shall be 8 inches (200 mm) thick measured perpendicular to the slope, with a least surface dimension of 12 to 16 inches (300 to 400 mm) measured parallel to the slope. Maximum to minimum ratio shall not exceed 3:1.

2.03 Concrete Riprap

A. Sound pieces of broken concrete free of soil, protruding reinforcing steel, bituminous and other similar materials with a depth indicated on the plans. The minimum thickness (unless otherwise indicated) shall be 8 inches (200 mm) and a least surface dimension of 12 to 16 inches (300 to 400 mm) measured parallel to the slope. Maximum to minimum ratio shall not exceed 3:1.

2.04 Geotextile Filter Fabric

A. Geotextile filter fabric material shall be a non-woven, needle punched fabric consisting of compositions of at least 85% by weight polyolefins, polyesters, or polyamides. The geotextile filter fabric shall be resistant to chemical attack, rot and mildew and shall have no tears or defects which adversely alter its physical properties. The fabric shall conform to the following physical strength requirements:

Physical Property	Test Procedure	Acceptable Test Results
Tensile Strength	ASTM D4632	200 pound min (0.890 kN)
Puncture Strength	ASTM D4833	100 pound min (0.445 kN)
Elongation	ASTM D4632	15% minimum
Seam Strength	ASTM D4632	180 pounds min (0.800 kN)
Burst Strength	ASTM D3786	400 psi min (2750 kPa)
Trapezoid Tear	ASTM D4533	100 pounds min (.445 kN)
Permittivity	ASTM D4491	0.5 sec^{-1} Minimum
Ultraviolet Degradation	ASTM D4355	70% of min Degradation strength retained after weathering for 500 hours

B. Geotextile filter fabric shall provide an Apparent Opening Size for coarseness or fineness per ASTM D4751 of 70 / 0.21 (U.S. Sieve/ mm) unless otherwise indicated on the Plans.

C. The seams of the fabric shall be sewn with thread of a material meeting the chemical and physical requirements listed above or shall be heat or cement bonded. The strength of seams shall be not less than 90% of the required tensile strength of the filter fabric in any principle direction.

Part 3 Execution

3.01 Verification of Subbase

A. Riprap Materials:

1. Prior to the installation of any riprap materials, examine the subbase to receive such material for the proper grades and lines required to receive the Work. Ascertain that all subgrades and bedding are adequate to receive slope protection. Correct all defects and deficiencies before proceeding with the Work.

B. Geotextile Filter Fabric:

1. Prior to installation of any geotextile filter fabric, verify that the surfaces to receive fabric are prepared to relatively smooth grades, free of obstructions, depressions, debris and soft or low density pockets of material. Correct all defects and/or deficiencies prior to installation of fabric so that fabric will not be damaged.

3.02 Preparation - General

A. Prepare all surfaces to receive slope protection materials as indicated on the Plans and as specified below.

3.03 Bedding Materials

A. Install all bedding materials of the types indicated on the Plans and as required to receive the slope protection materials.

B. Remove any buried debris protruding through the bedding material that will impede or damage the proper installation or affect the final appearance of the slope protection installations.

C. Fill all voids of installed bedding materials and compact as directed by ENGINEER.

3.04 Examination of Materials

A. Geotextile Filter Fabric:

1. Prior to installation, inspect all geotextile filter fabric for defects, rips, holes, contamination or deterioration. Replace all defective geotextile filter fabric as directed by ENGINEER.

3.05 Installation General

A. Material for bedding, where required, shall be spread uniformly on the prepared subbase to the slopes, lines, levels and grades indicated on the Plans in a manner satisfactory to ENGINEER. Bedding methods shall not cause segregation of bedding material particle sizes or damage to prepared subbase. Repair all defective or damaged work to the satisfaction of ENGINEER. Bedding shall be compacted and finished to present a reasonably even surface, free from mounds or wind rows.

B. Install formwork for concrete headers, cast-in-place concrete slope paving and weep holes for riprap paving where indicated on the Plans. Forms shall be the full depth of the concrete. Forms shall be firmly staked to the required line and grade. Slab division forms shall be placed so that the slab division joints are straight and continuous.

3.06 Geotextile Filter Fabric

A. Place geotextile filter fabric on the prepared subbase in the manner and at the locations shown on the Plans. Fabric shall be laid smooth and free of tension, stress, folds, wrinkles or creases. The fabric strips shall be placed to provide a minimum overlap of 24 inches (600 mm) for each joint. Install securing pins with washers through both strips of overlapped fabric along a line through the midpoint of the overlap at center-to-center spacings as recommended by manufacturer unless otherwise indicated on the Plans. Washers shall bear against fabric to secure firmly to subbase. Additional pins shall be installed as necessary to prevent slippage of the filter fabric. Securing pins shall be steel, 3/16 inch (5 mm) minimum size, pointed at one end, of lengths as recommended by manufacturer unless otherwise indicated on the Plans, but not less than 18 inches (450 mm) long. Washers shall have an outside diameter of not less than 1-1/2 inches (40 mm).

B. Fabric shall be placed so that the upper strip will overlap the next lower strip. Schedule the Work so that fabric is covered with slope protection materials specified within seven days after fabric placing. Failure to comply shall require replacement of fabric. Filter fabric shall be protected from damage by limiting the height of drop of slope protection material or by placing a cushioning layer of sand on top of fabric before placing other material.

3.07 Plain Riprap Slope Paving

A. Stone for riprap shall be placed on the prepared subbase commencing at the toe of the slope and progressing upward; each stone being laid by hand. Stone shall be placed in a manner as to produce a reasonably well graded mass with a minimum practicable percentage of voids. Riprap along the lower edge of an area shall consist of the largest stones.

Except for small stones used to fill voids between larger stones, no stone shall be used in the exposed face of the riprap which will extend less than 1/2 the riprap thickness, and shall be placed within the tolerances and to the lines and levels shown on the Plans. Riprap shall be placed to a full course thickness in one operation and in a manner to avoid displacement of subbase. The larger stones shall conform to the gradation indicated on the Plans and be well distributed over the area. Rearranging of individual stones will be required as necessary to obtain a reasonably well graded distribution of stone sizes.

B. The riprap and bedding shall be thoroughly compacted as the construction progresses to provide an even, tight surface. Riprap protection shall be placed as a part of the embankment and with minimum lag in construction of riprap to prevent mixture of embankment and stone protection material.

3.08 Field Quality Control

A. Upon completion of the slope protection, the Work shall be final inspected. The final inspection shall consist of a check to confirm the proper placement and backfill of the protection material, assure slopes and elevations as indicated on the Plans and completion of related earth Work.

End of Section

Division 32
Exterior Improvements

Section 32 1123
Aggregate Base Courses

Part 1 General

1.01 Scope of Work

A. This Section includes aggregate base courses complete with aggregate materials constructed in preparation for paving or aggregate surfacing.

1.02 Related Work Specified Elsewhere

A. Section 01 2200: Unit Prices
B. Section 01 8900: Site Construction Performance Requirements

1.03 Reference Standards

A. Unless otherwise specified, the Work for this Section shall conform to the applicable portions of the following Standard Specifications:

1. ASTM - ASTM International

2. AASHTO - American Association of State Highways and Transportation Officials

3. MDOT - Michigan Department of Transportation, Standard Specifications for Construction, latest edition

1.04 Allowable Tolerances

A. Finished surface shall be shaped to conform to plan grade and cross section within a tolerance of 3/4 inch in ten (10) feet (30 mm per 5 m).

1.05 Test Reports

A. Testing lab shall provide ENGINEER with two (2) certified copies of the test results of the thickness of the compacted aggregate. Core drilling, testing for thickness and the certification of the test results shall be performed by a testing laboratory approved by ENGINEER.

1.06 Stockpiling Aggregate

A. Aggregate shall be deposited in stockpiles in such a manner that the material may be removed from the stockpile by methods which will provide aggregate having a uniform gradation.

B. Stockpiling of aggregate, in excess of four (4) feet (1.2 m) in depth, on the completed subbase or aggregate surface will not be permitted, except with the approval of ENGINEER.

1.07 Environmental Requirements

A. Comply with the requirements for aggregate base or surfacing installations due to outside ambient air temperatures specified under Article 3.08 of this Section.

Part 2 Products

2.01 Dense-Graded Aggregate

A. Dense-graded aggregate gradation shall conform to Series 21and 22, as specified in MDOT, Section 902.

2.02 Calcium Chloride Additives

A. Calcium chloride additives shall conform to ASTM D98 and as specified in MDOT, Section 903.

2.03 Water

A. Water used for compaction and dust control shall be reasonably clean and free from substances injurious to the finished product. Water from sources approved by the Michigan State Department of Public Health as potable may be used.

Part 3 Execution

3.01 Excavation Verification

A. Prior to the placing of any aggregate material, examine the excavation for the grades, lines, and levels required to receive the new Work. Ascertain that all excavation and compacted subgrades or subbases are adequate to receive the new Work. Correct all defects and deficiencies before proceeding with the Work.

3.02 Subgrade Conditions

A. Prior to the placing of any aggregate material, examine the subgrade or subbase to ascertain that it is adequate to receive the aggregate to be placed. If the subgrade or subbase remains wet after all surface water has been removed, ENGINEER may require the installation of edge drain.

3.03 Existing Improvements

A. Investigate and verify locations of existing improvements, including structures, to which the new Work will be in contact. Necessary adjustments in line and grade, to align the new Work with the existing improvements must be approved by ENGINEER, prior to any changes.

3.04 Preparation of Subgrade or Subbase

A. Subgrade or subbase shall be fine graded to the cross section indicated on the Contract Drawings, and shall be thoroughly compacted prior to the placing of the aggregate material.

3.05 Installation - General

A. Width, thickness, and type of aggregate materials shall be indicated on the Contract Drawings or as directed by ENGINEER.

B. No aggregate material shall be placed until the subgrade, or subbase, or existing aggregate surface has been approved by ENGINEER.

3.06 Installation of Aggregate Base Course

A. Aggregate base course shall be placed by a mechanical spreader or other approved means, in uniform layers to such a depth that when compacted, the course will have the thickness shown on the Contract Drawings.

B. Depth of any one layer, when compacted, shall not be more than 8 inches (200 mm). If the required compaction cannot be obtained for the full depth of the aggregate course spread, the thickness of each course shall be reduced or, with the approval of ENGINEER, adequate equipment shall be used to compact the aggregate to the required unit weight.

C. The subgrade or subbase shall be shaped to the specified crown and grade and maintained in a smooth condition. If hauling equipment causes ruts or holes in the subgrade or subbase, the hauling equipment will not be permitted on the subgrade or subbase, but shall be operated on the aggregate base course behind the spreader.

D. Aggregate shall be compacted to at least 98% of maximum unit weight by the use of approved pneumatic-tired compaction equipment or vibratory compactors.

E. Optimum moisture content shall be maintained until the prescribed unit weight is obtained and each layer shall be compacted until the maximum unit weight is attained before placing the succeeding layer.

F. When approved by ENGINEER, additional water may be applied by an approved means, to the aggregate to aid in the compaction and shaping of the material.

G. Motor graders, trimmers or other approved equipment shall be used to shape the aggregate base course and maintain it until the surface course is placed.

H. When hauling material over the base course, subbase or subgrade, CONTRACTOR shall limit the weight and speed of his equipment to avoid damage to the subgrade, subbase or aggregate base course. If the subgrade, subbase or aggregate base course becomes rutted due to CONTRACTOR's operation, the subgrade, subbase or base course shall be removed and replaced, acceptable to ENGINEER, at CONTRACTOR's expense.

I. With the approval of ENGINEER, chloride additives may be used by CONTRACTOR to facilitate his compaction and maintenance of the aggregate surface. Amount and method of combining the chloride additives are at the option of CONTRACTOR and are at his expense.

3.07 Maintenance During Construction

A. Aggregate base course and aggregate surface shall be continuously maintained in a smooth and firm condition during all phases of the construction operation.

B. CONTRACTOR, at his expense, shall provide additional materials needed to fill depressions or bind the aggregate.

3.08 Temperature Limitations

A. Aggregate materials shall not be placed when there are indications that the mixtures may become frozen before the maximum unit weight is obtained.

B. In no case shall the aggregate be placed on a frozen subgrade or base course unless otherwise directed by ENGINEER.

3.09 Testing

A. During the course of the Work, ENGINEER may require testing for compaction or density and for thickness of material. Testing and coring required shall be performed by a testing laboratory acceptable to OWNER and approved by ENGINEER. Cost for testing and coring shall be at the expense of OWNER.

B. When thickness tests are done, a minimum of one depth (thickness) measurement will be made every 400 linear feet (120 m) per traffic lane. Lane width shall be as indicated on the Contract Drawings or as determined by ENGINEER.

