CITY OF ANN ARBOR
INVITATION TO BID

Veterans Memorial Park Skatepark Lighting

ITB No. 4707

Due Date: Wednesday, January 26, 2022 at 10:00 AM (Local Time)

Parks and Recreation Services
Community Services Unit

Issued By:

City of Ann Arbor
Procurement Unit
301 E. Huron Street
Ann Arbor, MI 48104

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ATTACHMENTS

DRAWINGS (separate file)

NOTICE OF PRE-BID CONFERENCE

A pre-bid conference for this project will not be held.

INSTRUCTIONS TO BIDDERS

General

Work to be done under this Contract is generally described through the detailed specifications and must be completed fully in accordance with the contract documents. All work to be done under this Contract is located in or near the City of Ann Arbor.

Any Bid which does not conform fully to these instructions may be rejected.

Preparation of Bids

Bids should be prepared providing a straight-forward, concise description of the Bidder's ability to meet the requirements of the ITB. Bids shall be written in ink or typewritten. No erasures are permitted. Mistakes may be crossed out and corrected and must be initialed and dated in ink by the person signing the Bid.

Bids must be submitted on the "Bid Forms" provided with each blank properly filled in. If forms are not fully completed it may disqualify the bid. No alternative bid will be considered unless alternative bids are specifically requested. If alternatives are requested, any deviation from the specification must be fully described, in detail on the "Alternate" section of Bid form.

Each person signing the Bid certifies that he/she is the person in the Bidder's firm/organization responsible for the decision as to the fees being offered in the Bid and has not and will not participated in any action contrary to the terms of this provision.

Questions or Clarifications / Designated City Contacts

All questions regarding this ITB shall be submitted via email. Emailed questions and inquires will be accepted from any and all prospective Bidders in accordance with the terms and conditions of the ITB.

All questions shall be due on or before **Wednesday, January 12, 2022** and should be addressed as follows:

Specification/Scope of Work questions emailed to christopher.elenbaas@stantec.com
Bid Process and Compliance questions emailed to cspencer@a2gov.org

Any error, omissions or discrepancies in the specification discovered by a prospective contractor and/or service provider shall be brought to the attention of Chris Elenbaas at christopher.elenbaas@stantec.com after discovery as possible. Further, the contractor and/or service provide shall not be allowed to take advantage of errors, omissions or discrepancies in the specifications.

Addenda

If it becomes necessary to revise any part of the ITB, notice of the Addendum will be posted to Michigan Inter-governmental Trade Network (MITN) www.mitn.info and/or City of Ann Arbor web site www.A2gov.org for all parties to download.

Each Bidder must in its Bid, to avoid any miscommunications, acknowledge all addenda which it has received; but the failure of a Bidder to receive, or acknowledge receipt of; any addenda shall

not relieve the Bidder of the responsibility for complying with the terms thereof.

The City will not be bound by oral responses to inquiries or written responses other than written addenda.

Bid Submission

All Bids are due and must be delivered to the City of Ann Arbor Procurement Unit on or before **Wednesday, January 26, 2022 at 10:00 AM (local time).** Bids submitted late or via oral, telephonic, telegraphic, electronic mail or facsimile **will not** be considered or accepted.

Each Bidder must submit one (1) original Bid and two (2) Bid copies in a sealed envelope clearly marked: **ITB No. 4707, Veterans Memorial Park Skatepark Lighting.**

Bids must be addressed and delivered to:

City of Ann Arbor
Procurement Unit,
c/o Customer Services, 1st Floor
301 East Huron Street
Ann Arbor, MI 48104

All Bids received on or before the Due Date will be publicly opened and recorded immediately. No immediate decisions are rendered.

The following forms provided within this ITB Document should be included in submitted bids.

- **City of Ann Arbor Prevailing Wage Declaration of Compliance**
- **City of Ann Arbor Living Wage Ordinance Declaration of Compliance**
- **Vendor Conflict of Interest Disclosure Form**
- **City of Ann Arbor Non-Discrimination Ordinance Declaration of Compliance**

Bids that fail to provide these forms listed above upon bid opening may be rejected as non-responsive and may not be considered for award.

Hand delivered bids may be dropped off in the Purchasing drop box located in the Ann Street (north) vestibule/entrance of City Hall which is accessible to the public at all hours. The City will not be liable to any Bidder for any unforeseen circumstances, delivery or postal delays. Postmarking to the Due Date will not substitute for receipt of the Bid. Each Bidder is responsible for submission of their Bid.

Additional time for submission of bids past the stated due date and time will not be granted to a single Bidder; however, additional time may be granted to all Bidders when the City determines in its sole discretion that circumstances warrant it.

Award

The City intends to award a Contract(s) to the lowest responsible Bidder(s) Bid. On multi-divisional contracts, separate divisions may be awarded to separate Bidders. The City may also utilize alternatives offered in the Bid Forms, if any, to determine the lowest responsible Bidder on each division, and award multiple divisions to a single Bidder, so that the lowest total cost is achieved for the City. For unit price bids, the Contract will be awarded based upon the unit prices

and the lump sum prices stated by the bidder for the work items specified in the bid documents, with consideration given to any alternates selected by the City. If the City determines that the unit price for any item is materially different for the work item bid than either other bidders or the general market, the City, in its sole discretion, in addition to any other right it may have, may reject the bid as not responsible or non-conforming.

The acceptability of major subcontractors will be considered in determining if a Bidder is responsible. In comparing Bids, the City will give consideration to alternate Bids for items listed in the bid forms. All key staff and subcontractors are subject to the approval by the City.

Official Documents

The City of Ann Arbor officially distributes bid documents from the Procurement Unit or through the Michigan Intergovernmental Trade Network (MITN). Copies of the bid documents obtained from any other source are not Official copies. Addenda and other bid information will only be posted to these official distribution sites. If you obtained City of Ann Arbor Bid documents from other sources, it is recommended that you register on www.MITN.info and obtain an official Bid. Bidders do not need to be shown on the plan holders list provided by MITN to be considered an official plan holder.

Bid Security

Each bid must be accompanied by a certified check, or Bid Bond by a surety licensed and authorized to do business within the State of Michigan, in the amount of 5% of the total of the bid price.

Withdrawal of Bids

After the time of opening, no Bid may be withdrawn for the period of ninety (90) days

Contract Time

Time is of the essence in the performance of the work under this Contract. The available time for work under this Contract is indicated on page C-2, Article III of the Contract. If these time requirements can not be met, the Bidder must stipulate on Bid Form Section 3 - Time Alternate its schedule for performance of the work. Consideration will be given to time in evaluating bids.

Liquidated Damages

A liquidated damages clause, as given on page C-2, Article III of the Contract, provides that the Contractor shall pay the City as liquidated damages, and not as a penalty, a sum certain per day for each and every day that the Contractor may be in default of completion of the specified work, within the time(s) stated in the Contract, or written extensions.

Liquidated damages clauses, as given in the General Conditions, provide further that the City shall be entitled to impose and recover liquidated damages for breach of the obligations under Chapter 112 of the City Code.

The liquidated damages are for the non-quantifiable aspects of any of the previously identified events and do not cover actual damages that can be shown or quantified nor are they intended to preclude recovery of actual damages in addition to the recovery of liquidated damages.

Human Rights Information

All contractors proposing to do business with the City shall satisfy the contract compliance administrative policy adopted by the City Administrator in accordance with the Section 9:158 of the Ann Arbor City Code. Breach of the obligation not to discriminate as outlined in Section 5, beginning at page GC-2 shall be a material breach of the contract. Contractors are required to post a copy of Ann Arbor's Non-Discrimination Ordinance attached at all work locations where its employees provide services under a contract with the City.

Wage Requirements

Section 4, beginning at page GC-1, outlines the requirements for payment of prevailing wages and for payment of a "living wage" to employees providing service to the City under this contract. The successful bidder and its subcontractors must comply with all applicable requirements and provide proof of compliance.

Pursuant to Resolution R-16-469 all public improvement contractors are subject to prevailing wage and will be required to provide to the City payroll records sufficient to demonstrate compliance with the prevailing wage requirements. Use of the Sample Certified Payroll form provided in the Appendix section or a City-approved equivalent will be required along with wage rate interviews.

For laborers whose wage level are subject to federal, state and/or local prevailing wage law the appropriate Davis-Bacon wage rate classification is identified based upon the work including within this contract. **The wage determination(s) current on the date 10 days before bids are due shall apply to this contract.** The U.S. Department of Labor (DOL) has provided explanations to assist with classification in the following resource link: beta.SAM.gov.

For the purposes of this ITB the Construction Type of Building will apply.

Conflict Of Interest Disclosure

The City of Ann Arbor Purchasing Policy requires that prospective Vendors complete a Conflict of Interest Disclosure form. A contract may not be awarded to the selected Vendor unless and until the Procurement Unit and the City Administrator have reviewed the Disclosure form and determined that no conflict exists under applicable federal, state, or local law or administrative regulation. Not every relationship or situation disclosed on the Disclosure Form may be a disqualifying conflict. Depending on applicable law and regulations, some contracts may awarded on the recommendation of the City Administrator after full disclosure, where such action is allowed by law, if demonstrated competitive pricing exists and/or it is determined the award is in the best interest of the City. A copy of the Vendor Conflict of Interest Disclosure Form is attached.

Major Subcontractors

The Bidder shall identify on Bid Form Section 4 each major subcontractor it expects to engage for this Contract if the work to be subcontracted is 15% or more of the bid sum or over $50,000, whichever is less. The Bidder also shall identify the work to be subcontracted to each major subcontractor. The Bidder shall not change or replace a subcontractor without approval by the City.

Debarment

Submission of a Bid in response to this ITB is certification that the Bidder is not currently debarred,

suspended, proposed for debarment, and declared ineligible or voluntarily excluded from participation in this transaction by any State or Federal departments or agency. Submission is also agreement that the City will be notified of any changes in this status.

Disclosures

After bids are opened, all information in a submitter's bid is subjected to disclosure under the provisions of Michigan Public Act No. 442 of 1976, as amended (MCL 15.231 et seq.) known as the "Freedom of Information Act." The Freedom of Information Act also provides for the complete disclosure of contracts and attachments thereto except where specifically exempted.

Bid Protest

All Bid protests must be in writing and filed with the Purchasing Agent within five (5) business days of the award action. The bidder must clearly state the reasons for the protest. If a bidder contacts a City Service Area/Unit and indicates a desire to protest an award, the Service Area/Unit shall refer the bidder to the Purchasing Agent. The Purchasing Agent will provide the bidder with the appropriate instructions for filing the protest. The protest shall be reviewed by the City Administrator or designee whose decision shall be final.

Any inquiries or requests regarding this procurement should be only submitted in writing to the Designated City Contacts provided herein. Attempts by any prospective bidder to initiate contact with anyone other than the Designated City Contacts provided herein that the bidder believes can influence the procurement decision, e.g., Elected Officials, City Administrator, Selection Committee Members, Appointed Committee Members, etc., may lead to immediate elimination from further consideration.

Cost Liability

The City of Ann Arbor assumes no responsibility or liability for costs incurred by the Bidder prior to the execution of a contract with the City. By submitting a bid, a bidder agrees to bear all costs incurred or related to the preparation, submission and selection process for the bid.