1. If 2 lanes are constructed simultaneously, only one test is necessary to represent both lanes.

2. For areas such as intersections, entrances, cross-overs, ramps, widening strips, acceleration and deceleration lane, at least one depth measurement will be taken for each 1,200 square yards (1000 m^2) of such areas or fraction thereof.

3. Location of the depth measurement will be at the discretion of ENGINEER.

C. The maximum unit weight shall be understood to mean the maximum unit weight per cubic foot (or cubic meter) as determined by ASTM D1557, Method D.

3.10 Defective Work

A. Thickness:

1. Measurements of aggregate base course thickness will be made to the nearest 1/4 inch (5 mm).

a. Depths may be 1/2 inch (10 mm) less than the thickness indicated on the Contract Drawings provided that the average of all measurements taken at regular intervals shall be equal to or greater than the specified thickness.

b. In determining the average in place thickness, measurements which are more than 1/2 inch (10 mm) in excess of the thickness indicated on the Contract Drawings will be considered as the specified thickness plus 1/2 inch (10 mm).

2. Locations of the depth measurements will be as specified herein unless otherwise directed by ENGINEER. Sections found to be deficient in depth shall be corrected by CONTRACTOR using methods approved by ENGINEER.

B. Weight:

1. When the aggregate material is measured by weight in Tons (or metric tons), the pay weights for aggregates will be the scale weight of the material, including admixtures, unless the moisture content is more than 6 percent.

a. Moisture tests will be made at the start of weighing operations and at any time thereafter when construction operations, weather conditions or any other cause may result in a change in the moisture content of the material.

b. If the tests indicate a moisture content in excess of six (6) percent, the excess over six (6) percent will be deducted from the scale weight of the aggregate until such time as moisture tests indicate that the moisture content of the material is not more than six (6) percent.

End of Section

Section 32 1216
Bituminous Paving

Part 1 General

1.01 Scope of Work

A. This Section includes bituminous paving complete with bituminous materials; bituminous mixtures; installation of bituminous base course, bituminous wearing course, and bituminous curbs; construction of bituminous pavement, sidewalks, and drive approaches, cold milling and pulverizing existing pavements.

1.02 Related Work Specified Elsewhere

A. Section 01 2200: Unit Prices
B. Section 01 8900: Site Construction Performance Requirements
C. Section 31 1100: Clearing and Grubbing
D. Section 32 1123: Aggregate Base Courses

1.03 Reference Standards

A. Unless otherwise specified, the Work for this Section shall conform to the applicable portions of the following Standard Specifications:

1. ASTM - ASTM International

2. AASHTO - American Association of State Highways and Transportation Officials

3. MAPA - Michigan Asphalt Paving Association

4. MDOT - Michigan Department of Transportation, Standard Specifications for Construction, latest edition

1.04 Allowable Tolerances

A. Following the final rolling, the surface will be tested longitudinally using a 10-foot (3 m) straightedge at locations selected by ENGINEER. Variation of the surface from the testing edge of the straightedge between any two (2) contacts with the surface shall at no point exceed the following limits:

1. For Bituminous Base Course Mixtures:

a. Multiple Courses:

(1) 3/8 inch (9 mm) for top course
(2) 3/4 inch (20 mm) for lower courses

2. For Bituminous Surface Course Mixtures:

a. Multiple Courses:

(1) 1/8 inch (3 mm) for top course
(2) 1/4 inch (5 mm) for lower courses

b. Single Course: 1/4 inch (5 mm)

B. Variations in excess of the specified tolerance shall be corrected as determined by ENGINEER.

1.05 Material Reports

A. At the request of ENGINEER, CONTRACTOR shall provide ENGINEER with certification that the various materials to be used conform to the ASTM Standards referred to in the Specifications.

B. CONTRACTOR shall provide ENGINEER, or his authorized representative, with the certified batch plant delivery tickets prior to the placing of the materials.

C. CONTRACTOR shall supply ENGINEER with a certified job mix design for each type of bituminous mixture used on this Project.

1.06 Test Reports

A. Testing lab shall provide ENGINEER with two (2) certified copies of the test results of the mix design and the thickness of the bituminous paving material. Core drilling, testing for mix design and thickness, and the certification of the test results shall be performed by a testing laboratory approved by ENGINEER.

1.07 Environmental Requirements

A. Comply with the requirements for bituminous concrete installation due to outside ambient air temperatures specified under Article 3.22 of this Section.

Part 2 Products

2.01 Blended Aggregate

A. The blended aggregate shall conform to ASTM D692, D1073; AASHTO M29, and as specified in MDOT, Sections 501 and 902. Aggregates for bituminous mixtures shall conform to the applicable requirements of Table A: Composition of Bituminous Mixtures and Table B: Mix Design Criteria.

2.02 Mineral Filler

A. The mineral filler gradation shall conform to AASHTO M17 and to mineral filler, 3MF, as specified in MDOT, Section 902.12.

2.03 Anti-Foaming Agents

A. The anti-foaming agents shall conform to anti-foaming agents, as specified in MDOT, Section 904.

2.04 Asphalt Binder

A. Asphalt binder for use in production of bituminous mixtures shall Be Performance Graded Asphalt Binder, PG58-28, per MDOT Section 904, unless otherwise indicated on the Plans.

2.05 Liquid Asphalts

A. Liquid asphalts for use in pavement construction shall conform to ASTM D2026, D2027, and D2028, AASHTO M81 and M82, and as specified in MDOT, Section 904.

2.06 Emulsified Asphalt (Bond Coat)

A. Emulsified asphalt for use in pavement construction shall conform to ASTM D244, and as specified in MDOT, Section 904.

2.07 Composition of Mixtures

A. Bituminous mixtures shall be mixed and placed in accordance with applicable requirements specified in MDOT Section 501, except as otherwise specified in this Section.

B. Blended aggregate used for the bituminous wearing course on this Project shall have an Aggregate Wear Index (AWI) of 260, or higher.

C. Aggregates, mineral filler (if required), and asphalt binder shall be combined as necessary to produce a mixture proportioned within the master gradation range limits shown in Table A and meeting the uniformity tolerance limits shown in Table C.

D. Composition limits in Table A are shown in percent by weight, based on the total aggregate, including mineral filler, in the mixture.

E. Bituminous mixture specified on the Plans or in the Proposal, when tested at optimum asphalt content (determined in accordance with MDOT Procedures Manual for Mix Design Processing), shall meet the requirements for stability, flow, voids in mineral aggregate (VMA), air voids, fines/binder ratio, fine aggregate angularity, L.A. Abrasion loss, and soft particles as specified in Table B, Mix Design Criteria.

F. Mixtures failing to meet the requirements specified in Table B will be rejected and the CONTRACTOR will be required to submit additional samples of bituminous mixtures until a combination of material is found which will produce a mixture meeting the Table B requirements.

G. If there is a change in the source of any of the aggregates, a new job-mix formula will be required.

H. After the job-mix formula is established, the aggregate gradation and the asphalt binder content of the bituminous mixture furnished for the Work shall be maintained within the Range 1 uniformity tolerance limits permitted for the job-mix formula as specified in Table C.

1. If two (2) consecutive aggregate gradations on one (1) sieve, or asphalt binder contents as determined by the field extractions are outside the Range 1 but within the Range 2 uniformity tolerance limits, CONTRACTOR shall suspend all operations. (Work days will be charged during the down time.)

2. Before resuming any production, CONTRACTOR shall make all necessary alterations to the materials or plant so that the job-mix formula can be maintained within the deviations permitted under Table C.

I. CONTRACTOR shall provide uniformity in the gradations of the aggregates placed in the cold feed bins so that the combination of aggregates produced for the mixture by blending the aggregates from two (2) or more cold feed bins will be uniformly fed by means of adjustable feeders onto a belt supplying the asphalt plant.

1. Feeders shall be equipped with cutoffs which will automatically stop the operations to the asphalt plant at any time the flow of any aggregate fraction is changed so as to affect the uniformity of the finished product.

J. CONTRACTOR has the option of using hot bins for proportioning the aggregates to meet the specified tolerances.

K. Aggregate gradation tests will be made on aggregate extracted from samples of bituminous mixture taken from the trucks as directed by ENGINEER. As a general guideline, samples will be taken at initial start of production and at other times when tests indicate that the aggregate gradation is fluctuating, truck samples will be taken at a frequency of one (1) sample per 250 Tons (225 metric tons) of mixture, but not more than four (4) samples per day. During other periods where tests indicate the aggregate gradation is stable, truck samples will be taken at a frequency of one (1) sample per 500 Tons (450 metric tons) of mixture, but no more than two (2) samples per day.

1. Mixtures exceeding the maximum tolerances listed in Range 2 under Table C, or exceeding the maximum limits specified for the master gradation range will be rejected and CONTRACTOR may be required to remove and replace any bituminous pavements which ENGINEER determines were constructed with mixtures in the excess of these tolerances.

2. Exact mixture proportions will be based on composite samples of aggregate and the particular bituminous material called for on the Plans and in the Proposal.

Part 3 Execution

3.01 Excavation

A. Prior to the installation of any bituminous concrete pavement, examine the excavation for the grades, lines, and levels required to receive the new Work. Ascertain that all excavation and compacted subgrades are adequate to receive the bituminous pavement to be installed. Correct all defects and deficiencies before proceeding with the Work.

3.02 Subgrade and Base Course Conditions

A. Prior to the installation of any bituminous pavement, examine the subgrade and base course to ascertain that it is adequate to receive the bituminous concrete pavement to be installed. If the subgrade remains wet after all surface water has been removed, ENGINEER may require the installation of edge drain.

3.03 Existing Improvements

A. Investigate and verify location of existing improvements, including structures, to which the new Work is to be connected. Adjustments in line and grade to align the new Work with the existing improvements must be approved by ENGINEER, prior to any changes.

3.04 Equipment Requirements

A. General:

1. CONTRACTOR shall furnish sufficient equipment for completing the Work in a timely and efficient manner.

2. Equipment shall be on the job site and ready for normal operation before the placing of material is started.

   a. Equipment shall be in good working order and of sufficient capacity that the operation can be continuous and a rate of production obtained which insures good workmanship, and eliminates overloading of the equipment or frequent interruptions or delays..

   b. Equipment shall be subject to inspections and testing during construction.

   c. Equipment shall conform to the requirements as specified in MDOT, Section 501 and as specified herein.

B. Pavers:

1. Paver shall be an approved self-powered machine capable of spreading and finishing the mixture in a uniform layer at the desired thickness and cross section and ready for compaction. The use of any machine in poor mechanical or worn condition, will not be permitted. Paver shall be of such design that the supporting wheels, treads, or other devices ride on the prepared base. The full width of surface being applied shall be screeded by an oscillating or vibrating screed.

2. Paver shall at all times produce a uniformly finished surface, free from tearing or other blemishes that would require hand work. Screed shall be adjustable to provide for tilting to secure the proper dray or compressive action necessary to produce the desired surface texture.

3. Paver shall be equipped with a hopper and an automatic material-depth control device so that each distributing auger and corresponding feeder shall respond automatically to provide for a constant level of mix ahead of the screed unit to the full width of the lane being paved.

4. In order to ensure that adequate material shall be fed to the center portion of the lane being paved, reverse pitch augers or paddles shall be installed at the inside of one or both ends of the auger shafts to force the mix to the middle portion of the lane. If necessary to prevent segregation of the mix as it drops off the feed conveyor, baffle plates shall be installed at the required location.

5. When extensions are added to the paver, they shall be provided with the same vibrating screed or tamper action as the main unit of the paver, except for paving variable width areas. Extensions shall also be equipped with a continuation of the automatically controlled spreading augers. Screed and extensions shall be provided with an approved method of heat distribution.

6. Unless specified otherwise, bituminous pavers shall be equipped with an automatically controlled and activated screed and strike-off assembly capable of grade reference and transverse slope control.

A manufacturer approved grade referencing attachment, not less than 30 feet (9 m) in length, shall be used for all lower courses and the first lane of the wearing course. After the first lane of the wearing course has been placed, a 10-foot (3 m), or longer, grade referencing attachment may be substituted for constructing subsequent adjacent lanes of wearing course mixture.

7. A self-propelled mechanical spreader capable of maintaining the proper width, depth, and slope without causing segregation of the material, may be used for base courses and for surface courses less than eight (8) feet (2.4 m) in width.

8. When surfacing ramps or shoulders, or when the grade of a concrete gutter or other existing installation must be met, the manner of use of the automatic grade reference and slope control devices shall be determined by ENGINEER.

9. Whenever a breakdown or malfunction of the automatic controls occurs, the equipment may be operated manually for the remainder of the normal working day, provided this method of operation will produce results meeting the specification requirements.