Reservation of Rights

The City of Ann Arbor reserves the right to accept any bid or alternative bid proposed in whole or in part, to reject any or all bids or alternatives bids in whole or in part and to waive irregularity and/or informalities in any bid and to make the award in any manner deemed in the best interest of the City.

Idlefree Ordinance

The City of Ann Arbor adopted an idling reduction Ordinance that went into effect July 1, 2017. The full text of the ordinance (including exemptions) can be found at: www.a2gov.org/idlefree.

Under the ordinance, No Operator of a Commercial Vehicle shall cause or permit the Commercial Vehicle to Idle:

(a) For any period of time while the Commercial Vehicle is unoccupied; or

(b) For more than 5 minutes in any 60-minute period while the Commercial Vehicle is occupied.

In addition, generators and other internal combustion engines are covered

(1) Excluding Motor Vehicle engines, no internal combustion engine shall be operated except

when it is providing power or electrical energy to equipment or a tool that is actively in use.

Environmental Commitment

The City of Ann Arbor recognizes its responsibility to minimize negative impacts on human health and the environment while supporting a vibrant community and economy. The City further recognizes that the products and services the City buys have inherent environmental and economic impacts and that the City should make procurement decisions that embody, promote, and encourage the City's commitment to the environment.

The City encourages potential vendors to bring forward emerging and progressive products and services that are best suited to the City's environmental principles.

INVITATION TO BID

City of Ann Arbor
Guy C. Larcom Municipal Building
Ann Arbor, Michigan 48107

Ladies and Gentlemen:

The undersigned, as Bidder, declares that this Bid is made in good faith, without fraud or collusion with any person or persons bidding on the same Contract; that this Bidder has carefully read and examined the bid documents, including City Nondiscrimination requirements and Declaration of Compliance Form, Living Wage requirements and Declaration of Compliance Form, Prevailing Wage requirements and Declaration of Compliance Form, Vendor Conflict of Interest Form, Notice of Pre-Bid Conference, Instructions to Bidders, Bid, Bid Forms, Contract, Bond Forms, General Conditions, Standard Specifications, Detailed Specifications, all Addenda, and the Plans (if applicable) and understands them. The Bidder declares that it conducted a full investigation at the site and of the work proposed and is fully informed as to the nature of the work and the conditions relating to the work's performance. The Bidder also declares that it has extensive experience in successfully completing projects similar to this one.

The Bidder acknowledges that it has not received or relied upon any representations or warrants of any nature whatsoever from the City of Ann Arbor, its agents or employees, and that this Bid is based solely upon the Bidder's own independent business judgment.

The undersigned proposes to perform all work shown on the plans or described in the bid documents, including any addenda issued, and to furnish all necessary machinery, tools, apparatus, and other means of construction to do all the work, furnish all the materials, and complete the work in strict accordance with all terms of the Contract of which this Bid is one part.

In accordance with these bid documents, and Addenda numbered N/A, the undersigned, as Bidder, proposes to perform at the sites in and/or around Ann Arbor, Michigan, all the work included herein for the amounts set forth in the Bid Forms.

The Bidder declares that it has become fully familiar with the liquidated damage clauses for completion times and for compliance with City Code Chapter 112, understands and agrees that the liquidated damages are for the non-quantifiable aspects of non-compliance and do not cover actual damages that may be shown and agrees that if awarded the Contract, all liquidated damage clauses form part of the Contract.

The Bidder declares that it has become fully familiar with the provisions of Chapter 14, Section 1:320 (Prevailing wages) and Chapter 23 (Living Wage) of the Code of the City of Ann Arbor and that it understands and agrees to comply, to the extent applicable to employees providing services to the City under this Contract, with the wage and reporting requirements stated in the City Code provisions cited. Bidder certifies that the statements contained in the City Prevailing Wage and Living Wage Declaration of Compliance Forms are true and correct. Bidder further agrees that the cited provisions of Chapter 14 and Chapter 23 form a part of this Contract.

The Bidder declares that it has become familiar with the City Conflict of Interest Disclosure Form and certifies that the statement contained therein is true and correct.

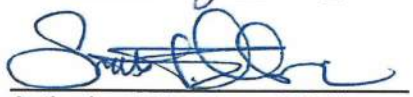
The Bidder encloses a certified check or Bid Bond in the amount of 5% of the total of the Bid Price. The Bidder agrees both to contract for the work and to furnish the necessary Bonds and insurance documentation within 10 days after being notified of the acceptance of the Bid.

If this Bid is accepted by the City and the Bidder fails to contract and furnish the required Bonds and insurance documentation within 10 days after being notified of the acceptance of this Bid, then the Bidder shall be considered to have abandoned the Contract and the certified check or Bid Bond accompanying this Bid shall become due and payable to the City.

If the Bidder enters into the Contract in accordance with this Bid, or if this Bid is rejected, then the accompanying check or Bid Bond shall be returned to the Bidder.

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

SIGNED THIS 24 DAY OF January, 2022

Rauhorn Electric, Inc.	
Bidder's Name	Authorized Signature of Bidder
14140 33 Mile Rd, Bruce Twp., Mi 48065	Scott Finkbeiner - Vice President
Official Address	(Print Name of Signer Above)
586-992-0400	sfinkbeiner@rauhornelec.com
Telephone Number	Email Address for Award Notice

LEGAL STATUS OF BIDDER

(The Bidder shall fill out the appropriate form and strike out the other three.)

Bidder declares that it is:

* A corporation organized and doing business under the laws of the State of Michigan, for whom Scott Finkbeiner, bearing the office title of Vice President, whose signature is affixed to this Bid, is authorized to execute contracts.

NOTE: If not incorporated in Michigan, please attach the corporation's Certificate of Authority

• A limited liability company doing business under the laws of the State of _____, whom _____ bearing the title of _____ whose signature is affixed to this proposal, is authorized to execute contract on behalf of the LLC.

* A partnership, organized under the laws of the state of _____ and filed in the county of _____, whose members are (list all members and the street and mailing address of each) (attach separate sheet if necessary):

_____

_____

_____

_____

_____

* An individual, whose signature with address, is affixed to this Bid: __ _____ (initial here)

Authorized Official

_____ **Date** January 24th, 2022

(Print) Name Scott Finkbeiner Title Vice President

Company: Rauhorn Electric, Inc.

Address: 14140 33 Mile Rd, Bruce Twp, Mi 48065

Contact Phone (586) 992-0400 Fax ( ) N/A

Email sfinkbeiner@rauhornelec.com

BID FORM

Section 1 – Schedule of Prices

Company: Rauhorn Electric, Inc.

Project: **ITB No. 4707, Veterans Memorial Park Skatepark Lighting**

Notes:

1. Bidders shall provide a Total Price for either the Base Bid, Alternate Bid, or both.
2. The City may elect to award the lowest responsible bid for either the Base Bid or the Alternate Bid and the selection of the Base bid or Alternate bid will not be based solely on price.

Base Bid – Flood Lighting

For the entire work outlined in these documents for the Veterans Memorial Park Skatepark Lighting – Base Bid with Flood Lighting System, complete as specified, using equipment and materials only of the type and manufacturers where specifically named.

Three Hundred Thirty-Five Thousand, Six Hundred & Twenty Two Dollars. ($ 335,622.00)

Alternate Bid – Area Lighting

For the entire work outlined in these documents for the Veterans Memorial Park Skatepark Lighting – Alternate Bid with Area Lighting System, complete as specified, using equipment and materials only of the type and manufacturers where specifically named.

Two Hundred & Sixty-Nine Thousand, Nine Hundred & Fifty-five Dollars. ($ 269,955.00)

BID FORM

Section 2 – Material, Equipment and Environmental Alternates

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

If the Contractor wishes to quote alternate items for consideration by the City, it may do so under this Section. A complete description of the item and the proposed price differential must be provided. Unless approved at the time of award, substitutions where items are specifically named will be considered only as a negotiated change in Contract Sum.

If an environmental alternative is bid the City strongly encourages bidders to provide recent examples of product testing and previous successful use for the City to properly evaluate the environmental alternative. Testing data from independent accredited organizations are strongly preferred.

Item Number	Description	Add/Deduct Amount
N/A		

If the Bidder does not suggest any material or equipment alternate, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT propose any material or equipment alternate under the Contract.

Signature of Authorized Representative of Bidder _____ Date 1/24/22

BID FORM

Section 3 - Time Alternate

If the Bidder takes exception to the time stipulated in Article III of the Contract, Time of Completion, page C-2, it is requested to stipulate below its proposed time for performance of the work. Consideration will be given to time in evaluating bids.

N/A

If the Bidder does not suggest any time alternate, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT propose any time alternate under the Contract.

Signature of Authorized Representative of Bidder _____ Date 1/24/22

BID FORM

Section 4 - Major Subcontractors

For purposes of this Contract, a Subcontractor is anyone (other than the Contractor) who performs work (other than or in addition to the furnishing of materials, plans or equipment) at or about the construction site, directly or indirectly for or on behalf of the Contractor (and whether or not in privity of Contract with the Contractor), but shall not include any individual who furnishes merely the individual's own personal labor or services.

Contractor agrees that all subcontracts entered into by the Contractor shall contain similar wage provision to Section 4 of the General Conditions covering subcontractor's employees who perform work on this contract.

For the work outlined in these documents the Bidder expects to engage the following major subcontractors to perform the work identified:

Subcontractor (Name and Address)	Work	Amount
N/A		

If the Bidder does not expect to engage any major subcontractor, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT expect to engage any major subcontractor to perform work under the Contract.

Signature of Authorized Representative of Bidder _____ Date 1/24/22

BID FORM

Section 5 – References

Include a minimum of 3 references from similar projects completed within the past 5 years.

[Refer also to Instructions to Bidders for additional requirements, if any]

1) Schoolcraft College Soccer Field Lighting — Project Name
$105,922.00 — Cost
6/7/2017 — Date Constructed

Steven J. Robbins — Contact Name
248-334-2000 — Phone Number

2) Eastern Michigan Football Stadium — Project Name
$91,019.20 — Cost
12/7/2017 — Date Constructed

Chris Longeream — Contact Name
734-732-3788 — Phone Number

3) Retrofit Flushing Schools Sports Field Lighting — Project Name
$65,955.00 — Cost
8/21/2018 — Date Constructed

Michael Foltyn — Contact Name
313-348-3788 — Phone Number

BID FORM

Section 6 – Contractor Information and Responsible Contractor Criteria

Backup documentation may be requested at the sole discretion of the City to validate all of the responses provided herein by bidders. False statements by bidders to any of the criteria provided herein will result in the bid being considered non-responsive and will not be considered for award.

Failure to provide responses to all questions may result in being deemed non-responsive.

Attach additional pages as needed if space below is insufficient.

Pursuant to Sec 1:312(20) of the City Code which sets forth requirements of a responsible bidder, Bidder is required to submit the following:

1. Organization Name: Rauhorn Electric, Inc.

Social Security or Federal Employer I.D. #: 38-2322700

Address: 14140 33 Mile Rd

City: Bruce Twp. State: Michigan Zip: 48065

Type of Organization (circle one below):

Individual Partnership (Corporation) Joint Venture Other

If "Other" please provide details on the organization:

N/A

Year organization established: 1980

2. Current owners/principals/members/managing members/partners of the organization:

Anthony Rau - Owner/President & Scott Finkbeiner - Vice President

3. Assumed Names, "doing business as" d/b/a, and/or former organization names(s), if applicable: N/A

Explanation of any business name changes:

N/A

4. If applicable, please provide a list of all bidder's litigation and arbitrations currently pending and within the past five years, including an explanation of each (parties, court/forum, legal claims, damages sought, and resolution).

N/A

5. Qualifications of management and supervisory personnel to be assigned by the bidder:

Will be determined upon availability of award.

6. List the state and local licenses and license numbers held by the bidder:

6109210 & 6209457

7. Will all subcontractors, employees and other individuals working on the construction project maintain current applicable licenses required by law for all licensed occupations and professions?

(Yes) No

8. Will contractors, subcontractors, employees, and other individuals working on the construction project be misclassified by bidder as independent contractors in violation of state or federal law?

(Yes) No

9. Submit a statement as to what percentage of your work force resides within the City of Ann Arbor, and what percentage resides in Washtenaw County, Michigan, and the same information for any major subcontractors.

Can be determined by crew availability at time of work start date.

10. Submit documentation as to bidder's employee pay rates (e.g., certified payroll without SSN or personal identifying information, or chart of job titles and pay rates, or other evidence). *Provide upon award/start of work.

11. State whether bidder provides health insurance, pension or other retirement benefits, paid leave (vacation, personal time, sick leave, etc), or other benefits to its employees, and if so, state whether each benefit is provided directly to employees, by payments or contributions to a third-party administered plan, in cash (e.g., fringe benefit portion of prevailing wages), or other manner.

*Office/management staff receives from Rauhorn Electric, Inc. Field staff receives from respected unions.

12. State whether bidder is an equal opportunity employer and does not discriminate in its hiring on the basis of race, sex, pregnancy, age, religion, national origin, marital status, sexual orientation or gender identity, height, weight, or disability.

(Yes) No

13. State whether bidder has Equal Employment Opportunity Programs for minorities, women, veterans, returning citizens, and small businesses, and if so, submit supporting documentation or other evidence of such program(s).

N/A

14. Has bidder had any violations of state, federal, or local laws or regulations, including OSHA or MIOSHA violations, state or federal prevailing wage laws, wage and hour laws, worker's compensation or unemployment compensation laws, rules or regulations, issued to or against the bidder within the past five years?

Yes (No)

If you answered "yes" to the question above, for each violation provide an explanation of the nature of the violation, the agency involved, a violation or reference number, any other individual(s) or party(ies) involved, and the status or outcome and resolution.

15. Does bidder have an existing Fitness for Duty Program (drugs and alcohol testing) of each employee working on the proposed jobsite?

(Yes) No

If you answered "Yes", please submit documentation of the Fitness for Duty Program and what it entails. *REI Drug & Alcohol Policy - please see attached.

16. Submit documents or evidence of any debarment by any federal, state or local governmental unit and/or findings of non-responsibility or non-compliance with respect to any public or private construction project performed by the bidder. *None.

17. Proof of insurance, including certificates of insurance, confirming existence and amount of coverage for liability, property damage, workers compensation, and any other insurances required by the proposed contract documents. *Please see attached.

18. Does bidder have an on-going MIOSHA-approved safety-training program for employees to be used on the proposed job site?

Yes (No)

*Weekly Tool Box Talks completed. MIOSHA Safety Program can be provided if required.

If bidder answered "yes" to the question above, submit documentation of your safety-training program.

19. Does bidder have evidence of worker's compensation Experience Modification Rating ("EMR")?

(Yes) No

EMR = .75

20. Will bidder use masters, journeypersons and apprentices on the project?

(Yes) No

If bidder answered "yes" to the question above, provide the ratio of masters and journeypersons to apprentices for this project.

Ratio:_____

*Ratio can be determined by crew availability at time of work start date.

If bidder answered "no" to the question above, submit documentation regarding the qualifications of each worker who may or will be assigned on the project.

If, yes, Ratio = N/A

21. Can bidder provide documentation that it participates in a Registered Apprenticeship Program (RAP) that is registered with the United States Department of Labor Office of Apprenticeship or by a State Apprenticeship Agency recognized by the Office of Apprenticeship?

(Yes) No

If bidder answered "yes" to the question above, please submit a copy of the program document(s) and evidence of its registration. *Can be provided upon award.

If bidder answered "no" to the question above, please provide details on how you assess the skills and qualifications of any employees who do not have master or journeyperson certification or status, or are not participants in a Registered Apprenticeship Program.

N/A

22. Will bidder comply with all applicable state and federal laws and visa requirements regarding the hiring of non-US citizens, and disclosure of any work visas sought or obtained by the bidder, any of the bidder's subcontractors, or any of the bidder's employees or independent contractors, in order to perform any portion of the project?

Yes No

23. Submit evidence that bidder has financial resources to start up and follow through on the project and to respond to damages in case of default as shown by written verification of bonding capacity equal to or exceeding the amount of the bidders scope of work on the project. The written verification must be submitted by a licensed surety company rated B+ or better in the current A.M. Best Guide and qualified to do business within the State of Michigan, and the same audited financial information for any subcontractor estimated to be paid more than $100,000 related to any portion of the project.

*Audited financial statements can be provided upon award.

24. Submit evidence of a quality assurance program used by the bidder and the results of same on the bidder's previous projects.

*Can be provided upon award.

Administrative Use Only
Contract Date: _____

CONTRACT

THIS CONTRACT is between the CITY OF ANN ARBOR, a Michigan Municipal Corporation, 301 East Huron Street, Ann Arbor, Michigan 48104 ("City") and Rauhorn Electric, Inc.("Contractor") a corporation organized and doing business under the laws of the State of Michigan, 14140 33 Mile Road, Bruce Township, Michigan 48065.

Based upon the mutual promises below, the Contractor and the City agree as follows:

ARTICLE I - Scope of Work

The Contractor agrees to furnish all of the materials, equipment and labor necessary; and to abide by all the duties and responsibilities applicable to it for the project titled **ITB No. 4707, Veterans Memorial Park Skatepark Lighting** in accordance with the requirements and provisions of the following documents, including all written modifications incorporated into any of the documents, all of which are incorporated as part of this Contract:

Non-discrimination and Living Wage Declaration of Compliance Forms (if applicable)
Vendor Conflict of Interest Form
Prevailing Wage Declaration of Compliance Form (if applicable)
Bid Forms
Contract and Exhibits
Bonds
General Conditions
Standard Specifications
Detailed Specifications
Plans
Addenda

ARTICLE II - Definitions

Administering Service Area/Unit means **Community Services Area / Parks and Recreation Unit**

Project means **ITB No. 4707, Veterans Memorial Park Skatepark Lighting**

Supervising Professional means the person acting under the authorization of the manager of the Administering Service Area/Unit. At the time this Contract is executed, the Supervising Professional is: **Hillary Hanzel** whose job title is **Park Planner & Landscape Architect**. If there is any question concerning who the Supervising Professional is, Contractor shall confirm with the manager of the Administering Service Area/Unit.

Contractor's Representative means **Scott Finkbeiner** whose job title is **Vice President**.

ARTICLE III - Time of Completion

(A) The work to be completed under this Contract shall begin immediately on the date specified in the Notice to Proceed issued by the City.

(B) All work for this Contract shall be completed within one hundred eighty (180) consecutive calendar days.

(C) Failure to complete all the work within the time specified above, including any extension granted in writing by the Supervising Professional, shall obligate the Contractor to pay the City, as liquidated damages and not as a penalty, an amount equal to $500 for each calendar day of delay in the completion of all the work. If any liquidated damages are unpaid by the Contractor, the City shall be entitled to deduct these unpaid liquidated damages from the monies due the Contractor.

The liquidated damages are for the non-quantifiable aspects of any of the previously identified events and do not cover actual damages that can be shown or quantified nor are they intended to preclude recovery of actual damages in addition to the recovery of liquidated damages.

ARTICLE IV - The Contract Sum

(A) The City shall pay to the Contractor for the performance of the Contract, the unit prices as given in the Bid Form for the estimated bid total of:

Two Hundred Sixty-Nine Thousand, Nine Hundred Fifty-Five and 00/100 Dollars ($269,955.00)

(B) The amount paid shall be equitably adjusted to cover changes in the work ordered by the Supervising Professional but not required by the Contract Documents. Increases or decreases shall be determined only by written agreement between the City and Contractor.

ARTICLE V - Assignment

This Contract may not be assigned or subcontracted any portion of any right or obligation under this contract without the written consent of the City. Notwithstanding any consent by the City to any assignment, Contractor shall at all times remain bound to all warranties, certifications, indemnifications, promises and performances, however described, as are required of it under this contract unless specifically released from the requirement, in writing, by the City.

ARTICLE VI - Choice of Law

This Contract shall be construed, governed, and enforced in accordance with the laws of the State of Michigan. By executing this Contract, the Contractor and the City agree to venue in a court of appropriate jurisdiction sitting within Washtenaw County for purposes of any action arising under this Contract. The parties stipulate that the venue referenced in this Contract is for convenience and waive any claim of non-convenience.

Whenever possible, each provision of the Contract will be interpreted in a manner as to be effective and valid under applicable law. The prohibition or invalidity, under applicable law, of any provision will not invalidate the remainder of the Contract.

ARTICLE VII - Relationship of the Parties

The parties of the Contract agree that it is not a Contract of employment but is a Contract to accomplish a specific result. Contractor is an independent Contractor performing services for the City. Nothing contained in this Contract shall be deemed to constitute any other relationship between the City and the Contractor.

Contractor certifies that it has no personal or financial interest in the project other than the compensation it is to receive under the Contract. Contractor certifies that it is not, and shall not become, overdue or in default to the City for any Contract, debt, or any other obligation to the City including real or personal property taxes. City shall have the right to set off any such debt against compensation awarded for services under this Contract.

ARTICLE VIII - Notice

All notices given under this Contract shall be in writing, and shall be by personal delivery or by certified mail with return receipt requested to the parties at their respective addresses as specified in the Contract Documents or other address the Contractor may specify in writing. Notice will be deemed given on the date when one of the following first occur: (1) the date of actual receipt; or (2) three days after mailing certified U.S. mail.

ARTICLE IX - Indemnification

To the fullest extent permitted by law, Contractor shall indemnify, defend and hold the City, its officers, employees and agents harmless from all suits, claims, judgments and expenses including attorney's fees resulting or alleged to result, in whole or in part, from any act or omission, which is in any way connected or associated with this Contract, by the Contractor or anyone acting on the Contractor's behalf under this Contract. Contractor shall not be responsible to indemnify the City for losses or damages caused by or resulting from the City's sole negligence. The provisions of this Article shall survive the expiration or earlier termination of this contract for any reason.