C. Crushing Equipment:

1. Crushing equipment for pulverizing existing bituminous base course shall be an approved rotary reduction machine having positive depth control adjustments in increments of ½ inch (10 mm) and capable of reducing material which is at least six (6) inches (150 mm) in thickness. The machine shall be of a type designed by the manufacturer specifically for reduction in size of pavement material, in place, and be capable of reducing the pavement material to the specified size. Cutting drums shall be enclosed and shall have a sprinkling system around the reduction chamber for pollution control. The rate of forward speed must be positively controlled in order to ensure consistent size of reduced material. The machine must be equipped with an accurate tachometer which is mounted in full view of the operator. Crushing equipment shall meet the approval of ENGINEER.

D. Cold Milling Machine:

1. Cold Milling machine for removing concrete or bituminous surfaces shall be equipped with automatically controlled and activated cutting drums that are capable of grade reference, transverse slope control, and produce a uniformly textured surface. An approved grade referencing attachment, not less than 30 feet (9 m) in length shall be used. Equipment for removing the concrete or bituminous surface shall be capable of accurately removing the surface, in one or more passes, to the required grade and cross section.

E. Joint Heaters:

1. Joint heaters shall be infrared or other approved heaters, equipped with an automatic ignition and extinguishing system to ensure that the heater operates only when the paver is moving. It shall be of sufficient length and heating capacity to adequately soften the edge of the mat. The heater shall be oriented parallel to the joint edge. The bituminous pavement shall not be heated by a direct open flame.

F. Rollers:

1. Steel-wheel rollers shall weight at least eight (8) Tons (7 metric tons) and shall be self-propelled, vibratory or static, tandem rollers or shall be self-propelled static 3-wheel rollers.

    a. Steel-wheel rollers shall be free from backlash, faulty steering mechanism, or worn king bolts.

    b. Steering device shall respond readily and permit the roller to be directed on the alignment desired.

    c. Rollers shall be equipped with wheel sprinklers and scrapers.

    d. Roller wheels shall be smooth and free from openings or projections which will mark the surface of the pavement.

2. Vibratory rollers shall have a shutoff to deactivate the vibrators when the roller speed is less than 0.5 mph (.8 km/hr) and shall have provisions to lock in the manufacturer's recommended speed, the vibration per minute, and the amplitude of vibration (dynamic force) for the type of bituminous mixture being compacted.

3. Pneumatic-tired roller shall be of the self-propelled type with a total weight, including ballast, not greater than 30 tons (27 metric tons).

    a. It shall be equipped with a minimum of seven (7) wheels situated on the axles in such a way that the rear group of tires will not follow in the tracks of the forward group, but will be so spaced that a minimum tire path overlap of 1/2 inch (10 mm) is obtained.

    b. Tires shall be smooth and shall be capable of being inflated to or adapted to achieve a pressure necessary to provide ground-contact pressures of at least 80 pounds per square inch (550 kPa).

    c. Tire pressures shall not vary by more than five (5) pounds per square inch (35 kPa) between individual tires.

    d. CONTRACTOR shall furnish a tire gage which shall be available at all times to enable NGINEER to check the tire pressures.

    e. CONTRACTOR shall furnish ENGINEER charts or tabulations showing the contact areas and the contact pressures for the full range of tire inflation pressures and tire loadings for the type and size roller used.

4. Roller shall be equipped with a mechanism capable of reversing the motion of the roller smoothly. Roller shall be equipped with wheel sprinklers and scrapers or mats.

5. Rollers shall be of sufficient size to compact the bituminous mixture to the required density without tearing, displacing, or cracking the mat.

G. Chip Spreader:

1. Chip spreader shall be self-propelled and shall be equipped with pneumatic tires.

2. Spreader shall be equipped with a screen mounted below the metering gage.

3. Spreader shall be capable of spreading the cover material uniformly at widths of 3 to 12 feet (1 to 3.5 m), or separate spreaders shall be provided for the specific widths required.

a. Rate of discharge of the spreader shall be adjustable to spread uniform layers of 10 to 50 pounds per square yard (5 to 27 kg/m^2).

H. Bituminous Concrete Curbing Machine:

1. Bituminous concrete curbing machine shall be self-propelled and shall be capable of laying and satisfactorily compacting curved and straight line curb to the cross section specified on the Plans. It shall be equipped with templates for the cross sections required.

3.05 Preparation of Foundations

A. For bituminous base course mixtures required to be placed directly on the subgrade, the density, grade and cross section shall meet the approval of ENGINEER at the time of placement of any mixture.

B. Prior to placing any bituminous mixture, the surface of the existing pavement including joints and cracks shall be thoroughly cleaned of all dirt and debris.

C. Existing structures within the limits of the new Work shall be adjusted as specified in the Plans, or as directed by ENGINEER.

3.06 Preparation of Aggregate Base

A. Prior to the placing of any prime coats or any bituminous mixtures, the density, grade and cross section of the aggregate base shall meet the approval of the ENGINEER at the time of placement of any material.

B. Surfaces that have become too wet or too dry shall be reworked to provide the required density.

3.07 Preparation of Existing Pavement

A. This Work consists of preparation of the existing concrete road for resurfacing. All broken pavement or pavement not bonded to the base pavement, and loose bituminous surfacing or patches shall be removed. All longitudinal and transverse joints and cracks shall be cleaned in accordance with Article 3.14, Joint Cleanout. Butt joints at the end of surfacing sections and at intersections of adjoining streets shall be made in accordance with Article 3.08. Vertical face of the cut shall be maintained true, straight and undamaged until installation of wearing course.

3.08 Butt Joints

A. If butt joints are specified on the Plans, or by ENGINEER, the old surface shall be cut back for at least five (5) feet (1.5 m) to a depth of at least 1-inch (25 mm), for the full width of the joint. The vertical face of the cut shall be maintained true, straight and undamaged until installation of wearing course.

3.09 Edge Trimming

A. Trimming and truing the edge of an existing bituminous surface shall be performed as required to give a straight, sharp edge at the proper elevations.

B. The existing base under the bituminous surface shall be left undisturbed.

3.10 Removing Bituminous Surfacing

A. When removing an existing bituminous pavement, the edges of the area to be removed shall be cut along straight lines, either perpendicular or parallel to the direction of travel, for the full depth of the bituminous surfacing with the cut edge a minimum of 18 inches (450 mm) back from the disturbed edge of pavement.

B. The cutting of the edges and the breaking up of the bituminous material within the removal area, and the removing and disposing of the unsuitable material are included in the Work of removing bituminous surfacing.

3.11 Removing Bituminous Patches

A. Where the removal of bituminous patching material is specified on the Plans or as directed by ENGINEER, it shall be saw cut along the edges of the patched area to prevent the tearing of the adjoining pavement surfaces during the removal operation.

B. Cutting, removing and disposing of bituminous surfacing and unsuitable materials are included in the Work of removing bituminous patches.

3.12 Pulverization and Shaping of Existing Bituminous Base Course

A. This Work consists of scarifying, pulverizing, milling, crushing, adding new material if required, shaping, rolling, compacting, and proofrolling the crushed base to the proper elevation and slope.

B. Additional materials required to fill holes and voids shall be furnished at CONTRACTOR's expense. Additional aggregate, if required shall be 20A or 22A aggregate.

C. The material shall be scarified and uniformly pulverized to a maximum size of two inches (50 mm), in addition, 95 to 100 percent of the material shall have a particle size of 1-1/2 inches (40 mm) or smaller.

D. The material shall be scarified and uniformly pulverized, in one or more passes, to the depth specified on the Plans or as determined by ENGINEER.

E. The maximum length or width of roadbed to be scarified and pulverized at any one time shall be as specified on the Plans or as determined by ENGINEER.

F. The crushed material shall be rough graded to within 3/4 of an inch (20 mm) of the grade called for on the Plans, or as directed by ENGINEER. Additional aggregate shall be placed, if necessary, to attain the required cross sections.

G. After the material has been balanced, it shall be thoroughly mixed. In restrictive areas, the material to be mixed may be bladed into a windrow to provide working room for the mixer.

H. The mixed material shall be shaped and compacted in reasonably close conformity with the lines, grades, and cross sections shown on the Plans or as established by ENGINEER. Excess material shall be removed and disposed of by CONTRACTOR at his expense.

I. Finished rolling shall be done with a vibratory steel wheel roller.

J. Aggregate-bituminous pavement mixture shall be compacted to not less than 95 percent of the unit weight obtained by the AASHTO T180 test method. The test shall be made on the aggregate-bituminous mixture at the field moisture content existing during the compacting operation. Required density shall be maintained until the material has been surfaced.

K. Prior to the placing of any surface courses, the pulverized material shall be proofrolled. Proofrolling shall be accomplished with an 18,000 pound (82 000 kg) single axle load. Unstable areas shall be removed and backfilled.

3.13 Hand Patching

A. Where the filling of holes and depressions in the base or the replacing of the patches is specified on the Plans or as directed by ENGINEER, the filler material shall be an approved bituminous mixture.

B. The mixture selected will be dependent on the depth and size of the patch and the type of mixture and performance grade of the asphalt binder required.

C. Patches shall be compacted to the required grade by use of a machine vibrator or approved roller.

3.14 Joint Cleanout

A. Where joint cleanout is specified on the Plans or as directed by ENGINEER, the joint sealants and foreign material shall be removed to a minimum depth of 1-inch (25 mm) by approved mechanical or hand methods.

B. Removal and disposal of unsuitable materials and the removal and disposal of bituminous surface patches adjacent to joints are included in the Work for joint cleanout.

3.15 Repairing Pavement Joints

A. Where existing pavement joints and cracks are to be repaired, as specified on the Plans or as directed by ENGINEER, the existing bituminous surface and any loose or spalled concrete around the joints and cracks shall be removed.

B. Each joint or crack shall be cleaned and shall be filled with an approved mixture and the mixture shall be compacted with a vibratory machine or by an approved method.

3.16 Cold Milling Concrete or Bituminous Pavement

A. Where cold milling concrete or bituminous pavement is specified, the pavement shall be milled to the shape and cross section as shown on the plans. Immediately after cold milling, the surface shall be cleaned. CONTRACTOR shall remove and dispose of any resulting debris.

B. When allowed by ENGINEER, milling materials may be used for temporary wedging.

1. Prior to placing pavement, temporary wedging materials shall be removed and disposed of.

2. Wedging with milled materials is incidental to the Project.

3.17 General Bituminous Pavement Installation Requirements

A. The width, thickness and type of bituminous paving improvement shall be specified on the Plans, indicated in the Proposal or as determined by ENGINEER.

B. At street intersections, curb drops conforming to the current rules and regulations of Act 8, Michigan PA 1973, as amended, shall be provided for the construction of sidewalk ramps. In addition, curb drops for sidewalks and driveway approaches shall be provided in locations called for on the Plans or as determined by ENGINEER.

C. Existing improvements, including structures, shall be protected to prevent their surfaces from being discolored during application of bituminous materials.

3.18 Bituminous Prime Coat or Bond Coat

A. The prepared foundation shall be treated with bituminous material for prime coat or bond coat as specified. A bond coat shall be applied to each layer of bituminous mixture before the succeeding layer is placed.

B. Bituminous material shall be applied uniformly by means of a pressure distributor, and only in such areas as may be inaccessible to the regular distributor operation shall the bituminous material be applied by means of the hand spraying apparatus of the distributor.

1. Where necessary to accommodate traffic, the surface shall be treated half-width or as recommended by ENGINEER.

2. Foundation shall be free from moisture when the treatment is applied.

3. Under no circumstances shall pools of bituminous material be allowed to remain on the surface.

C. The amount of prime coat to be applied per square yard shall be 0.05 gal/s.y (250 ml/m^2) unless otherwise specified on the Plans or recommended by ENGINEER.

D. When prime coat is applied, the surface course shall not be placed until the prime coat has been properly cured. No blotting of the prime coat with aggregate in lieu of proper curing will be permitted.

E. Prime coat may be omitted or reduced when authorized by ENGINEER.

F. Bond coat shall be applied at the rate specified by ENGINEER. This rate will be between 0 and 0.10 gallons per square yard (0 to 450 ml/m^2) on the bituminous or concrete foundation and between 0 and 0.05 gallons per square yard (0 to 250 ml/m^2) between subsequent courses.

G. Bond coat material shall be applied ahead of the paving operation for a distance of at least 1,500 feet (450 m), depending on traffic conditions, as determined by ENGINEER. The surfacing shall not be placed until the bond coat has cured.

3.19 Transportation of Mixtures

A. The transportation of the mixtures as specified shall be in accordance with MDOT, Section 501.

3.20 Placing Bituminous Mixtures

A. Pavers will be required to have an automatically controlled and activated screed and strike-off assembly except when placing mixtures for:

1. Variable width sections;

2. Sections of pavement less than 1,000 feet(300 m) in length;

3. Placing the first course of a base course mixture on an earth grade or on a sand subbase; or,

4. Placing base course mixtures in widths less than eight (8) feet (2.5 m).

B. Bituminous base course mixtures shall not be placed in lifts exceeding three (3) inches (75 mm), unless otherwise approved by ENGINEER.

1. Approval to place lifts in excess of three (3) inches (75 mm) will be based on the ability of CONTRACTOR to place and compact the base course to the required cross section and within the specified tolerances.

C. For lifts of 2-1/2 inches (65 mm) or greater, a berm of shoulder material shall be banked against the outside edge of each layer of mixture placed unless the sequence of operations is such that the edges of the material are adequately confined and supported in some other manner.

1. The width of material placed shall be twice the height of the bituminous layer being placed but in no case less than a 6-inch (150 mm) width.

D. When the application rate for a bituminous wearing course exceeds 220 pounds per square yard (120 kg/m^2), the pavement shall be constructed in two (2) or more courses, unless otherwise specified on the Plans or as authorized by ENGINEER.

E. Bituminous mixture shall be placed by an approved self-propelled mechanical paver to such a depth that when compacted, it will have the thickness specified.

1. The mixture shall be dumped into the center of the hopper and care shall be exercised to avoid overloading the paver and spilling the mixture upon the base.

2. The paver speed shall be adjusted at the discretion of ENGINEER to that speed which, in his opinion, gives the best results for the type of paver being used and which coordinates satisfactorily with the rate of delivery of the mixture to the paver to provide a uniform rate of placing the mixture without intermittent operation of the paver.

F. When delays result in slowing paving operations such that the temperature of the mat immediately behind the screed falls below 170 degrees Fahrenheit (75 degrees Celsius), paving shall be stopped and a transverse construction joint placed.

G. Bituminous mixture shall be placed in one (1) or more layers as called for on the Plans or as approved by ENGINEER.

1. To take out irregularities in the existing road surface, wedging with bituminous mixture shall be done by placing several layers with the paver.

2. Corrections to the foundation by wedging with bituminous material shall be made by placing, compacting, and allowing the material to cool prior to paving.

H. Bituminous mixtures shall be placed using two (2) pavers in echelon or one (1) paver equipped with an approved joint heater.

1. ENGINEER may omit the use of the joint heater if the temperature of the previously placed mat does not fall below 170 degrees Fahrenheit (75 degrees Celsius) prior to placement of the adjacent course.

I. Echelon paving will be permitted when allowed by ENGINEER.

J. Cold joints will be permitted along acceleration and deceleration lanes, lanes less than full width, irregularly shaped sections, and at transverse joints.

1. Edges of the initial mat for all cold joints shall be painted with bituminous material before the bituminous mixture is placed in the adjacent section.

2. In placing the bituminous mixture adjacent to all joints, hand raking or brooming will be required to provide a dense smooth connection.

K. Connections with existing surfaces at the beginning and ending of resurfacing sections and at intersections shall be made by feathering out the mix, by constructing a butt joint, or as approved by ENGINEER.

L. When placing the bituminous mixture in a lane adjoining a previously placed lane, the mixture shall be placed such that it uniformly overlaps the first lane by two (2) to four (4) inches (50 to 100 mm) and is placed at a height above the cold mat equal to the breakdown roller depression on the hot mat.

1. Overlapping material shall be bumped, back onto the hot lane so that the roller will compress the excess material into the hot side of the joint.

2. If, in the opinion of ENGINEER, the overlap is excessive, the excess material shall be trimmed so as to leave an edge having a uniform thickness.

3. Excess material shall be discarded; it shall not be spread across the surface course.

M. If the lanes are being constructed with two (2) or more pavers in echelon, the loss depths of bituminous material from each paver shall match at the longitudinal joints.

3.21 Rolling and Compacting of Bituminous Mixtures

A. Each layer of bituminous mixture shall be compacted with approved rollers. At least two (2) rollers will be required when the mixture lay-down rate exceeds 800 square yards (650 m^2) per hour.

B. Steel 3-wheel rollers may be used for initial compaction immediately following the paver.

C. The final rolling operation on each layer of bituminous mixture shall be accomplished by use of tandem steel-wheel rollers or by use of vibratory rollers operated in the static mode.

D. Roller wheels shall be kept properly moistened with water.

E. Pneumatic-tired rollers shall be operated in a competent manner and shall not mark or rut the surface or displace the pavement edges.

1. Pneumatic-tired roller shall be ballasted to obtain the required ground-contact pressures as directed by ENGINEER.

2. To obtain a uniformly textured mat and the desired pavement density, ENGINEER may recommend CONTRACTOR to raise or lower tire pressures at any time during the rolling operations.

3. Roller operations shall be conducted in such a manner as to prevent scuffing or chatter marks in the pavement surface.

4. The number of passes made by the pneumatic-tired roller shall not be less than two (2) round trip passes over each area.

F. Rolling of the mixture shall begin as soon after placing without undue displacement, picking up the mat, or cracking.

1. Rolling shall start longitudinally at the extreme sides of the lanes and proceed toward the center of the pavement, overlapping on successive trips by at least half the width of the drive wheel of the roller.

2. Alternate trips of the roller shall be of slightly different lengths.

3. The maximum roller speed shall not exceed the manufacturer's recommended speed for the type of mixture or thickness of layer being placed.

G. When compacting an adjoining lane, the longitudinal joint shall be rolled first with the roller supported mainly on the cold lane with only three (3) to six (6) inches (75 to 150 mm) of the roller extending onto the freshly placed bituminous material.

H. Finish rolling shall continue until all roller marks are eliminated.

I. Pneumatic-tired rollers will not be permitted on wearing courses.

J. Areas too narrow to be rolled directly by standard 8-Ton (7 metric ton) tandem rollers shall be compacted by self-propelled trench rollers of suitable width, approved by ENGINEER, and weighting not less than 300 pounds per inch of width (5500 kg/m).

K. Skin patching on an area that has been rolled will not be permitted. Any mixture that becomes mixed with foreign material or is in any way defective shall be removed and replaced at CONTRACTOR's expense.

L. See Article 3.31 of this Section for compaction test.

3.22 Weather and Seasonal Limitations

A. Bituminous mixtures shall not be placed nor the prime coat or bond coat applied when rain is threatening or when the moisture on the existing surface would prevent satisfactory bonding.

B. Unless otherwise approved by ENGINEER in writing, minimum mixture temperature limitations at the time of placement, and seasonal limitations for placing bituminous mixtures shall be in accordance with the following:

C. Seasonal Limitations:

1. Upper Peninsula ..... June 1 - Oct 15
2. Lower Peninsula, north of M-46 ..... May 15 - Nov 1
3. Lower Peninsula, south of M-46 ..... May 5 - Nov 15

Mix Temperature Placement Limitations:			
Temperature of Surface being Overlayed °F (°C)	Rate of Application of Bituminous Material, lbs/syd (kg/m^3)		
	< 120 (65)	120 – 200 (65 – 110)	> 200 (110)
35 – 39 (2 – 4)	-	-	329 (165)
70 – 78 (21 – 25)	302 (150)	289 (142)	275 (135)
79 – 86 (26 – 30)	289 (142)	275 (135)	275 (135)
86 and Over	275 (135)	275 (135)	275 (135)

D. Bituminous paving will not be allowed below these minimum temperatures, nor when there is frost on the grade or existing surface.

3.23 Heating Bituminous Materials

A. Bituminous material which requires heating before application shall be heated in such a manner as to insure a uniform temperature throughout the entire mass with efficient and positive control at all times. It shall be heated to a temperature consistent with the type of material used and only to such temperature as will insure the necessary fluidity.

1. Excessively high temperatures shall be avoided.

2. A thermometer shall be provided to enable ENGINEER to observe the temperature at any time.

3. Bituminous material which has been overheated will be rejected.

B. Asphalt emulsion shall be circulated continuously when heated above atmospheric temperature so as to prevent it from separating.

1. Heating of asphalt emulsion to the required temperature for application shall be done entirely in the distributor unless a uniform temperature is maintained in the storage tank by means of a circulating heater.

2. Asphalt emulsion which has been damaged by continuous heating for too long a time or by alternate heating and cooling will be rejected.

3.24 Patching

A. Where patching is required on a bituminous surface or concrete surface because of small holes or pitted surface, the holes shall be cleaned of all dirt and foreign material.

B. The bituminous patching material shall be placed, struck off and compacted so that when completed, the patch shall be flush with the adjacent pavement. The compaction may be done with a hand tamper, vibratory compactor or roller.

C. When patching is required for repairing a cut in the pavement, made for the construction of underground structures and utilities, the granular backfill shall be compacted to not less than 95% of the maximum unit weight.

An aggregate base material of not less than 12 inches (300 mm) compacted thickness, or a bituminous base of the specified thickness, shall be used. The top of the base shall be 2 to 2-1/2 inches (50 to 65 mm) below the surface of the adjacent pavement. Bituminous patching material shall be placed and compacted.

D. The surface of the bituminous patch shall be smooth and shall not vary more than 1/4 inch (5 mm) from the crown and grade of the adjacent pavement. Variations over 1/4 inch (5 mm) from the established grade shall be corrected as determined by ENGINEER.

3.25 Chip Seal

A. Seal coating shall consist of 1 or more applications of bituminous material applied to the prepared surface and 1 or more coverings of coarse or fine aggregate applied to the bituminous material.

B. Asphalt Emulsion shall be HFRS-2M or CRS-2M and aggregate shall be MDOT 29A unless otherwise specified on the plans.

C. Cover materials used for seal coating shall be sufficiently dry when it comes in contact with bituminous material. The moisture content shall not exceed 3 percent by weight, dry basis. Satisfactory means shall be provided for the protection of the coating materials against excessive moisture by covering stockpiles, by aeration or through manipulation.

D. The bituminous material specified for surface coat shall be uniformly applied by means of the pressure distributor in the number of applications provided and in the amount per square yard as determined by ENGINEER. Each application of bituminous material shall cure sufficiently to prevent displacement or pickup by traffic or construction equipment before a succeeding application of bituminous material is made.

E. Following the application of surface coat bituminous material, the cover material shall be uniformly spread over the surface by means of approved mechanical spreaders, in the amount per square yard as specified or as determined by ENGINEER. Truck wheels shall ride on spread cover material and not on bituminous material.

F. Irregularities or deficiencies in the uniformity of the cover aggregate on the surface shall be corrected by hand spreading and dragging.

G. Following the spreading of each course of cover material, the surface shall be rolled by means of approved rollers.

H. Rolling shall immediately follow the placing of cover material before the bituminous material has set. At no time shall there be more than 300 feet (90 m) of unrolled cover material. No cover material shall be left unrolled for more than five (5) minutes.

I. Sufficient rolling shall be done to embed the cover material in the bituminous material without crushing the aggregate.

J. For areas deficient in cover material after completion of the surface treatment, additional cover material shall be added. For areas with excessive cover material, the excess cover material shall be removed before the next seal is applied. Final application of cover material shall be swept with a power broom.

K. Completed surface shall be maintained with a drag, broom or other approved equipment to keep the material well distributed on the road until all cover material possible has been embedded in the bituminous material. The length of time required for this maintenance will be from 2 to 5 days, as determined by ENGINEER, depending on the weather and the materials used.

3.26 Bituminous Concrete Curb

A. Bituminous concrete curb shall be constructed to the design specified on the Plans or as approved by ENGINEER and shall include the conditioning and treating of the surface on which the curb is to be placed.

B. Materials used in the construction and installation of bituminous concrete curbing shall meet the requirements as specified in Part 2, Products of this Section, and as specified in MDOT, Section 904.

C. Bituminous concrete curb mixture shall be 13 or 13A as specified in this Section and in accordance with MDOT, Section 501, unless otherwise approved by ENGINEER.

D. Bituminous curb shall be constructed to conform to the Plans or as determined by ENGINEER. The method of construction shall conform to MDOT, Section 805, unless otherwise specified.

E. Bituminous mixture shall be thoroughly compacted by a curbing machine to the cross section shown on the Plans, or as determined by ENGINEER. The curb shall be formed to the density to produce a tight surface texture. Curbs showing segregation, slumping, or misalignment shall be removed and replaced at CONTRACTOR's expense.

F. When specified on the Plans or as directed by ENGINEER, an application of asphalt emulsion or other approved bituminous coating shall be applied to the finished curb at the joint of the curb and pavement, or to the inside face of the curb, or to both, as a protective seal.

G. Backfilling behind the curb shall not commence until the bituminous mixture has cured.

H. Backfill material shall be placed and thoroughly tamped and compacted to the satisfaction of ENGINEER, without disturbing the curb, and shall be left in a neat and workmanlike condition.

3.27 Bituminous Approaches, Sidewalks, and Shoulders

A. This Work shall consist of constructing a bituminous surface course as specified on the Plans, or as approved by ENGINEER. Bituminous surface course shall be placed on a prepared foundation.