ARTICLE X - Entire Agreement

This Contract represents the entire understanding between the City and the Contractor and it supersedes all prior representations, negotiations, agreements, or understandings whether written or oral. Neither party has relied on any prior representations in entering into this Contract. No terms or conditions of either party's invoice, purchase order or other administrative document shall modify the terms and conditions of this Contract, regardless of the other party's failure to object to such form. This Contract shall be binding on and shall inure to the benefit of the parties to this Contract and their permitted successors and permitted assigns and nothing in this Contract, express or implied, is intended to or shall confer on any other person or entity any legal or equitable right, benefit, or remedy of any nature whatsoever under or by reason of this Contract. This Contract may be altered, amended or modified only by written amendment signed by the City and the Contractor.

ARTICLE XI – Electronic Transactions

The City and Contractor agree that signatures on this Contract may be delivered electronically in lieu of an original signature and agree to treat electronic signatures as original signatures that bind them to this Contract. This Contract may be executed and delivered by facsimile and upon such delivery, the facsimile signature will be deemed to have the same effect as if the original signature had been delivered to the other party.

FOR CONTRACTOR

By_____

Its:_____

FOR THE CITY OF ANN ARBOR

By_____
Christopher Taylor, Mayor

By_____
Jacqueline Beaudry, City Clerk

Approved as to substance

By_____

Milton Dohoney Jr
Interim City Administrator

By_____
Derek Delacourt
Community Services Area Administrator

Approved as to form and content

_____
Stephen K. Postema, City Attorney

PERFORMANCE BOND

(1) _____ of _____(referred to as "Principal"), and _____, a corporation duly authorized to do business in the State of Michigan (referred to as "Surety"), are bound to the City of Ann Arbor, Michigan (referred to as "City"), for $ _____, the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by this bond.

(2) The Principal has entered a written Contract with the City entitled _____ _____ _____, for ITB No. _____and this bond is given for that Contract in compliance with Act No. 213 of the Michigan Public Acts of 1963, as amended, being MCL 129.201 et seq.

(3) Whenever the Principal is declared by the City to be in default under the Contract, the Surety may promptly remedy the default or shall promptly:

(a) complete the Contract in accordance with its terms and conditions; or

(b) obtain a bid or bids for submission to the City for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, arrange for a Contract between such bidder and the City, and make available, as work progresses, sufficient funds to pay the cost of completion less the balance of the Contract price; but not exceeding, including other costs and damages for which Surety may be liable hereunder, the amount set forth in paragraph 1.

(4) Surety shall have no obligation to the City if the Principal fully and promptly performs under the Contract.

(5) Surety agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder, or the specifications accompanying it shall in any way affect its obligations on this bond, and waives notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work, or to the specifications.

(6) Principal, Surety, and the City agree that signatures on this bond may be delivered electronically in lieu of an original signature and agree to treat electronic signatures as original signatures that bind them to this bond. This bond may be executed and delivered by facsimile and upon such delivery, the facsimile signature will be deemed to have the same effect as if the original signature had been delivered to the other party.

SIGNED AND SEALED this _____ day of _____, 202_.

_____
(Name of Surety Company)

By _____
(Signature)

Its_____
(Title of Office)

Approved as to form:

_____
Stephen K. Postema, City Attorney

_____
(Name of Principal)

By _____
(Signature)

Its _____
(Title of Office)

Name and address of agent:

_____

_____

_____

LABOR AND MATERIAL BOND

(1) _____

of _____(referred to as "Principal"), and _____, a corporation duly authorized to do business in the State of Michigan, (referred to as "Surety"), are bound to the City of Ann Arbor, Michigan (referred to as "City"), for the use and benefit of claimants as defined in Act 213 of Michigan Public Acts of 1963, as amended, being MCL 129.201 et seq., in the amount of $ _____, for the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by this bond.

(2) The Principal has entered a written Contract with the City entitled _____

_____

_____

____, for ITB No. _____; and this bond is given for that Contract in compliance with Act No. 213 of the Michigan Public Acts of 1963 as amended;

(3) If the Principal fails to promptly and fully repay claimants for labor and material reasonably required under the Contract, the Surety shall pay those claimants.

(4) Surety's obligations shall not exceed the amount stated in paragraph 1, and Surety shall have no obligation if the Principal promptly and fully pays the claimants.

(5) Principal, Surety, and the City agree that signatures on this bond may be delivered electronically in lieu of an original signature and agree to treat electronic signatures as original signatures that bind them to this bond. This bond may be executed and delivered by facsimile and upon such delivery, the facsimile signature will be deemed to have the same effect as if the original signature had been delivered to the other party.

SIGNED AND SEALED this _____ day of _____, 202_

_____
(Name of Surety Company)

By _____
(Signature)

Its _____
(Title of Office)

Approved as to form:

_____
Stephen K. Postema, City Attorney

_____
(Name of Principal)

By _____
(Signature)

Its _____
(Title of Office)

Name and address of agent:

_____

_____

_____

GENERAL CONDITIONS

Section 1 - Execution, Correlation and Intent of Documents

The contract documents shall be signed in 2 copies by the City and the Contractor.

The contract documents are complementary and what is called for by any one shall be binding. The intention of the documents is to include all labor and materials, equipment and transportation necessary for the proper execution of the work. Materials or work described in words which so applied have a well-known technical or trade meaning have the meaning of those recognized standards.

In case of a conflict among the contract documents listed below in any requirement(s), the requirement(s) of the document listed first shall prevail over any conflicting requirement(s) of a document listed later.

(1) Addenda in reverse chronological order; (2) Detailed Specifications; (3) Standard Specifications; (4) Plans; (5) General Conditions; (6) Contract; (7) Bid Forms; (8) Bond Forms; (9) Bid.

Section 2 - Order of Completion

The Contractor shall submit with each invoice, and at other times reasonably requested by the Supervising Professional, schedules showing the order in which the Contractor proposes to carry on the work. They shall include the dates at which the Contractor will start the several parts of the work, the estimated dates of completion of the several parts, and important milestones within the several parts.

Section 3 - Familiarity with Work

The Bidder or its representative shall make personal investigations of the site of the work and of existing structures and shall determine to its own satisfaction the conditions to be encountered, the nature of the ground, the difficulties involved, and all other factors affecting the work proposed under this Contract. The Bidder to whom this Contract is awarded will not be entitled to any additional compensation unless conditions are clearly different from those which could reasonably have been anticipated by a person making diligent and thorough investigation of the site.

The Bidder shall immediately notify the City upon discovery, and in every case prior to submitting its Bid, of every error or omission in the bidding documents that would be identified by a reasonably competent, diligent Bidder. In no case will a Bidder be allowed the benefit of extra compensation or time to complete the work under this Contract for extra expenses or time spent as a result of the error or omission.

Section 4 - Wage Requirements

Under this Contract, the Contractor shall conform to Chapter 14 of Title I of the Code of the City of Ann Arbor as amended; which in part states "...that all craftsmen, mechanics and laborers employed directly on the site in connection with said improvements, including said employees of

subcontractors, shall receive the prevailing wage for the corresponding classes of craftsmen, mechanics and laborers, as determined by statistics for the Ann Arbor area compiled by the United States Department of Labor. At the request of the City, any contractor or subcontractor shall provide satisfactory proof of compliance with the contract provisions required by the Section.

Pursuant to Resolution R-16-469 all public improvement contractors are subject to prevailing wage and will be required to provide to the City payroll records sufficient to demonstrate compliance with the prevailing wage requirements. A sample Prevailing Wage Form is provided in the Appendix herein for reference as to what will be expected from contractors. Use of the Prevailing Wage Form provided in the Appendix section or a City-approved equivalent will be required along with wage rate interviews.

Where the Contract and the Ann Arbor City Ordinance are silent as to definitions of terms required in determining contract compliance with regard to prevailing wages, the definitions provided in the Davis-Bacon Act as amended (40 U.S.C. 278-a to 276-a-7) for the terms shall be used.

If the Contractor is a "covered employer" as defined in Chapter 23 of the Ann Arbor City Code, the Contractor agrees to comply with the living wage provisions of Chapter 23 of the Ann Arbor City Code. The Contractor agrees to pay those employees providing Services to the City under this Contract a "living wage," as defined in Section 1:815 of the Ann Arbor City Code, as adjusted in accordance with Section 1:815(3); to post a notice approved by the City of the applicability of Chapter 23 in every location in which regular or contract employees providing services under this Contract are working; to maintain records of compliance; if requested by the City, to provide documentation to verify compliance; to take no action that would reduce the compensation, wages, fringe benefits, or leave available to any employee or person contracted for employment in order to pay the living wage required by Section 1:815; and otherwise to comply with the requirements of Chapter 23.

Contractor agrees that all subcontracts entered into by the Contractor shall contain similar wage provision covering subcontractor's employees who perform work on this contract.

Section 5 - Non-Discrimination

The Contractor agrees to comply, and to require its subcontractor(s) to comply, with the nondiscrimination provisions of MCL 37.2209. The Contractor further agrees to comply with the provisions of Section 9:158 of Chapter 112 of Title IX of the Ann Arbor City Code, and to assure that applicants are employed and that employees are treated during employment in a manner which provides equal employment opportunity.

Section 6 - Materials, Appliances, Employees

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation, and other facilities necessary or used for the execution and completion of the work. Unless otherwise specified, all materials incorporated in the permanent work shall be new, and both workmanship and materials shall be of the highest quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

The Contractor shall at all times enforce strict discipline and good order among its employees, and shall seek to avoid employing on the work any unfit person or anyone not skilled in the work

assigned.

Adequate sanitary facilities shall be provided by the Contractor.

Section 7 - Qualifications for Employment

The Contractor shall employ competent laborers and mechanics for the work under this Contract. For work performed under this Contract, employment preference shall be given to qualified local residents.

Section 8 - Royalties and Patents

The Contractor shall pay all royalties and license fees. It shall defend all suits or claims for infringements of any patent rights and shall hold the City harmless from loss on account of infringement except that the City shall be responsible for all infringement loss when a particular process or the product of a particular manufacturer or manufacturers is specified, unless the City has notified the Contractor prior to the signing of the Contract that the particular process or product is patented or is believed to be patented.

Section 9 - Permits and Regulations

The Contractor must secure and pay for all permits, permit or plan review fees and licenses necessary for the prosecution of the work. These include but are not limited to City building permits, right-of-way permits, lane closure permits, right-of-way occupancy permits, and the like. The City shall secure and pay for easements shown on the plans unless otherwise specified.

The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified. If the Contractor observes that the contract documents are at variance with those requirements, it shall promptly notify the Supervising Professional in writing, and any necessary changes shall be adjusted as provided in the Contract for changes in the work.

Section 10 - Protection of the Public and of Work and Property

The Contractor is responsible for the means, methods, sequences, techniques and procedures of construction and safety programs associated with the work contemplated by this contract. The Contractor, its agents or sub-contractors, shall comply with the "General Rules and Regulations for the Construction Industry" as published by the Construction Safety Commission of the State of Michigan and to all other local, State and National laws, ordinances, rules and regulations pertaining to safety of persons and property.