B. Bituminous materials used shall be as specified on the Plans, or as approved by ENGINEER. Materials acceptable for use are specified in Part 2 of this Section, and as specified in MDOT, Section 904.

C. Bituminous approach mixture shall be in accordance with MDOT, Section 501, unless otherwise approved by ENGINEER.

D. Existing pavement or aggregate base shall be prepared to receive the bituminous surface course as specified in this Section.

E. Bituminous prime and bond coats used shall meet the requirements specified in this Section. Care shall be taken to prevent spreading of bituminous material on adjoining surfaces. When approved by ENGINEER, the prime coat may be omitted.

F. The bituminous mixture shall be placed to the thickness specified on the Plans or as determined by ENGINEER.

G. Placing the bituminous mixture shall conform to this Section.

H. When approved by ENGINEER, the paver used for placing bituminous approaches and sidewalks will not be required to have an automatically controlled or activated screed or strike-off assembly or the corresponding grade referencing equipment. Also, with approval from ENGINEER, only one (1) roller may be used with each paver.

3.28 Cleanup

A. Area adjacent to the new Work shall be backfilled with sound earth of topsoil quality.

B. Backfill shall be compacted, leveled and left in a neat, workmanlike condition. At a seasonally correct time the disturbed area shall be raked, have topsoil placed thereon, fertilized and seeded per the requirements of Section 32 9219, Seeding, or sodded in accordance with Section 32 9223, Sodding.

3.29 Monument Boxes

A. Government, plat, and street intersection monuments within existing or proposed pavement shall be preserved by enclosing in standard monument boxes. Monument box castings shall be furnished and installed by CONTRACTOR and shall be East Jordan Iron Works No. 1570, or approved equal.

B. Existing monument boxes shall be adjusted to meet the proposed pavement elevation by removing the castings and resetting to the required elevation. Support for the monument box shall be concrete bedding, so constructed as to hold them firmly in place. The adjacent pavement, curb, or curb and gutter shall be replaced to the new elevation, condition, and kind of construction, unless otherwise provided.

3.30 Testing

A. During the course of the Work, ENGINEER may require testing for mix designs, aggregate gradation, and physical properties, bitumen content, compaction or density, and thickness of material. Testing and coring required shall be performed by a testing laboratory approved by ENGINEER. Cost for testing and coring shall be at the expense of OWNER. The testing laboratory shall furnish ENGINEER with two certified copies of the results of all tests.

B. Testing procedures shall conform to current MDOT Standards for Construction.

C. Testing of asphalt binders, liquid asphalts, asphalt emulsions, tars shall conform to MDOT, Section 904.

D. Rolling shall proceed until the required compaction is attained and the amount of rolling required shall be based on the test results of a nuclear gage or on using a specified minimum number of rollers. When the total tonnage for the Project is in excess of 1,000 Tons (900 metric tons), the nuclear gage method will be used to govern the compactive requirements.

E. Control density for the bituminous mixture to be placed, will be determined by use of a modified Marshall Test.

F. Control Density:

1. During CONTRACTOR's start-up operations, a rolling procedure to attain the control density will be established.

    a. Rolling procedure will be based on the number and type of rollers used and the rolling pattern.

    b. Goal of the compactive effort will be to establish a rolling procedure which will achieve 100% of the control density but in any case, the density achieved shall not be less than 95% of the control density.

    c. Density values less than 98% will be sufficient cause for ENGINEER to require an adjustment in the number or type of rollers being used or in the rolling pattern.

2. Once the procedure has been established on the start-up section, the procedure shall be used for the remainder of the mixture to be placed, unless subsequent tests indicate a need to change the number of rollers or the rolling pattern.

3. If difficulties are encountered or if there is a significant change in aggregate or bitumen content, ENGINEER will determine the control density for the new mixture and require CONTRACTOR to again establish the number and type of rollers and the rolling pattern required on the new mixture to attain the control density. Compactive procedures thus determined shall be used when placing the remainder of that mixture.

4. Density checks will be made at the discretion of ENGINEER to determine if the compactive procedure being used is achieving the required density, or if a change in procedure is necessary.

5. Each layer of bituminous mixture shall be compacted to at least 95% of the control density, using the established procedure.

3.31 Price Adjustments

A. Samples of asphalt binder may be taken prior to incorporation into the mixture and from the bituminous mixture. Where results of tests on these samples deviate from specification requirements, the affected material will be subject to price adjustments on the following basis:

1. When the test results deviate from the limits specified in MDOT, Table 904-1, Performance Graded Asphalt Binder Specification, by ten (10) percent or more, the mixture produced will be evaluated by ENGINEER and if in his judgment the defective pavement warrants removal, CONTRACTOR shall remove and replace the affected area at his expense. If it is determined that the removal is not required, the Contract unit price of the affected mixture will be reduced by ten (10) percent.

2. Core samples may be taken on the completed Work. If the results from testing of the core samples indicates a deficiency in the completed Work, ENGINEER will evaluate the test results and will recommend removal and replacement or a credit to OWNER.

Table A: Composition of Mixtures										
Mixture No.	2B	2C	3B	3C	4B	4C	13	13A	11A	36A
Binder %	4-6	4-6	4.5-7	4.5-7	5-8	5-8	5-8	5-8	4-6	5.5-8
Percent Passing Indicated Sieve										
1-1/2" (37.5 mm)	100	100							100	
1" (25 mm)	99-100	99-100	100	100					90-100	
3/4" (19 mm)	90 max	90 max	99-100	99-100	100	100	100	100	70-95	
1/2" (12.5 mm)	78 max	78 max	90 max	90 max	99-100	99-100	75-95	75-95	55-85	100
3/8" (9.5 mm)	70 max	70 max	77 max	77 max	90 max	90 max	60-90	60-90	40-80	92-100
No. 4 (4.75 mm)	52 max	52 max	57 max	57 max	67 max	67 max	45-80	45-80	25-65	65-90
No. 8 (2.36 mm)	15-40	15-40	15-45	15-45	15-52	15-52	30-65	30-65	15-50	55-75
No. 16 (1.18 mm)	30 max	30 max	33 max	33 max	37 max	37 max	20-50	20-50	10-40	
No. 30 (600 um)	22 max	22 max	25 max	25 max	27 max	27 max	15-40	15-40	7-32	50-20
No. 50 (300 um)	17 max	17 max	19 max	19 max	20 max	20 max	10-25	10-25	5-20	
No. 100 (150 um)	15 max	15 max	15 max	15 max	15 max	15 max	5-15	5-15	4-12	
No. 200 (75 um)	3-6	3-6	3-6	3-6	3-6	3-6	3-6	3-6	3-6	3-10
Crushed Min. %	50	90	50	90	50	90	0	25	25	60

Table B: Mix Design Criteria										
Mixture No.	2B	2C	3B	3C	4B	4C	13	13A	11A	36A
VMA Min. %	13.5	13.5	15	15	16	16	15.5	15.5	13.5	16.5
Air Voids % Target (1)	3	3	3.5	3.5	3.5	3.5	3	3	3	3
Fines/Binder Ratio Max. (2)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Fine Aggregate Angularity Min. (3)	3	4	3	4	3	4	2	2.5	2.5	3
Flow-in. (mm)	.08-.16 (2.0-4.0)	.08-.16 (2.0-4.0)	.08-.16 (2.0-4.0)	.08-.16 (2.0-4.0)	.08-.16 (2.0-4.0)	.08-.16 (2.0-4.0)	.08-.16 (2.0-4.0)	.08-.16 (2.0-4.0)	.08-.16 (2.0-4.0)	.08-.16 (2.0-4.0)
L.A. Abrasion Max. % loss (4)	40	40	40	40	40	40	40	40	50	40
Soft Particle Max. % (5)	12	12	12	12	8	8	8	8	12	8
Stability Min. Pounds (kN)	1200 (5.3)	1200 (5.3)	1200 (5.3)	1200 (5.3)	1200 (5.3)	1200 (5.3)	900 (4.0)	900 (4.0)	900 (4.0)	900 (4.0)

Notes:

(1) The JMF target may be adjusted in the field, prior to placement, to meet the project design criteria for a specific application; for example, 2.0 percent air voids on shoulders or bike paths.
(2) Fines/Binder Ratio. The ratio of aggregate material finer than the No. 200 (75 um) sieve to asphalt binder content by weight including fines and bituminous contributed by reclaimed asphalt pavement (RAP).
(3) The fine aggregate angularity of blended aggregate, determined by MTM 118, must meet the minimum requirement. In mixtures containing RAP, the required minimum fine aggregate angularity must be met by virgin material.
(4) Los Angeles abrasion loss must be met for the composite mixture; however, each individual aggregate must be less than 50.
(5) The sum of the shale, siltstone, structurally weak, and clay-ironstone particles shall not exceed 8.0 percent for aggregates used in top course. The sum of the shale, siltstone, structurally weak, and clay-ironstone shall not exceed 12 percent for base and leveling courses.

Table C: Uniformity Tolerance Limits For Bituminous Mixtures						
Type of Course	Range (a)	Percentage Passing Designated Sieves				Asphalt Binder Content
		(b)	No. 8 2.35 mm	No. 30 600 um	No. 200 75 um	
Top and Leveling Course	Range 1	± 5.0	± 5.0	± 4.0	± 1.0	± 0.40
	Range 2	± 8.0	± 8.0	± 6.0	± 2.0	± 0.50
Base Courses	Range 1	± 7.0	± 7.0	± 6.0	± 2.0	± 0.40
	Range 2	± 9.0	± 9.0	± 9.0	± 3.0	± 0.50

Notes:

(1) This range allows for normal mixture and testing variations. The mixture shall be proportioned to test as closely as possible to the Job Mix Formula.
(2) This includes all sieve sizes No. 4 (4.75 mm) and larger listed on the Job Mix Formula.

Table A[1]: Composition of Mixtures									
Total Percent Passing Indicated Sieve (a)									
Mixture No.	No. 1800 No. 1500 No. 1300 (36A)(36B)	No. 1800 No. 1500 No. 1300 (20AAA)	No. 1100 (36A) (36B)	NO. 1100 (20AA)	NO. 1100 (20A)	No. 900 (20AA)	No. 900 (20A)	No. 900 (20B)	No. 700 No. 500 (20C)
1-1/2" (37.5 mm)	-	-	-	-	-	-	-	-	100
1" (25 mm)	-	-	-	-	-	-	-	-	80-100
3/4" (19 mm)	-	100	-	100	100	100	100	100	-
1/2" (12.5 mm)	100	90- 00	100	90-100	-	90-100	-	-	-
3/8" (9.5 mm)	92-100	65- 5	92-100	65-95	60-90	65-95	60-90	60-95	55-90
No. 4 (4.75 mm)	65-90	55- 5	65-90	-	-	-	-	-	-
No. 8 (2.36 mm)	55-75	45- 0	55-75	45-70	40-65	45-70	40-65	40-70	30-55
No. 30 (600 um)	25-50	20- 5	25-50	20-45	20-40	20-45	20-40	20-45	15-40
No. 200 (75 um)(b)	4 -10	3-0	4-10	3-10	3-10	3-10	3-10	3-10	3-10
Binder % (c)	5-9	5- 9	5-9	5-7	5-7	5-7	5-8	5-8	3-6
Crushed Min. %	(d)	60	(d)	40	25	40	25	-	-

Notes:

(a) Composition limits are shown in percent by weight, based on the total aggregate, including mineral filler in the mixture.
(b) The Job-Mix-Formula shall have a minimum total percent passing a No. 200 sieve of 5.0 percent.
(c) The percent of bitumen in the mixture shown in Table A1 is a range and the actual bitumen content in the production mixture shall be as determined by the Job-Mix-Formula. For mixtures No. 900, 1100, 1300, 1500, and 1800 placed in two courses, the leveling course will be designed to have up to 0.5 percent less bitumen than the optimum specified for the top course. Mixtures No. 500 and 700 will be designed to have a target air void of 4.0 percent.
(d) 36A = 60%, 36B = 40%

Table B[1]: Mix Design Criteria					
Mixture No.	Aggregate Required	Stability Pounds (Minimum)	Flow (.00 inch)	VMA % (Minimum)	Air Voids % Target
500	20jC	500	-	13.0	4.0
700	20C	700	8-16	13.0	4.0
900	20B, 20A, 20AA	900	8-16	13.5	2.5
1100	20A, 20AA, 36A, 36B	1100	8-16	13.5	3.0
1300	20AAA, 36A, 36B	1300	8-16	14.0	3.0
1500	20AAA, 36A, 36B	1500	8-16	14.0	3.0
1800	20AAA, 36A, 36B	1800	9-16	14.0	3.0

End of Section

Section 32 9219
Seeding

Part 1 General

1.01 Scope of Work

A. This Section includes seeding complete with hand seeding and fertilizing for lawns.

1.02 Related Work Specified Elsewhere

A. Section 01 2200: Unit Prices
B. Section 01 8900: Site Construction Preparation Requirements
C. Section 31 2200: Grading

1.03 Requirements of Regulatory Agencies

A. Comply with the applicable requirements of the Michigan Department of Agriculture, Pesticide and Plant Pest Management Division, Michigan Seed Law, Act 329, PA of 1965, as amended.

B. Comply with the applicable requirements of the Proceedings of the Association of Official Seed Analysts, Rules for Testing Seeds.

C. Chemical fertilizer shall be supplied in suitable bags with the net weight of the contents and guaranteed analysis shown on the container. Bulk shipments shall be accompanied by an analysis and net weight certification of the shipment. Custom mixed fertilizers shall be accompanied by a certification of the weight of each commercial fertilizer used in the mixture and a guaranteed analysis of each shipment expressed in percentages of total Nitrogen (N), total available Phosphoric Acid (P_2O_5) and total available Potash (K_2O) included.

1.04 Source Quality Control

A. A seed mixture proposed for use in the Work shall have been tested for purity and germination by the Seed Producer within nine (9) months of sowing.

1.05 Reference Standards

A. ASTM - American Society for Testing and Materials

B. MDOT - Michigan Department of Transportation, Standard Specifications for Construction, latest edition

1.06 Submittals

A. Submit Seed Producers Certification that seed meets the requirements of these Specifications and conform to the State of Michigan Seed Act referenced above under Article 1.03 of this Section.

B. Where required, submit test reports for all seed proposed for use in the Work to ENGINEER, showing results of purity and germination tests, compliance with regulatory agencies, dates and location of tests.

1.07 Product Delivery, Storage, and Handling

A. Material shall be delivered to the Project site in their original, unopened containers. Containers shall be clearly marked showing, name of manufacturer, brand name, trade name or generic name of material, warranty of analysis, net weight of contents and date of packaging, where applicable.

B. Seed shall be delivered to the site in durable bags, tagged or labeled to show date of tests, warranty of purity and germination analysis, name, lot number and net weight of contents.

C. Commercial fertilizers shall be delivered to the site of the Work in the original unopened bags. Bags shall not exceed 100 pounds (45 kg) net weight each and shall be clearly marked with guaranteed analysis in a conspicuous location on each bag.

D. Material shall be stored at the Project site, under shelter, off the ground and shall be protected from damage by moisture, temperature, exposure to elements, vandalism or other action which might otherwise impair their use.

E. Materials proposed for use in the Work shall be handled in a manner that will protect the material and the personnel involved in the Work. Handle seed in a manner which will protect the mixture from contamination or deterioration.

1.08 Environmental Requirements

A. Seeding is limited to the periods between April 20 and June 1, August 10 to October 1 and after November 20 for as long as weather permits preparation of the seed bed without irrigation and/or mulch. With the use of irrigation and/or mulch, seeding can be done from April 20 thru October 1 inclusively.

B. Comply with the limitations placed on the use of certain soil protection materials because of prevailing temperatures as described in this Section.

C. Comply with the limitation placed on seeding applications because of wind velocity as described-in this Section.

1.09 Protection

A. Provide suitably approved warning signs and barricades for protection of seeded areas from pedestrian or vehicular traffic. Protect all newly seeded areas during the progress of the Work and until completion of the turf establishment period.

B. Protect all adjacent construction from topsoil spills and perform such cleanup of affected surfaces before it becomes compacted by traffic.

1.10 Final Acceptance

A. CONTRACTOR shall establish a dense cover of seeded grass on disturbed areas.

B. These areas shall be maintained until final acceptance of the Work by ENGINEER.

C. ENGINEER will inspect the turf to insure that the grass seed is well established, weed free, in a growing and vigorous condition.

D. Areas that do not meet the approval of ENGINEER at the end of the project and for a period of one year shall be re-seeded at CONTRACTOR's expense. This shall include erosion repair areas of disturbance.

Part 2 Products

2.01 Seed

A. Seed and seeding mixtures shall be certified, mature, clean, dry, new crop seed products suitable for the specified applications and having the percentages of purity, germination and proportions, by weight, indicated in Table 1.

Table 1 - Seeding Mixtures

	Seeds		Mixture Proportions (%)			
Kind	Purity	Germination	TDS	TUF	TGM	THM
Kentucky Blue Grass	98%	80%	5	10	10	30
Perennial Rye Grass	96%	85%	25	20	20	20
Hard Fescue	97%	85%	25	20	30	
Creeping Red Fescue	97%	85%	45	40	40	50
Fults Salt Grass	98%	85%*		10		

Table 2 – Soil Types and Location of Seeding

Symbol for Turf Seed Mixture	Soil Type	General Location	Rate of Seeding lbs/ac (kg/ha)
TDS	Dry Sandy to Sand Loam	Rural or Urban	250 (280)
TUF	All Types	Freeway, Blvds, Streets	250 (280)
TGM	Medium to Heavy	All	250 (280)
THM	Loamy to Heavy	Home and Business Turf	250 (280)

B. The specific mixture to be used shall be for the type of soil on the Project and the location of the seeding unless otherwise indicated on the Plans or as designated by ENGINEER.

C. Hydroseeding shall consist of a blend of seed, fertilizer and hydromulch.

2.02 Mulching Material – Lawn Areas

A. Straw:

1. Small grain straw or grass or marsh hay acceptable to ENGINEER.

B. Wood Excelsior:

1. Green wood fibers, baled or blanket of type and manufacture acceptable to ENGINEER.

2. Wood excelsior shall be made of green timber fiber baled so that the bales weigh 80 to 90 pounds at the time of manufacture.

3. Wood excelsior blankets shall be made of a uniform web of interlocking fibers with a backing of fabric netting on one (1) side only. The fabric net shall have a mesh size not exceeding 1-1/2" x 3" (40 mm x 75 mm) and shall be a woven of either cotton cord, twisted paper cord or a synthetic, biodegradable fiber.

Blankets shall be produced in the form of a tightly compressed roll 36 inches ± 1-inch (900m m ± 25 mm) wide and approximately 120 feet (36 m) long. Blanket shall have a fiber net on the outside of the fiber mat. Blanket roll weight, when manufactured, shall average 85 pounds (38 kg) ± 10%. Each roll shall have separator sheets of 40 pound Kraft paper placed at the beginning and at the end of each roll to facilitate unrolling and handling at the job site. The Kraft paper sheet at the end of each roll shall also form a wrapper for the roll.

C. Netting:

1. Twisted Kraft paper or synthetic fiber, biodegradable woven mesh net material suitable for the application and acceptable to ENGINEER.

2. The net shall consist of a biodegradable mesh with openings not to exceed 1-1/2" x 3" (40 x 75 mm)

3. The net shall be furnished in widths of not less than 35 inches (900 mm).

D. Proprietary Mulch Material:

1. Biodegradable natural and/or synthetic materials suitably fabricated and acceptable to ENGINEER.

2.03 Mulch Anchoring Material

A. Emulsified Asphalt:

1. ASTM D977, Rapid Setting (R.S. 1 or 2), Medium Setting (M.S. 2 or 2h) or Slow Setting (S.S. 1).

B. Mulch Anchoring Tool:

1. Suitable unit having a series of flat, notched discs for punching and anchoring mulch in soil, or a regular farm disc weighted and set nearly straight as a substitute.

C. Latex Base Adhesive:

1. Latex base adhesive mixed with water at a ratio of 25 gallon of water to 1 gallon adhesive with 25 pounds of recycled newsprint as a tracer (14 L of adhesive with 0.35 kL of water with 28 kg of newsprint).

D. Recycled Newsprint:

1. Mix 7 pounds of newsprint with 7 gallons of water (60 kg of newsprint with 1000 L of water).

E. Guar Gum:

1. Mix 1 pound of dry adhesive with 26.5 gallons of water with 5 pounds of recycled newsprint as a tracer (55 kg adhesive / 12 200 L water / 280 kg newsprint).

2.04 Fertilizer

A. Fertilizer shall be a standard commercial grade fertilizer, conforming to state regulations, of the type recommended for grasses. The fertilizer shall contain slow release nitrogen amounting to 75% of the nitrogen available. Fertilizer shall be uniform in composition, free flowing and suitable for application with method selected. Fertilizer for hydraulic seeding shall be soluble or ground to a fineness that will permit complete suspension of all insoluble particles in the slurry.

2.05 Topsoil – Lawn Areas

A. Topsoil shall be fertile, friable, sandy clay loam without admixture of subsoil. Topsoil is to be free of glass, stones greater than one (1) inch (25 mm) in any dimension, weeds, undesirable grasses and other extraneous materials. Topsoil shall have the following range of values:

1.	Soil pH	5.0 to 7.5
2.	Soluble Salts	500 ppm max
3.	Organic Content	5 to 30 %
4.	Silt Content	35% to 50%
5.	Clay Content	5% to 10%
6.	Deleterious Material*	5% max

*rock, gravel, stone, sticks, roots, sod, etc.

B. Compost may be mixed with topsoil to obtain the desired content. Topsoil is to be final screened thru a 5/8-inch (15 mm) maximum mesh screen prior to delivery to the Project site. ENGINEER shall review source and final screen results prior to release of topsoil. CONTRACTOR shall submit a certified analysis of the topsoil from each source to ENGINEER. Topsoil shall be placed in 6-inch (75 mm) minimum thickness throughout, or as specified in the plans or Specifications.

C. CONTRACTOR shall obtain his own topsoil borrow pit source and shall obtain all necessary permits and agreements for the use of such borrow pits at his own expense.

Part 3 Execution

3.01 Preparation of Subgrade

A. Complete all fine grading within the areas to be covered with topsoil necessary to bring the surface of the proposed subgrade to the elevations indicated on the Plans and parallel to the proposed finished grade. The surface of the subgrade immediately prior to being covered with topsoil shall be raked or otherwise loosened to a minimum depth of two (2) inches (50 mm) to facilitate making a bond between the subsoil and the topsoil.

3.02 Preparation of Soil

A. After the areas to be seeded have been brought to the required grade and properly trimmed and cleaned up, the existing soil shall be brought to a friable condition by harrowing or otherwise loosening and mixing to a depth of at least four (4) inches (100 mm). Lumps and clods shall be thoroughly broken. When the area to be seeded has been prepared and covered with a layer of topsoil as specified under Article 3.01 of this section, this operation will not be required.

3.03 Seeding

A. Hand seeding and fertilizing shall be done daily as areas are disturbed and prepared for final grade.

B. Seed of the kind required shall be sown at the rate as specified in Table 2. Seed shall be sown in the presence of an inspector by mechanical spreader, hydraulic seeder or broadcasting. The broadcasting method shall be used for sowing seed only in areas inaccessible to mechanical spreading equipment. Seeding during winds above 15 miles per hour (25 km/hr) shall not be permitted.

C. Prior to placing seed materials, water topsoil to a depth of four (4) inches (100 mm) at least 48 hours prior to seeding operations to obtain a loose friable seed bed. Time and depth of watering operations shall be varied at the direction of ENGINEER for varying conditions at the site of the Work.

D. Broadcasting methods for sowing seed materials shall be accomplished by spreading one-half of the specified amount of seed in one direction and then broadcasting the remaining one-half of the seed at right angles to the first seeding pattern using the same broadcast method. Rate of broadcast shall be as specified herein or per the written recommendations of the Producer of the seed material used. Roll seeded area with roller weighing a maximum of 150 pounds/foot (225 kg/m) of width.

E. Mulching shall consist of placing a mulch material on areas that have been or are to be seeded. Mulch shall be placed in a loose enough condition so as to allow penetration of sunlight and circulation of air, but thick enough to shade the ground, reduce rate of water evaporation and prevent or reduce erosion by wind or water. Mulch shall be secured with suitably acceptable anchoring material.

F. For surfaces and slopes on which power equipment can be operated, satisfactory mulching materials include the following:

G. Small grain wheat straw or grass hay applied at 1-1/2 to two (2) tons per acre (3.5 to 4.5 metric ton/ha) with disc packer, asphalt or netting tie-down.

H. Wood chips applied at six (6) to nine (9) tons per acre (13.5 to 20.0 metric tons/ha).

I. Asphalt emulsion alone at 600 to 1,200 gallons per acre (5.5 to 11. kl/ha). (This application is suitable for limited periods of time and where trampling by either people or animals will not occur.)

J. For surfaces and slopes where power equipment cannot be operated, satisfactory mulching materials include the following:

K. Straw or grass hay applied at 1-1/2 to two (2) tons per acre (3.5 to 4.5 metric tons/ha), anchored with asphalt or netting tie-down.