The Contractor shall take all necessary and reasonable precautions to protect the safety of the public. It shall continuously maintain adequate protection of all work from damage, and shall take all necessary and reasonable precautions to adequately protect all public and private property from injury or loss arising in connection with this Contract. It shall make good any damage, injury or loss to its work and to public and private property resulting from lack of reasonable protective precautions, except as may be due to errors in the contract documents, or caused by agents or employees of the City. The Contractor shall obtain and maintain sufficient insurance to cover damage to any City property at the site by any cause.

In an emergency affecting the safety of life, or the work, or of adjoining property, the Contractor is, without special instructions or authorization from the Supervising Professional, permitted to act at its discretion to prevent the threatened loss or injury. It shall also so act, without appeal, if authorized or instructed by the Supervising Professional.

Any compensation claimed by the Contractor for emergency work shall be determined by agreement or in accordance with the terms of Claims for Extra Cost - Section 15.

Section 11 - Inspection of Work

The City shall provide sufficient competent personnel for the inspection of the work.

The Supervising Professional shall at all times have access to the work whenever it is in preparation or progress, and the Contractor shall provide proper facilities for access and for inspection.

If the specifications, the Supervising Professional's instructions, laws, ordinances, or any public authority require any work to be specially tested or approved, the Contractor shall give the Supervising Professional timely notice of its readiness for inspection, and if the inspection is by an authority other than the Supervising Professional, of the date fixed for the inspection. Inspections by the Supervising Professional shall be made promptly, and where practicable at the source of supply. If any work should be covered up without approval or consent of the Supervising Professional, it must, if required by the Supervising Professional, be uncovered for examination and properly restored at the Contractor's expense.

Re-examination of any work may be ordered by the Supervising Professional, and, if so ordered, the work must be uncovered by the Contractor. If the work is found to be in accordance with the contract documents, the City shall pay the cost of re-examination and replacement. If the work is not in accordance with the contract documents, the Contractor shall pay the cost.

Section 12 - Superintendence

The Contractor shall keep on the work site, during its progress, a competent superintendent and any necessary assistants, all satisfactory to the Supervising Professional. The superintendent will be responsible to perform all on-site project management for the Contractor. The superintendent shall be experienced in the work required for this Contract. The superintendent shall represent the Contractor and all direction given to the superintendent shall be binding as if given to the Contractor. Important directions shall immediately be confirmed in writing to the Contractor. Other directions will be confirmed on written request. The Contractor shall give efficient superintendence to the work, using its best skill and attention.

Section 13 - Changes in the Work

The City may make changes to the quantities of work within the general scope of the Contract at any time by a written order and without notice to the sureties. If the changes add to or deduct from the extent of the work, the Contract Sum shall be adjusted accordingly. All the changes shall be executed under the conditions of the original Contract except that any claim for extension of time caused by the change shall be adjusted at the time of ordering the change.

In giving instructions, the Supervising Professional shall have authority to make minor changes in

the work not involving extra cost and not inconsistent with the purposes of the work, but otherwise, except in an emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order by the Supervising Professional, and no claim for an addition to the Contract Sum shall be valid unless the additional work was ordered in writing.

The Contractor shall proceed with the work as changed and the value of the work shall be determined as provided in Claims for Extra Cost - Section 15.

Section 14 - Extension of Time

Extension of time stipulated in the Contract for completion of the work will be made if and as the Supervising Professional may deem proper under any of the following circumstances:

(1) When work under an extra work order is added to the work under this Contract;

(2) When the work is suspended as provided in Section 20;

(3) When the work of the Contractor is delayed on account of conditions which could not have been foreseen, or which were beyond the control of the Contractor, and which were not the result of its fault or negligence;

(4) Delays in the progress of the work caused by any act or neglect of the City or of its employees or by other Contractors employed by the City;

(5) Delay due to an act of Government;

(6) Delay by the Supervising Professional in the furnishing of plans and necessary information;

(7) Other cause which in the opinion of the Supervising Professional entitles the Contractor to an extension of time.

The Contractor shall notify the Supervising Professional within 7 days of an occurrence or conditions which, in the Contractor's opinion, entitle it to an extension of time. The notice shall be in writing and submitted in ample time to permit full investigation and evaluation of the Contractor's claim. The Supervising Professional shall acknowledge receipt of the Contractor's notice within 7 days of its receipt. Failure to timely provide the written notice shall constitute a waiver by the Contractor of any claim.

In situations where an extension of time in contract completion is appropriate under this or any other section of the contract, the Contractor understands and agrees that the only available adjustment for events that cause any delays in contract completion shall be extension of the required time for contract completion and that there shall be no adjustments in the money due the Contractor on account of the delay.

Section 15 - Claims for Extra Cost

If the Contractor claims that any instructions by drawings or other media issued after the date of the Contract involved extra cost under this Contract, it shall give the Supervising Professional written notice within 7 days after the receipt of the instructions, and in any event before proceeding to execute the work, except in emergency endangering life or property. The procedure shall then be as provided for Changes in the Work-Section 13. No claim shall be valid unless so made.

If the Supervising Professional orders, in writing, the performance of any work not covered by the contract documents, and for which no item of work is provided in the Contract, and for which no unit price or lump sum basis can be agreed upon, then the extra work shall be done on a Cost-Plus-Percentage basis of payment as follows:

(1) The Contractor shall be reimbursed for all reasonable costs incurred in doing the work, and shall receive an additional payment of 15% of all the reasonable costs to cover both its indirect overhead costs and profit;

(2) The term "Cost" shall cover all payroll charges for employees and supervision required under the specific order, together with all worker's compensation, Social Security, pension and retirement allowances and social insurance, or other regular payroll charges on same; the cost of all material and supplies required of either temporary or permanent character; rental of all power-driven equipment at agreed upon rates, together with cost of fuel and supply charges for the equipment; and any costs incurred by the Contractor as a direct result of executing the order, if approved by the Supervising Professional;

(3) If the extra is performed under subcontract, the subcontractor shall be allowed to compute its charges as described above. The Contractor shall be permitted to add an additional charge of 5% percent to that of the subcontractor for the Contractor's supervision and contractual responsibility;

(4) The quantities and items of work done each day shall be submitted to the Supervising Professional in a satisfactory form on the succeeding day, and shall be approved by the Supervising Professional and the Contractor or adjusted at once;

(5) Payments of all charges for work under this Section in any one month shall be made along with normal progress payments. Retainage shall be in accordance with Progress Payments-Section 16.

No additional compensation will be provided for additional equipment, materials, personnel, overtime or special charges required to perform the work within the time requirements of the Contract.

When extra work is required and no suitable price for machinery and equipment can be determined in accordance with this Section, the hourly rate paid shall be 1/40 of the basic weekly rate listed in the Rental Rate Blue Book published by Dataquest Incorporated and applicable to the time period the equipment was first used for the extra work. The hourly rate will be deemed to include all costs of operation such as bucket or blade, fuel, maintenance, "regional factors", insurance, taxes, and the like, but not the costs of the operator.

Section 16 - Progress Payments

The Contractor shall submit each month, or at longer intervals, if it so desires, an invoice covering work performed for which it believes payment, under the Contract terms, is due. The submission shall be to the City's Finance Department - Accounting Division. The Supervising Professional will, within 10 days following submission of the invoice, prepare a certificate for payment for the work in an amount to be determined by the Supervising Professional as fairly representing the acceptable work performed during the period covered by the Contractor's invoice. To insure the proper performance of this Contract, the City will retain a percentage of the estimate in accordance with Act 524, Public Acts of 1980. The City will then, following the receipt of the Supervising Professional's Certificate, make payment to the Contractor as soon as feasible, which is anticipated will be within 15 days.

An allowance may be made in progress payments if substantial quantities of permanent material have been delivered to the site but not incorporated in the completed work if the Contractor, in the opinion of the Supervising Professional, is diligently pursuing the work under this Contract. Such materials shall be properly stored and adequately protected. Allowance in the estimate shall be at the invoice price value of the items. Notwithstanding any payment of any allowance, all risk of loss due to vandalism or any damages to the stored materials remains with the Contractor.

In the case of Contracts which include only the Furnishing and Delivering of Equipment, the payments shall be; 60% of the Contract Sum upon the delivery of all equipment to be furnished, or in the case of delivery of a usable portion of the equipment in advance of the total equipment delivery, 60% of the estimated value of the portion of the equipment may be paid upon its delivery in advance of the time of the remainder of the equipment to be furnished; 30% of the Contract Sum upon completion of erection of all equipment furnished, but not later than 60 days after the date of delivery of all of the equipment to be furnished; and payment of the final 10% on final completion of erection, testing and acceptance of all the equipment to be furnished; but not later than 180 days after the date of delivery of all of the equipment to be furnished, unless testing has been completed and shows the equipment to be unacceptable.

With each invoice for periodic payment, the Contractor shall enclose a Contractor's Declaration - Section 43, and an updated project schedule per Order of Completion - Section 2.

Section 17 - Deductions for Uncorrected Work

If the Supervising Professional decides it is inexpedient to correct work that has been damaged or that was not done in accordance with the Contract, an equitable deduction from the Contract price shall be made.

Section 18 - Correction of Work Before Final Payment

The Contractor shall promptly remove from the premises all materials condemned by the Supervising Professional as failing to meet Contract requirements, whether incorporated in the work or not, and the Contractor shall promptly replace and re-execute the work in accordance with the Contract and without expense to the City and shall bear the expense of making good all work of other contractors destroyed or damaged by the removal or replacement.

If the Contractor does not remove the condemned work and materials within 10 days after written notice, the City may remove them and, if the removed material has value, may store the material

at the expense of the Contractor. If the Contractor does not pay the expense of the removal within 10 days thereafter, the City may, upon 10 days written notice, sell the removed materials at auction or private sale and shall pay to the Contractor the net proceeds, after deducting all costs and expenses that should have been borne by the Contractor. If the removed material has no value, the Contractor must pay the City the expenses for disposal within 10 days of invoice for the disposal costs.

The inspection or lack of inspection of any material or work pertaining to this Contract shall not relieve the Contractor of its obligation to fulfill this Contract and defective work shall be made good. Unsuitable materials may be rejected by the Supervising Professional notwithstanding that the work and materials have been previously overlooked by the Supervising Professional and accepted or estimated for payment or paid for. If the work or any part shall be found defective at any time before the final acceptance of the whole work, the Contractor shall forthwith make good the defect in a manner satisfactory to the Supervising Professional. The judgment and the decision of the Supervising Professional as to whether the materials supplied and the work done under this Contract comply with the requirements of the Contract shall be conclusive and final.

Section 19 - Acceptance and Final Payment

Upon receipt of written notice that the work is ready for final inspection and acceptance, the Supervising Professional will promptly make the inspection. When the Supervising Professional finds the work acceptable under the Contract and the Contract fully performed, the Supervising Professional will promptly sign and issue a final certificate stating that the work required by this Contract has been completed and is accepted by the City under the terms and conditions of the Contract. The entire balance found to be due the Contractor, including the retained percentage, shall be paid to the Contractor by the City within 30 days after the date of the final certificate.

Before issuance of final certificates, the Contractor shall file with the City:

(1) The consent of the surety to payment of the final estimate;
(2) The Contractor's Affidavit in the form required by Section 44.