L. Asphalt emulsion alone at 600 to 1,200 gallons per acre (5.5 to 11.0 kl/ha). (Limited to areas where tracking is not a problem.)

M. Commercially available erosion control netting of jute, paper or biodegradable synthetics.

N. Continuous filament fiberglass at 1,000 pounds per acre (1100 kg/ha) anchored with 150 gallons (1400 l/ha) of asphalt emulsion.

O. Anchor straw or hay mulch by the methods as specified herein.

P. Wood chips will not need anchoring when used on workable slopes.

Q. Commercially manufactured netting and/or fiberglass materials shall be anchored in accordance with the manufacturer's printed instructions for the material used.

R. Punch and anchor mulch material into soil using mulch anchoring tool. Soil must be moist, free of stones and loose enough to permit disc penetration to a depth of three (3) inches (75 mm).

S. Blow on liquid or emulsified asphalt materials with the straw or hay mulch or spray or sprinkle asphalt tie-down materials immediately after mulch is spread.

T. Apply emulsified asphalt at 0.04 gallons per square yard 0.2 l/m^2). Do not apply emulsified asphalt during freezing weather since it contains approximately 50% water. Apply liquid (cut back) asphalt at approximately 0.10 gallons per square yard (0.45 l/m^2). Liquid asphalt may be applied during freezing weather since it is cut back with kerosene.

U. Acceptable proprietary netting and erosion control materials shall be disposed of in accordance with the manufacturer's printed instructions for the material used prior to any seeding operations.

3.04 Lawn Establishment

A. Topsoil shall be placed and spread over the area designated on the Plans, or as determined by ENGINEER, to a depth of six (6) inches, ± 1-inch (100 mm ± 25 mm) or to such depth as specified on the plans.

B. In all cases, topsoil shall be placed to a depth sufficiently greater than that shown on the Plans or specified so that, after natural settlement or rolling, the completed Work will conform to the lines, grades and elevations shown on the Plans.

C. Spreading of topsoil shall be completed in such a manner that seeding as specified can proceed without additional moving of topsoil. Topsoil furnished and placed shall be considered incidental to seeding unless otherwise specified in the Proposal.

D. After topsoil is spread, all large earth lumps, rocks, roots, debris, or other foreign matter shall be raked and removed from the topsoiled area and legally disposed of by CONTRACTOR.

E. Seeded areas shall be watered whenever excessive drying is evident during the period set for establishment. Watering shall be done in a manner that will prevent erosion due to the application of excessive quantities and the watering equipment shall be of a type that will prevent damage to the cultivated surfaces. CONTRACTOR shall be responsible for the proper care of the seeded areas until final acceptance of the entire Work covered by the Contract.

F. The seeded areas shall be mowed with mowing equipment acceptable to ENGINEER to a height of two (2) inches (50 mm) whenever the average height of grass establishment reaches four (4) inches (100 mm). When the amount of cut grass is heavy, cut grass shall be removed to prevent destruction of the underlying grass. If weeds or other undesirable vegetation threaten to smother the planted species, such vegetation shall be mowed, or in the case of rank growths, shall be uprooted, raked and legally disposed of from the area.

G. Reseed and mulch areas larger than four (4) square inches (25 cm^2) not having a dense, uniform, vigorous stand of grass acceptable to ENGINEER.

H. The establishment period shall extend for a period from the time of seeding until the seeded area has a uniform stand of grass acceptable to ENGINEER. The minimum period shall be 30 days.

I. If after 60 days from the initial seeding a dense, uniform, vigorous stand of grass has not been established by CONTRACTOR, OWNER may reseed the defective areas and all costs will be deducted from CONTRACTOR's payments.

J. Chemical fertilizer shall be applied on the prepared soil surfaces at a minimum rate of 1/3 ton per acre (666 lbs/ac.) (750 kg/ha) of 12-12-12 fertilizer, or such other rate of another fertilizer mixture that yield 240 lbs/acre (270 kg/ha) of nutrient. Dry fertilizers shall be thoroughly disced, harrowed or raked into the soil to a minimum depth of not less than 1-inch (25 mm). Where hydraulic seeders are used for sowing seed, one half the recommended rate of fertilizer may be spread in combination with such sowing with the balance incorporated into the soil prior to seeding. In all other cases, fertilizer shall be incorporated into the soil before any seeding is started.

K. Hydroseeding shall be performed using suitably acceptable hydraulic seeding equipment and a homogeneous slurry solution of water, seed, fertilizer and suitable mulch material as approved by ENGINEER. Seed slurry mixture shall be distributed uniformly at a rate approved by ENGINEER for the seed materials, fertilizer and/or mulch materials used to suit the seed application rate. Seed application rate shall be 300 lbs/acre (340 kg/ha).

End of Section

Division 33
Utilities

Section 33 4100
Storm Utility Drainage Piping

Part 1 General

1.01 Scope of Work

A. This Section includes storm sewer Work indicated on the Plans complete with pipes, joints, structures, pipe bedding, final inspection and appurtenances.

1.02 Related Work Specified Elsewhere

A. Section 01 2200: Unit Prices
B. Section 31 2333: Trenching and Backfilling (Culverts)

1.03 Reference Standards

A. Unless otherwise specified, the Work for this Section shall conform to the applicable portions of the following Standard Specifications:

1. ANSI - American National Standard Institute

2. ASTM - ASTM International

3. AASHTO - American Association of State Highway Transportation Officials

4. MDOT - Michigan Department of Transportation, Standard Specifications for Construction, latest edition

5. NCPI - National Clay Pipe Institute

1.04 Source Quality Control

A. Laboratory test not less than 1percent, with a minimum of 3 pieces each size, material and class of gravity pipe required in the Work.

1.05 Submittals

A. Submit a complete field report of the location of all wye openings and sump pump discharge leads to ENGINEER at the end of each sewer section of the Project or on the last day of each week, whichever occurs first.

B. Submit two (2) copies of the laboratory test reports required per Article 1.04 of this Section to ENGINEER.

C. Complete Shop Drawings for all manhole tees shall be submitted to ENGINEER.

D. Submit shop drawings and design information for all precast concrete box sections.

1.06 Storage of Materials

A. Piping material shall not be stacked higher than four (4) feet (1.2 m) or as recommended by the manufacturer, whichever is lowest. Suitable racks, chairs, and other supports shall be provided to protect preformed pipe mating surfaces from damage. Store bottom tiers off the ground, alternate tiers and chock tier ends.

B. Jointing and sealing materials used in the storm sewer system shall be protected from sunlight and stored in as cool and clean a place as practicable until ready for application.

1.07 Handling of Material

A. Load and unload materials using suitable approved equipment. Material shall not be dropped, bumped or allowed to impact against itself. Damaged material shall be rejected by ENGINEER.

B. Lifting devices shall be suited to the Work and shall protect surfaces from damage.

Part 2 Products

2.01 Materials

A. It is the intent of the Articles in Part 2 of this specification section is to specify in detail the various types of sewer pipe, joints, manholes, etc. which have been indicated throughout the Plans and Specifications.

B. These Articles shall not be construed as allowing any alternate type of material to that which is indicated on the Plans or elsewhere in the Specifications.

2.02 Corrugated Metal Pipe

A. Galvanized Corrugated Metal Pipe:

1. Corrugated galvanized steel pipe with circular cross section and corrugated galvanized steel pipe with pipe-arch shape shall conform to the requirements of AASHTO M36, and as specified in MDOT Section 909.05. Helical corrugated pipe shall have a minimum of two (2) circumferential corrugations rerolled on each end of each section of pipe.

B. Polymeric Coated Corrugated Galvanized Steel Pipe:

1. Polymeric coated corrugated galvanized steel pipe with circular cross section and polymeric coated corrugated galvanized steel pipe with pipe-arch shape shall conform to the requirements of AASHTO M245, and as specified in MDOT Section 909.05. Helical corrugated pipe shall have a minimum of two (2) circumferential corrugations re-rolled on each end of each section of pipe.

C. Aluminized Type 2 Corrugated Metal Pipe:

1. Type 2 aluminized corrugated steel pipe with circular cross section and corrugated steel pipe with pipe-arch shape shall conform to the requirements of AASHTO M36, AASHTO M274, Type 2 and as specified in MDOT Section 909.05. Helical corrugated pipe shall have a minimum of two (2) circumferential corrugations re-rolled on each end of each section.

D. Corrugated Aluminum Alloy Pipe:

1. Corrugated aluminum alloy pipe with circular cross section and corrugated aluminum alloy pipe with arch-pipe shape shall conform to the requirements of AASHTO M196 and MDOT Section 909.05.

E. Joints for Corrugated Metal Pipe:

1. Joints for corrugated metal pipe shall be made by use of coupling bands. Coupling bands shall be of the same material as specified for the pipe and shall prevent infiltration of the side fill material. Coupling bands shall be corrugated to match the corrugations of the pipe to be jointed, and shall include two (2) "O" ring neoprene gaskets for each joint. Dimple bands shall not be used.

2. Joints shall be wrapped with a 3 foot (1 m) wide geotextile filter fabric centered on the joint.

3. When called for in the Contract Documents, joints shall have bell and spigot coupling system and rubber gasketed joint.

2.03 Concrete

A. In accordance with MDOT Section 701, use Grade S2; 3,500 psi (24 MPa) strength; Type IA cement; 6.0 sacks cement per cubic yard (335 kg/m^3); 6A coarse aggregate; 2NS fine aggregate; 6.5% ± 1.5% air content; 3-inch (75 mm) maximum slump; no admixtures without ENGINEER's approval.

2.04 Concrete Reinforcement

A. In accordance with MDOT Section 905, use ASTM A615, Grade 60 for bars and ASTM A185 for welded wire fabric.

Part 3 Execution

3.01 Verification of Excavation and Bedding

A. Prior to the installation of any storm sewer piping, structures, or materials, examine trenches and other excavations for the proper grades, lines, levels and clearances required to receive the new Work. Ascertain that excavation bottoms, compacted subgrades and pipe bedding are adequate to receive the storm sewer materials to be installed. Correct defects and deficiencies before proceeding with the Work.

3.02 Existing Storm Sewers and Drains

A. Expose the existing storm sewer and structures to which the new Work is to be connected and notify ENGINEER of same. ENGINEER will verify the vertical and horizontal locations of the existing system and shall inform CONTRACTOR as to the necessary adjustments required to align the new storm sewer Work with the existing system.

3.03 Preparation

A. Outside surface of the spigot end and the inside surface of the bell end of the pipe shall be cleaned and free of any foreign materials, other than the sealant recommended by the manufacturer, prior to installation.

B. Pipe, frames, covers, accessories, and appurtenances shall be examined carefully for damage and other defects immediately prior to installation. Defective or damaged material shall be rejected and removed from the Project by CONTRACTOR.

3.04 Installation - General

A. Each section of pipe, when placed to grade and line, shall have firm bearing on the trench bedding throughout its length.

B. Cutting of pipe shall be done with approved tools and by approved methods suitable for the pipe material.

1. Pipe cutting methods that produce a smooth, square-cut end without damage to the pipe and that minimize air-borne particles, shall be employed.

2. Pipe cutting shall be performed using the recommendations of the manufacturer of the type of the pipe materials being cut and according to the best trade practices.

3. When cutting pipe, care shall be taken to prevent damage to the interior and exterior surfaces.

4. Damage to either shall be cause for rejection of a complete section of pipe.

C. During the preparation of the pipe bedding and until the trench has been satisfactorily backfilled, the trench shall be kept free of water.

1. A dewatering system, in accordance with Section 31 2319, Dewatering, shall be provided and maintained by CONTRACTOR. Dewatering system shall remain in operation until the trench is backfilled.

D. Backfill shall be as indicated on the Plans and as specified in Section 31 2333, Trenching and Backfilling.

3.05 Pipe Laying

A. Installation of pipe shall conform to ASTM C12, and as recommended by the pipe manufacturer.

B. Pipe shall be protected during handling against impact shocks and free fall. Hooks shall not be permitted to come in contact with premolded joint surfaces.

C. Pipes having pre-molded joint rings or attached couplings shall be handled so that no weight, including the weight of the pipe itself, will bear on or be supported by the jointing material. Care shall be taken to avoid dragging any pipe on the ground or allowing it to be damaged by contact with gravel, crushed stone, or other hard objects.

D. Pipe shall be laid to the line and grade called for on the Plans.

1. Each pipe as laid, shall be checked by CONTRACTOR with line and grade pole or laser system to insure that this result is obtained.

2. When employing a laser system, CONTRACTOR shall have an independent and alternate means of checking the line and grade.

3. Finished work shall be straight and shall be sighted through between manholes.

E. Construction shall begin at the outlet end and proceed upgrade with spigot ends pointing in direction of flow. Bell holes shall be excavated so that the full length of the barrel will bear uniformly on the bedding material.

F. Lubricants, primers or adhesives as recommended by the pipe or joint manufacturer shall be used immediately prior to jointing.

G. Pipe shall be centered in the bells or grooves and pushed tight together to form a smooth and continuous invert. After laying of pipe, care shall be taken so as not to disturb its line and grade. Pipes found off grade or out of line shall be re-laid properly by CONTRACTOR.

H. Mechanical means shall be used for pulling home pipe where manual means will not result in pushing and holding the pipe home. Mechanical means shall consist of a cable placed inside of the pipe with a suitable winch, jack, or come along for pulling the pipe home and holding the pipe in position.

3.06 Pipe Bedding

A. After the bottom of trench has been excavated the pipe bedding material will be installed in accordance with Section 31 2333, Trenching and Backfilling. Pipe shall then be installed strictly in accordance with the manufacturer's recommendations. After the pipe is laid, the bedding shall be continued above the pipe as specified in Section 31 2333, Trenching and Backfilling. Particular care shall be taken to assure filling and tamping spaces under, around and above the top of the pipe.

B. A continuous and uniform bedding as specified in Section 31 2333, Trenching and Backfilling, shall be provided in the trench for buried pipe.

3.07 Underdrains

A. Pipe shall be laid in close conformity with the lines or grades shown on the Plans or established by ENGINEER. The upgrade ends of all underdrains shall be closed with suitable plugs to prevent entry of soil or other foreign material.

B. Perforated pipe shall be laid with the perforations down.

C. Underdrains shall be bedded in MDOT open graded drainage course material. Bedding shall have a minimum thickness beneath the pipe of four (4) inches (100 mm), a minimum width of six (6) inches (150 mm) on each side of the pipe and extend to a level not less than 12 inches (300 mm) above the top of the pipe.

D. Bedding shall be placed equally on both sides of the underdrain at the same time. Staking or other methods to restrain the pipe may be necessary during the backfilling operation to maintain the line and grade of the underdrain.

3.08 Field Quality Control

A. After all the pipe and structures have been laid, constructed and backfilled, the system shall be final inspected. The sewer system shall be ready for the final inspection within two (2) weeks after the completion of each 2,000-foot (600 m) section of sewer installed.

B. Final inspection shall consist of a visible and audible check of the sewers and structures to ascertain that the steps have been placed, lift holes jointed, the channeling of the manhole bottoms completed, visible or audible leaks stopped, pipe has been placed straight and true to the proper slopes and elevations, the required brick courses for adjustment, the frame and cover properly installed, the required end section installed, trenches and structures backfilled in a workmanlike manner and that the system has been thoroughly cleaned.

C. The final inspection shall be considered complete when all the repairs have been made.

3.09 Remove Culverts

A. Excavate and remove culverts where indicated on the plans. Backfill the completed work as specified under "Backfilling Trenches" in Section 31 2333, Trenching and Backfilling.

3.10 Remove Structure

A. Excavate and remove structures where indicated on the plans. Bulkhead the ends of any sewers remaining in place. Backfill the completed work as specified under "Backfilling Trenches" in Section 31 2333, Trenching and Backfilling. Removal of existing storm structures is incidental to the project if a new structure or sewer is being constructed in essentially the same location.

End of Section

Section 33 4400
Storm Utility Water Drains

Part 1 General

1.01 Scope of Work

A. This Section includes open drain construction complete with excavation and disposal of excavated material, backfilling and grading of abandoned open drains, maintaining overland drainage and cleanout of existing open and enclosed drains.

1.02 Related Work Specified Elsewhere

A. Section 01 2200: Unit Prices
B. Section 01 5713: Temporary Erosion and Sediment Control
C. Section 01 8900: Site Construction Performance Requirements
D. Section 31 1100: Clearing and Grubbing
E. Section 31 2200: Grading
F. Section 31 3500: Slope Protection
G. Section 32 9219: Seeding
H. Section 33 4100: Storm Utility Drainage Piping

1.03 Allowable Tolerances

A. Areas to be excavated shall be trimmed and dressed to conform to the lines, grades and cross sections shown on the Plans within the following tolerances:

B. Finished surface elevation of all channel bottoms shall be within ± 1-inch (25 mm) of Plan elevation.

C. Finished surface elevation of all channel areas, other than the channel bottoms, shall be within plus or minus two (2) inches (50 mm) of Plan elevation.

1.04 Job Conditions

A. Trees, shrubs and other types of vegetation not within the Work limits designated on the Plans or by ENGINEER shall be carefully protected from damage or injury during the entire drain construction operation.

B. Trees, shrubs, or other types of vegetation not designated to be removed but which are damaged by CONTRACTOR's operation shall be replaced by CONTRACTOR. Costs incurred shall be incidental to the open drain construction operation.

C. Existing buildings, fences, culverts, drain tile, utility poles, overhead lines, underground conduits, underground cables, sewers, structures, or other types of improvements within the drain right-of-way limits not designated on the Plans to be removed, shall be carefully protected from damage during the drain construction operation.

D. Existing structures or improvements not designated to be removed, but which damaged by CONTRACTOR's operation, shall be repaired or replaced by CONTRACTOR. Costs incurred shall be incidental to the drain construction operation.

Part 2 Products (Not Used)

Part 3 Execution

3.01 Performance - General

A. Construction shall begin at the outlet end of the open drain and proceed upstream, unless otherwise authorized by ENGINEER.

3.02 Disposal Areas

A. If disposal areas for unsuitable materials are not specified on the Plans, CONTRACTOR, at his expense, shall furnish and maintain a disposal area. Spoil disposal areas that may be designated on the Plans are not for disposal of unsuitable materials unless otherwise specified on the Plans or as determined by ENGINEER.

3.03 Clearing and Grubbing

A. Drain right-of-way and spoil deposit areas, designated on the Plans or as determined by ENGINEER, shall be cleared and grubbed prior to actual excavation of the open drain as provided for in Section 31 1100, Clearing and Grubbing.

B. Along the open drain, the clearing and grubbing Work shall precede the excavation operation by at least a 1/2 mile (800 m).

C. Clearing and grubbing shall consist of preparing an area for excavation or fill by removing unsuitable materials and vegetation which interferes with the proposed Work, and shall include the preservation from injury or defacement of material ground cover, trees, and other vegetation and improvements designated to remain.

D. Clearing and grubbing operations, including removal and disposal of unsuitable materials, shall be considered incidental to the Project and shall be considered part of the excavation pay item.

3.04 Excavation

A. Open drains shall be excavated to the lines, grades, dimensions and cross sections specified on the Plans.

B. Excavation shall consist of the removal and disposal of all materials necessary to construct the open drain. Material removed shall be placed in suitably prepared spoil disposal areas. If spoil disposal areas are not specified on the Plans, CONTRACTOR, at his expense, shall provide and maintain a disposal area. Spoils in agricultural and wooded areas shall be leveled along the drain. Spoils in lawn areas shall be hauled away to location determined by the CONTRACTOR.

C. Construction, excavation and disposal operations shall be performed in such a manner and sequence that adequate drainage will be maintained at all times.

D. When stones, boulders, or rocks are encountered during the excavation, they shall be removed and disposed of as unsuitable material. After the stones, boulders, or rocks have been removed, any holes or voids created, which continue below the Plan grade, shall be backfilled with approved materials, and compacted, to the satisfaction of ENGINEER.

E. When ledge rock is encountered, CONTRACTOR shall immediately cease operations and notify ENGINEER of his findings.

F. Costs incurred for removal and disposal of stones, boulders, and rocks in addition to backfilling and compaction shall be at CONTRACTOR's expense.

G. Blasting will not be permitted, unless otherwise specified on the Plans or at the approval of ENGINEER.

3.05 Grading Requirements

A. Channel areas receiving a slope protection as specified on the Plans, shall be excavated to a depth sufficient to provide for installation of the protective materials, meeting the finished surface grade tolerances.

B. Additional excavation necessary to provide for slope protection shall be considered incidental to the cost of the Project.

C. In areas where CONTRACTOR over excavates, the over excavation area shall be backfilled with approved materials and compacted at CONTRACTOR's expense.

D. Grades shall be finished in a condition satisfactory to ENGINEER immediately prior to the placement of slope protective materials.

E. Trimming and finishing the earth grade will be considered incidental to the excavation.

3.06 Soil Erosion and Sedimentation Control

A. CONTRACTOR, at his expense, shall provide, maintain and remove such temporary and/or permanent soil erosion and sedimentation control measures as specified on the Plans or as determined by ENGINEER.

B. Measures shall prevent surface runoff from carrying excavated materials into the drain, to reduce erosion of the slopes, and to prevent silting in of drain downstream of the Work.

C. Measures should include provisions to reduce erosions by the wind of areas stripped of vegetation, including material stockpiles.

D. Comply with requirements of Section 01 5713, Temporary Erosion and Sediment Control.

3.07 Slope Stabilization

A. After completion of the grading operation, and prior to the placing on any protective covering, ENGINEER shall inspect the slopes for any signs of internal water movement as indicated by seepage and soil slippage, and for the existence of unstable slope conditions.

B. CONTRACTOR shall take the necessary measures to stabilize the slopes including removal and disposal of unsuitable or unstable materials, the backfilling with approved material, and compaction. Cost incurred for slope stabilization shall be considered incidental to the excavation.

3.08 Spoil Disposal Areas

A. Excavation, free from unsuitable materials shall be deposited in approved spoil disposal areas, as specified in Section 01 8900, Site Construction Performance Requirements.

B. Depositing of spoil materials in existing watercourses or drains shall be prohibited, unless otherwise specified on the Plans. Spoil material shall be deposited, compacted and graded to provide drainage. Swales shall be constructed when necessary to provide positive drainage to drain.

3.09 Culverts

A. New culverts or culverts to be relayed as indicated on the Plans shall be installed as required in Section 33 4100, Storm Utility Drainage Piping. Special care shall be taken in removing, salvaging, storing, handling or placing culverts so that they are not damaged.

B. Only culverts meeting the approval of ENGINEER may be relayed.

C. Culverts having the protective coating scraped or otherwise damaged, shall be repaired by CONTRACTOR, at his expense, to the satisfaction of ENGINEER.

D. Corrugated steel pipe, when specified, will be layed with the outside laps of circumferential joints pointing upstream and with longitudinal laps at the sides at about the vertical mid-height of the culvert.

E. When existing culverts are to be relayed, the inverts shall be rotated 180 degrees.

F. CONTRACTOR shall make arrangements with the land owner and/or land user for the removal of culverts. CONTRACTOR shall provide ENGINEER with a copy of the arrangements made, bearing the signature of the landowner and/or land user.

G. Culverts removed and not relayed shall be disposed of by CONTRACTOR, at his expense.

H. Culverts which are removed shall be relayed, when specified, at the culvert crossing from which they were removed. Salvaged culverts shall not be used at any other location, unless otherwise authorized by ENGINEER.

3.10 Tile Outlets

A. The OWNER shall send letter to the property owners requesting that they mark any existing field tile.

B. CONTRACTOR shall contact existing landowners that indicate that there is existing tile and land users to locate and flag the location of all known tile outlets to be protected during the excavating operation.

C. CONTRACTOR shall not proceed with the Work until the tile outlet locations have been so marked.

D. CONTRACTOR will be responsible for leaving the tile outlets in good repair and in working order.

E. It may become necessary to shorten the length of existing tile outlets and recess them back into the newly shaped slope. This Work shall be considered incidental to the Project.

F. When called for on the Plans new outlets shall be installed and shall conform to the materials specified. Existing rodent guards shall be relocated by CONTRACTOR, and this Work shall be considered incidental to the Project.

G. When it is apparent a tile outlet is carrying human or animal waste material from a home or barnyard area, CONTRACTOR will request the County Health Department approval before reconnecting the outlet to the drain.

3.11 Bridges

A. Existing bridges shall be removed and disposed of, or shall be removed, salvaged and reinstalled, as specified on the Plans. Care shall be taken when removing, salvaging, storing, handling and installing the existing bridge.

B. CONTRACTOR shall make arrangements with the landowner and/or land user for the removal of the bridge. CONTRACTOR shall provide ENGINEER with a copy of the arrangements made, bearing the signature of the landowner and/or land user.

3.12 Cleanout of Drain

A. Cleanout of the existing drain shall include the clearing and grubbing of all trees, brush, stumps and other vegetation in accordance with Section 31 1100, Clearing and Grubbing. Excavation shall be in accordance with Article 3.04 of this Section.

B. Enclosed drain cleanout shall include the complete removal and disposal of all sediment, silt, dirt, debris and other miscellaneous items to the bottom of the culvert or to the elevation shown on the plans, or as determined by ENGINEER.

C. At the completion of the cleanout CONTRACTOR shall restore areas disturbed and seed.

End of Section