In case the Affidavit or consent is not furnished, the City may retain out of any amount due the Contractor, sums sufficient to cover all lienable claims.

The making and acceptance of the final payment shall constitute a waiver of all claims by the City except those arising from:

(1) unsettled liens;
(2) faulty work appearing within 12 months after final payment;
(3) hidden defects in meeting the requirements of the plans and specifications;
(4) manufacturer's guarantees.

It shall also constitute a waiver of all claims by the Contractor, except those previously made and still unsettled.

Section 20 - Suspension of Work

The City may at any time suspend the work, or any part by giving 5 days notice to the Contractor in writing. The work shall be resumed by the Contractor within 10 days after the date fixed in the

written notice from the City to the Contractor to do so. The City shall reimburse the Contractor for expense incurred by the Contractor in connection with the work under this Contract as a result of the suspension.

If the work, or any part, shall be stopped by the notice in writing, and if the City does not give notice in writing to the Contractor to resume work at a date within 90 days of the date fixed in the written notice to suspend, then the Contractor may abandon that portion of the work suspended and will be entitled to the estimates and payments for all work done on the portions abandoned, if any, plus 10% of the value of the work abandoned, to compensate for loss of overhead, plant expense, and anticipated profit.

Section 21 - Delays and the City's Right to Terminate Contract

If the Contractor refuses or fails to prosecute the work, or any separate part of it, with the diligence required to insure completion, ready for operation, within the allowable number of consecutive calendar days specified plus extensions, or fails to complete the work within the required time, the City may, by written notice to the Contractor, terminate its right to proceed with the work or any part of the work as to which there has been delay. After providing the notice the City may take over the work and prosecute it to completion, by contract or otherwise, and the Contractor and its sureties shall be liable to the City for any excess cost to the City. If the Contractor's right to proceed is terminated, the City may take possession of and utilize in completing the work, any materials, appliances and plant as may be on the site of the work and useful for completing the work. The right of the Contractor to proceed shall not be terminated or the Contractor charged with liquidated damages where an extension of time is granted under Extension of Time - Section 14.

If the Contractor is adjudged a bankrupt, or if it makes a general assignment for the benefit of creditors, or if a receiver is appointed on account of its insolvency, or if it persistently or repeatedly refuses or fails except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials, or if it fails to make prompt payments to subcontractors or for material or labor, or persistently disregards laws, ordinances or the instructions of the Supervising Professional, or otherwise is guilty of a substantial violation of any provision of the Contract, then the City, upon the certificate of the Supervising Professional that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the Contractor 3 days written notice, terminate this Contract. The City may then take possession of the premises and of all materials, tools and appliances thereon and without prejudice to any other remedy it may have, make good the deficiencies or finish the work by whatever method it may deem expedient, and deduct the cost from the payment due the Contractor. The Contractor shall not be entitled to receive any further payment until the work is finished. If the expense of finishing the work, including compensation for additional managerial and administrative services exceeds the unpaid balance of the Contract Sum, the Contractor and its surety are liable to the City for any excess cost incurred. The expense incurred by the City, and the damage incurred through the Contractor's default, shall be certified by the Supervising Professional.

Section 22 - Contractor's Right to Terminate Contract

If the work should be stopped under an order of any court, or other public authority, for a period of 3 months, through no act or fault of the Contractor or of anyone employed by it, then the Contractor may, upon 7 days written notice to the City, terminate this Contract and recover from the City payment for all acceptable work executed plus reasonable profit.

Section 23 - City's Right To Do Work

If the Contractor should neglect to prosecute the work properly or fail to perform any provision of this Contract, the City, 3 days after giving written notice to the Contractor and its surety may, without prejudice to any other remedy the City may have, make good the deficiencies and may deduct the cost from the payment due to the Contractor.

Section 24 - Removal of Equipment and Supplies

In case of termination of this Contract before completion, from any or no cause, the Contractor, if notified to do so by the City, shall promptly remove any part or all of its equipment and supplies from the property of the City, failing which the City shall have the right to remove the equipment and supplies at the expense of the Contractor.

The removed equipment and supplies may be stored by the City and, if all costs of removal and storage are not paid by the Contractor within 10 days of invoicing, the City upon 10 days written notice may sell the equipment and supplies at auction or private sale, and shall pay the Contractor the net proceeds after deducting all costs and expenses that should have been borne by the Contractor and after deducting all amounts claimed due by any lien holder of the equipment or supplies.

Section 25 - Responsibility for Work and Warranties

The Contractor assumes full responsibility for any and all materials and equipment used in the construction of the work and may not make claims against the City for damages to materials and equipment from any cause except negligence or willful act of the City. Until its final acceptance, the Contractor shall be responsible for damage to or destruction of the project (except for any part covered by Partial Completion and Acceptance - Section 26). The Contractor shall make good all work damaged or destroyed before acceptance. All risk of loss remains with the Contractor until final acceptance of the work (Section 19) or partial acceptance (Section 26). The Contractor is advised to investigate obtaining its own builders risk insurance.

The Contractor shall guarantee the quality of the work for a period of one year. The Contractor shall also unconditionally guarantee the quality of all equipment and materials that are furnished and installed under the contract for a period of one year. At the end of one year after the Contractor's receipt of final payment, the complete work, including equipment and materials furnished and installed under the contract, shall be inspected by the Contractor and the Supervising Professional. Any defects shall be corrected by the Contractor at its expense as soon as practicable but in all cases within 60 days. Any defects that are identified prior to the end of one year shall also be inspected by the Contractor and the Supervising Professional and shall be corrected by the Contractor at its expense as soon as practicable but in all cases within 60 days. The Contractor shall assign all manufacturer or material supplier warranties to the City prior to final payment. The assignment shall not relieve the Contractor of its obligations under this paragraph to correct defects.

Section 26 - Partial Completion and Acceptance

If at any time prior to the issuance of the final certificate referred to in Acceptance and Final Payment - Section 19, any portion of the permanent construction has been satisfactorily completed, and if the Supervising Professional determines that portion of the permanent construction is not required for the operations of the Contractor but is needed by the City, the Supervising Professional shall issue to the Contractor a certificate of partial completion, and immediately the City may take over and use the portion of the permanent construction described in the certificate, and exclude the Contractor from that portion.

The issuance of a certificate of partial completion shall not constitute an extension of the Contractor's time to complete the portion of the permanent construction to which it relates if the Contractor has failed to complete it in accordance with the terms of this Contract. The issuance of the certificate shall not release the Contractor or its sureties from any obligations under this Contract including bonds.

If prior use increases the cost of, or delays the work, the Contractor shall be entitled to extra compensation, or extension of time, or both, as the Supervising Professional may determine.

Section 27 - Payments Withheld Prior to Final Acceptance of Work

The City may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any certificate to the extent reasonably appropriate to protect the City from loss on account of:

(1) Defective work not remedied;

(2) Claims filed or reasonable evidence indicating probable filing of claims by other parties against the Contractor;

(3) Failure of the Contractor to make payments properly to subcontractors or for material or labor;

(4) Damage to another Contractor.

When the above grounds are removed or the Contractor provides a Surety Bond satisfactory to the City which will protect the City in the amount withheld, payment shall be made for amounts withheld under this section.

Section 28 - Contractor's Insurance

(1) The Contractor shall procure and maintain during the life of this Contract, including the guarantee period and during any warranty work, such insurance policies, including those set forth below, as will protect itself and the City from all claims for bodily injuries, death or property damage that may arise under this Contract; whether the act(s) or omission(s) giving rise to the claim were made by the Contractor, any subcontractor, or anyone employed by them directly or indirectly. Prior to commencement of any work under this contract, Contractor shall provide to the City documentation satisfactory to the City, through City-approved means (currently myCOI), demonstrating it has obtained the required policies and endorsements. The certificates of insurance endorsements and/or copies of

policy language shall document that the Contractor satisfies the following minimum requirements. Contractor shall add registration@mycoitracking.com to its safe sender's list so that it will receive necessary communication from myCOI. When requested, Contractor shall provide the same documentation for its subcontractor(s) (if any).

Required insurance policies include:

(a) Worker's Compensation Insurance in accordance with all applicable state and federal statutes. Further, Employers Liability Coverage shall be obtained in the following minimum amounts:

Bodily Injury by Accident - $500,000 each accident
Bodily Injury by Disease - $500,000 each employee
Bodily Injury by Disease - $500,000 each policy limit

(b) Commercial General Liability Insurance equivalent to, as a minimum, Insurance Services Office form CG 00 01 04 13 or current equivalent. The City of Ann Arbor shall be named as an additional insured. There shall be no added exclusions or limiting endorsements specifically for the following coverages: Products and Completed Operations, Explosion, Collapse and Underground coverage or Pollution. Further there shall be no added exclusions or limiting endorsements that diminish the City's protections as an additional insured under the policy. The following minimum limits of liability are required:

$1,000,000	Each occurrence as respect Bodily Injury Liability or Property Damage Liability, or both combined.
$2,000,000	Per Project General Aggregate
$1,000,000	Personal and Advertising Injury
$2,000,000	Products and Completed Operations Aggregate, which, notwithstanding anything to the contrary herein, shall be maintained for three years from the date the Project is completed.

(c) Motor Vehicle Liability Insurance, including Michigan No-Fault Coverages, equivalent to, as a minimum, Insurance Services Office form CA 00 01 10 13 or current equivalent. Coverage shall include all owned vehicles, all non-owned vehicles and all hired vehicles. The City of Ann Arbor shall be named as an additional insured. There shall be no added exclusions or limiting endorsements that diminish the City's protections as an additional insured under the policy. Further, the limits of liability shall be $1,000,000 for each occurrence as respects Bodily Injury Liability or Property Damage Liability, or both combined.

(d) Umbrella/Excess Liability Insurance shall be provided to apply excess of the Commercial General Liability, Employers Liability and the Motor Vehicle coverage enumerated above, for each occurrence and for aggregate in the amount of $1,000,000.

(2) Insurance required under subsection (1)(b) and (1)(c) above shall be considered primary as respects any other valid or collectible insurance that the City may possess, including any self-insured retentions the City may have; and any other insurance the City does possess shall be considered excess insurance only and shall not be required to contribute with this insurance. Further, the Contractor agrees to waive any right of recovery by its

insurer against the City for any insurance listed herein.

(3) Insurance companies and policy forms are subject to approval of the City Attorney, which approval shall not be unreasonably withheld. Documentation must provide and demonstrate an unconditional and un-qualified 30-day written notice of cancellation in favor of the City of Ann Arbor. Further, the documentation must explicitly state the following: (a) the policy number(s); name of insurance company(s); name and address of the agent(s) or authorized representative(s); name(s), email address(es), and address of insured; project name; policy expiration date; and specific coverage amounts; (b) any deductibles or self-insured retentions which may be approved by the City, in its sole discretion; (c) that the policy conforms to the requirements specified Contractor shall furnish the City with satisfactory certificates of insurance and endorsements prior to commencement of any work. Upon request, the Contractor shall provide within 30 days a copy of the policy(ies) and all required endorsements to the City. If any of the above coverages expire by their terms during the term of this Contract, the Contractor shall deliver proof of renewal and/or new policies and endorsements to the Administering Service Area/Unit at least ten days prior to the expiration date.

(4) Any Insurance provider of Contractor shall be authorized to do business in the State of Michigan and shall carry and maintain a minimum rating assigned by A.M. Best & Company's Key Rating Guide of "A-" Overall and a minimum Financial Size Category of "V". Insurance policies and certificates issued by non-authorized insurance companies are not acceptable unless approved in writing by the City.

(5) City reserves the right to require additional coverage and/or coverage amounts as may be included from time to time in the Detailed Specifications for the Project.

(6) The provisions of General Condition 28 shall survive the expiration or earlier termination of this contract for any reason.

Section 29 - Surety Bonds

Bonds will be required from the successful bidder as follows:

(1) A Performance Bond to the City of Ann Arbor for the amount of the bid(s) accepted;
(2) A Labor and Material Bond to the City of Ann Arbor for the amount of the bid(s) accepted.

Bonds shall be executed on forms supplied by the City in a manner and by a Surety Company authorized to transact business in Michigan and satisfactory to the City Attorney.

Section 30 - Damage Claims

The Contractor shall be held responsible for all damages to property of the City or others, caused by or resulting from the negligence of the Contractor, its employees, or agents during the progress of or connected with the prosecution of the work, whether within the limits of the work or elsewhere. The Contractor must restore all property injured including sidewalks, curbing, sodding, pipes, conduit, sewers or other public or private property to not less than its original condition with new work.

Section 31 - Refusal to Obey Instructions

If the Contractor refuses to obey the instructions of the Supervising Professional, the Supervising Professional shall withdraw inspection from the work, and no payments will be made for work performed thereafter nor may work be performed thereafter until the Supervising Professional shall have again authorized the work to proceed.

Section 32 - Assignment

Neither party to the Contract shall assign the Contract without the written consent of the other. The Contractor may assign any monies due to it to a third party acceptable to the City.

Section 33 - Rights of Various Interests

Whenever work being done by the City's forces or by other contractors is contiguous to work covered by this Contract, the respective rights of the various interests involved shall be established by the Supervising Professional, to secure the completion of the various portions of the work in general harmony.

The Contractor is responsible to coordinate all aspects of the work, including coordination of, and with, utility companies and other contractors whose work impacts this project.

Section 34 - Subcontracts

The Contractor shall not award any work to any subcontractor without prior written approval of the City. The approval will not be given until the Contractor submits to the City a written statement concerning the proposed award to the subcontractor. The statement shall contain all information the City may require.

The Contractor shall be as fully responsible to the City for the acts and omissions of its subcontractors, and of persons either directly or indirectly employed by them, as it is for the acts and omissions of persons directly employed by it.

The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Contractor by the terms of the General Conditions and all other contract documents applicable to the work of the subcontractors and to give the Contractor the same power to terminate any subcontract that the City may exercise over the Contractor under any provision of the contract documents.

Nothing contained in the contract documents shall create any contractual relation between any subcontractor and the City.

Section 35 - Supervising Professional's Status

The Supervising Professional has the right to inspect any or all work. The Supervising Professional has authority to stop the work whenever stoppage may be appropriate to insure the proper execution of the Contract. The Supervising Professional has the authority to reject all work and materials which do not conform to the Contract and to decide questions which arise in the execution of the work.

The Supervising Professional shall make all measurements and determinations of quantities. Those measurements and determinations are final and conclusive between the parties.

Section 36 - Supervising Professional's Decisions

The Supervising Professional shall, within a reasonable time after their presentation to the Supervising Professional, make decisions in writing on all claims of the City or the Contractor and on all other matters relating to the execution and progress of the work or the interpretation of the contract documents.

Section 37 - Storing Materials and Supplies

Materials and supplies may be stored at the site of the work at locations agreeable to the City unless specific exception is listed elsewhere in these documents. Ample way for foot traffic and drainage must be provided, and gutters must, at all times, be kept free from obstruction. Traffic on streets shall be interfered with as little as possible. The Contractor may not enter or occupy with agents, employees, tools, or material any private property without first obtaining written permission from its owner. A copy of the permission shall be furnished to the Supervising Professional.

Section 38 - Lands for Work

The Contractor shall provide, at its own expense and without liability to the City, any additional land and access that may be required for temporary construction facilities or for storage of materials.

Section 39 - Cleaning Up

The Contractor shall, as directed by the Supervising Professional, remove at its own expense from the City's property and from all public and private property all temporary structures, rubbish and waste materials resulting from its operations unless otherwise specifically approved, in writing, by the Supervising Professional.

Section 40 - Salvage

The Supervising Professional may designate for salvage any materials from existing structures or underground services. Materials so designated remain City property and shall be transported or stored at a location as the Supervising Professional may direct.

Section 41 - Night, Saturday or Sunday Work

No night or Sunday work (without prior written City approval) will be permitted except in the case of an emergency and then only to the extent absolutely necessary. The City may allow night work which, in the opinion of the Supervising Professional, can be satisfactorily performed at night. Night work is any work between 8:00 p.m. and 7:00 a.m. No Saturday work will be permitted unless the Contractor gives the Supervising Professional at least 48 hours but not more than 5 days notice of the Contractor's intention to work the upcoming Saturday.

Section 42 - Sales Taxes

Under State law the City is exempt from the assessment of State Sales Tax on its direct purchases. Contractors who acquire materials, equipment, supplies, etc. for incorporation in City projects are not likewise exempt. State Law shall prevail. The Bidder shall familiarize itself with the State Law and prepare its Bid accordingly. No extra payment will be allowed under this Contract for failure of the Contractor to make proper allowance in this bid for taxes it must pay.

Section 43

CONTRACTOR'S DECLARATION

I hereby declare that I have not, during the period _____, 20___, to _____, 20 , performed any work, furnished any materials, sustained any loss, damage or delay, or otherwise done anything in addition to the regular items (or executed change orders) set forth in the Contract titled _____, for which I shall ask, demand, sue for, or claim compensation or extension of time from the City, except as I hereby make claim for additional compensation or extension of time as set forth on the attached itemized statement. I further declare that I have paid all payroll obligations related to this Contract that have become due during the above period and that all invoices related to this Contract received more than 30 days prior to this declaration have been paid in full except as listed below.

There is/is not (Contractor please circle one and strike one as appropriate) an itemized statement attached regarding a request for additional compensation or extension of time.

_____ _____
Contractor Date

By _____
(Signature)

Its _____
(Title of Office)

Past due invoices, if any, are listed below.

Section 44

CONTRACTOR'S AFFIDAVIT

The undersigned Contractor,_____, represents that on _____, 20___, it was awarded a contract by the City of Ann Arbor, Michigan to_____ under the terms and conditions of a Contract titled _____. The Contractor represents that all work has now been accomplished and the Contract is complete.

The Contractor warrants and certifies that all of its indebtedness arising by reason of the Contract has been fully paid or satisfactorily secured; and that all claims from subcontractors and others for labor and material used in accomplishing the project, as well as all other claims arising from the performance of the Contract, have been fully paid or satisfactorily settled. The Contractor agrees that, if any claim should hereafter arise, it shall assume responsibility for it immediately upon request to do so by the City of Ann Arbor.

The Contractor, for valuable consideration received, does further waive, release and relinquish any and all claims or right of lien which the Contractor now has or may acquire upon the subject premises for labor and material used in the project owned by the City of Ann Arbor.

This affidavit is freely and voluntarily given with full knowledge of the facts.

_____ _____
Contractor Date

By _____
(Signature)

Its _____
(Title of Office)

Subscribed and sworn to before me, on this _____ day of _____, 20__
_____ , _____ County, Michigan
Notary Public
_____ County, MI
My commission expires on:

STANDARD SPECIFICATIONS

All work under this contract shall be performed in accordance with the Public Services Department Standard Specifications in effect at the date of availability of the contract documents stipulated in the Bid. All work under this Contract which is not included in these Standard Specifications, or which is performed using modifications to these Standard Specifications, shall be performed in accordance with the Detailed Specifications included in these contract documents.

Standard Specifications are available online:

http://www.a2gov.org/departments/engineering/Pages/Engineering-and-Contractor-Resources.aspx

DETAILED SPECIFICATIONS

SECTION 01 00 00

GENERAL REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

A. This project includes the installation of a complete lighting system at the existing City of Ann Arbor Veterans Memorial Park Skatepark. The project includes a Base Bid and an Alternate Bid for two different lighting systems.

B. The Base Bid includes the installation of a sports flood lighting system with 7 poles and 22 luminaires.

C. The Alternate Bid includes the installation of an area lighting system with 9 poles and 27 total luminaires.

1.2 CONTRACT DOCUMENTS

A. The Work to be done is shown on the set of Drawings entitled Ann Arbor Skatepark Lighting. The numbers and titles of all Drawings appear on the cover sheet of the Drawings. All Drawings so enumerated shall be considered an integral part of the Contract Documents as defined herein.

B. Certain Document Sections refer to Divisions of the Contract Specifications. Sections are each individually numbered portions of the Specifications (numerically). The term Division is used as a convenience term meaning all Sections within a numerical grouping.

C. Where references in the Contract Documents are made to CONTRACTORs for specific disciplines of work (e.g., Electrical Contractor, etc.), these references shall be interpreted to be the single prime CONTRACTOR when the project is bid or awarded as a single prime contract.

D. The prime CONTRACTOR shall be responsible for all Work in the Contract Documents regardless of the division of disciplines.

E. Any items of work indicated as incidental or included shall be considered as part of the project work and shall be completed at no additional expense to the Owner. Incidental or included items shall include labor, materials, and equipment that may not be specifically listed in the Bid Form or in the drawings or specifications, but which are necessary to complete the work. Unless there is a specific pay item identified, incidental work items shall include but not be limited to the following

1.3 CONSTRUCTION PERMITS, EASEMENTS AND ENCROACHMENTS

A. The OWNER shall obtain or cause to be obtained all permanent and temporary construction easements required. No easements are anticipated for this project.

B. The CONTRACTOR shall obtain, keep current and pay all fees for any other necessary construction permits from those authorities, agencies, or municipalities having jurisdiction over land areas, utilities, or structures which are located within the Contract limits and which will be occupied, encountered, used, or temporarily interrupted by the CONTRACTOR's operations unless otherwise stated. CONTRACTOR shall pay plan

review fees and any other fees for required permits. Record copies of all permits shall be furnished to the ENGINEER and OWNER.

C. When construction permits are accompanied by regulations or requirements issued by a particular authority, agency, or municipality, it shall be the CONTRACTOR's responsibility to become familiar with and comply with such regulations or requirements as they apply to CONTRACTOR’s operations on this Project.

D. The CONTRACTOR will be required to follow the requirements established by all permits necessary for the construction of this project. The following is a list of all permits that must be obtained prior to the beginning of construction:

1. Applicable City Building Permits (all trades).

2. City of Ann Arbor Soil Erosion and Sedimentation Control Permit

E. The permits for the various trades shall be applied for and paid for by the CONTRACTOR.

F. There will be do fee for the City of Ann Arbor Soil Erosion and Sedimentation Control Permit. CONTRACTOR shall be responsible to apply for the permit.

1.4 ADDITIONAL ENGINEERING SERVICES

A. In the event that the ENGINEER is required to provide additional engineering services as a result of substitution of materials or equipment which are not "or equal" by the CONTRACTOR, or changes by the CONTRACTOR in dimension, weight, power requirements, etc., of the equipment and accessories furnished, or if the ENGINEER is required to examine and evaluate any changes proposed by the CONTRACTOR for the convenience of the CONTRACTOR, then the ENGINEER's charges in connection with such additional services shall be charged to the CONTRACTOR by the OWNER.

B. Structural design shown on the Contract Drawings is based upon typical weights for major items of equipment as indicated on the Contract Drawings and specified. If the equipment furnished exceeds the weights of said equipment, the CONTRACTOR shall assume the responsibility for all costs of redesign and for any construction changes required to accommodate the equipment furnished, including the ENGINEER's expenses in connection therewith.

C. In the event that the ENGINEER is required to provide additional engineering services as a result of CONTRACTOR's errors, omissions, or failure to conform to the requirements of the Contract Documents, or if the ENGINEER is required to examine and evaluate any changes proposed by the CONTRACTOR solely for the convenience of the CONTRACTOR, then the ENGINEER's charges in connection with such additional services shall be charged to the CONTRACTOR by the OWNER.

1.5 ADDITIONAL OWNER'S EXPENSES

A. In the event the Work of this Contract is not completed within the time set forth in the Contract or within the time to which such completion may have been extended in accordance with the Contract Documents, the additional engineering or inspection charges incurred by the OWNER may be charged to the CONTRACTOR and deducted from the monies due the CONTRACTOR. Extra work or supplemental Contract work added to the original Contract, as well as extenuating circumstances beyond the control of the CONTRACTOR, will be given due consideration by the OWNER before assessing engineering and inspection charges against the CONTRACTOR.

B. Charges for additional OWNER's expenses shall be in addition to any liquidated damages assessed in accordance with the Contract.

1.6 WORK RESTRICTIONS

A. Work shall be generally performed during normal business working hours of 7:00 a.m. to 8:00 p.m., Monday through Friday, except where otherwise indicated. No work shall be permitted on Saturday or Sunday without prior approval from the OWNER.

B. Coordinate with the OWNER to avoid work during all Skatepark special events.

C. Onsite work impacting operations at Veterans Memorial Park shall be limited to a maximum of 21 calendar days. This shall include conduit and conductor installation, light pole base installation, electrical work, pole installation and light installation.

1.7 CONSTRAINTS REGARDING SKATEPARK OPERATIONS

A. The proposed lighting shall be installed and put into operation while the Skatepark remains open for operation, except for during light pole installation, unless otherwise approved by the OWNER. The CONTRACTOR must coordinate closure dates with the OWNER 72 hours in advance of closure. On days of closure, the CONTRACTOR shall place closure signage as required to notify the public and maintain safety.

B. The associated Maple Road parking lot must also remain open for operation during construction.

C. During operations while the park remains open, ADA compliant barriers and fencing must be installed at the CONTRACTOR'S expense, to prevent park users from entering the construction area.

1.8 EQUIPMENT LOCKOUTS AND OPERATION

A. Power feed shall be locked out jointly by the CONTRACTOR and OWNER.

B. Lockouts shall not be removed without agreement by the CONTRACTOR and OWNER.

C. The existing switchboard provides power to the traffic signal located along Maple Road adjacent to the project site. Any work requiring to shutdown of power to this switchboard shall be coordinated with the City of Ann Arbor Signs and Signals group. All coordination efforts and backup power feeds to supply the traffic signal during the CONTRACTOR's work shall be incidental.

1.9 EXISTING UTILITIES

A. Approximate utility locations are shown on the plan where known. CONTRACTOR shall be responsible for field verifying all utility locations. Existing site utilities will not be marked by Miss Dig and include electrical, storm sewer, sanitary sewer, water main, and irrigation systems. CONTRACTOR shall hire a locating firm to identify all utility conflicts along conduit routes and at light pole locations.

1.10 PROTECTION OF WORK

A. Unless otherwise specifically permitted, all work that would be subject to damage shall be stopped during inclement, windy, or freezing weather. Only such work as will not suffer injury to workmanship or materials will be permitted.

B. CONTRACTOR shall carefully protect the work against damage or injury from the weather, and when work is permitted during freezing weather, CONTRACTOR shall provide and maintain approved facilities for heating the materials and for protecting the finished work.

1.11 SURVEYS AND LAYOUT

A. All work under this Contract shall be constructed in accordance with the lines and grades shown on the Drawings or as directed by the ENGINEER or OWNER. Elevation of existing ground and appurtenances are believed to be reasonably correct but are not guaranteed to be absolute and therefore are presented only as an approximation. Any error or apparent discrepancy in the data shown or omissions of data required for accurately accomplishing the stake out survey shall be referred immediately to the ENGINEER for interpretation or correction.

B. All survey work for construction control purposes, staking, and all related work shall be performed by the CONTRACTOR.

C. CONTRACTOR shall have the responsibility to carefully preserve the benchmarks, reference points and stakes, and in the case of destruction thereof by the CONTRACTOR or resulting from CONTRACTOR's negligence, the CONTRACTOR shall be charged with the expense and damage resulting therefrom and shall be responsible for any mistakes that may be caused by the unnecessary loss or disturbance of such benchmarks, reference points and stakes.

D. The OWNER or ENGINEER may check all, or any portion of the work and the CONTRACTOR shall afford all necessary assistance to the OWNER and ENGINEER in carrying out such checks. Any necessary corrections to the work shall be immediately made by the CONTRACTOR. Such checking by the OWNER or ENGINEER shall not relieve the CONTRACTOR of any responsibilities for the accuracy or completeness of CONTRACTOR's work.

1.12 RESIDENT PROJECT REPRESENTATIVE

A. If the OWNER authorizes the ENGINEER, the ENGINEER shall provide a resident project representative to assist the ENGINEER in carrying out his responsibilities at the site. The resident may not be full-time on-site, and the CONTRACTOR shall be responsible for coordination with the ENGINEER.

B. The furnishing of such resident project representatives shall not make the ENGINEER responsible for the CONTRACTOR's construction means, methods, techniques, sequences, or procedures or for any safety precautions or programs in connection with the work. The CONTRACTOR shall remain solely responsible for meeting the requirements of the Contract Documents.

C. The CONTRACTOR shall provide access and fall protection for the ENGINEER's representative to make up-close inspections of the gates.

1.13 EXISTING FACILITIES ACCESS

A. It shall be the responsibility of the CONTRACTOR to obtain any permits required from the City of Ann Arbor and pay all associated fees.

B. The CONTRACTOR will not disturb the OWNER's operation and maintenance of the park facilities without a written and approved plan.

1.14 CONSTRUCTION UTILITIES

A. Water for construction is not available from the OWNER.

B. 110V single phase power is available for use. The CONTRACTOR will be responsible for providing all connections.

1.15 WORK SCHEDULE

A. The CONTRACTOR shall provide a work schedule. The schedule shall be complete and shall show in detail the way he proposes to complete the work under this Contract and approximate monthly billing of the Contract. The purpose of the schedule is to assist the OWNER in notifying the public of inconveniences and to anticipate cash-flow on the job, and to determine if the CONTRACTOR is reasonably proceeding with the work to assure completion within the specified time.

C. Work hours shall be restricted to Monday through Friday, 7 AM to 8 PM. Work shall not be conducted on City holidays or Sundays. Exceptions to work hour limits (i.e., Saturday work) shall by only by written permission of the OWNER.

1.16 CONSTRUCTION SEQUENCE

A. The CONTRACTOR shall coordinate and schedule his work with the OWNER.

B. Prior to commencing the work, the CONTRACTOR shall provide the ENGINEER a detailed schedule of the proposed work. The schedule shall include a list of tasks required to complete the work; their relevancy to each other; expected duration; and completion dates.

C. The CONTRACTOR is responsible for presenting a sequence with schedule to the OWNER/ENGINEER for review. All proposed improvements shall be constructed only in accordance with an approved schedule.

D. The CONTRACTOR shall give the OWNER a minimum of 7 days' notice to coordinate closure of a bay for construction work.

1.17 PROJECT PROGRESS MEETINGS

A. The CONTRACTOR shall be available for meetings, which will be held once per month, or as necessary.

B. It shall be the responsibility of the CONTRACTOR to have a representative, including key subcontractors, present at each meeting.

1.18 FIRE PROTECTION

A. CONTRACTOR shall take all necessary precautions to prevent fires at or adjacent to the work and shall provide adequate facilities for extinguishing fires which do occur. Burning of debris is not permitted on the project site.

B. When fire or explosion hazards are created in the vicinity of the work as a result of the locations of fuel tanks, or similar hazardous utilities or devices, the CONTRACTOR shall immediately alert the local Fire Marshal, the ENGINEER, and the OWNER of such tank or device. The CONTRACTOR shall exercise all safety precautions and shall comply with all instructions issued by the Fire Marshal and shall cooperate with the OWNER of the tank or device to prevent the occurrence of fire or explosion.

C. Fire protection alarm and detection systems shall comply with the Michigan International Building Code 2009 and NFPA standards.

D. Hydrants must be maintained in service and approved during all phases of work.

E. Storage area for construction materials must not interfere with fire/emergency site access.

F. All material demolished from site should not be stored on location.

1.19 CHEMICALS

A. All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, or reactant of other classification, must show approval of either the EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with all applicable rules and regulations.

B. Post on site Safety Data Sheets (SDS) for all chemicals and provide copies to the OWNER.

1.20 FIRST AID FACILITIES AND ACCIDENTS

A. First Aid Facilities

1. The CONTRACTOR shall provide at the site such equipment and supplies as are necessary to supply first aid to any of CONTRACTOR's personnel who may be injured in connection with the work.

2. First aid equipment and supplies shall be kept up-to-date and in good condition.

3. The CONTRACTOR shall notify employees of the location of First Aid facilities and provide any necessary training.

B. Accidents

1. The CONTRACTOR shall promptly report, in writing, to the ENGINEER and OWNER all accidents in connection with the performance of the work, whether on or adjacent to the site, which cause death, personal injury or property damage, giving full details and statements of witnesses.

2. If death, serious injuries, or serious damages are caused, the accident shall be reported immediately by telephone or messenger to both the OWNER and the ENGINEER.

3. If any claim is made by anyone against the CONTRACTOR or a Subcontractor on account of any accidents, the CONTRACTOR shall promptly report the facts, in writing, to the ENGINEER and OWNER, giving full details of the claim.

1.21 LIMITS OF WORK AREA

A. The CONTRACTOR shall confine the construction operations within the Contract limits shown on the Drawings and/or property lines and/or fence lines. Storage of equipment and materials, or erection and use of sheds outside of the Contract limits, if such areas are the property of the OWNER, shall be used only with the OWNER's approval. Such storage or temporary structures, even within the Contract's limits, shall be confined to the OWNER's property and shall not be placed on properties designated as easements or rights-of-way unless specifically permitted elsewhere in the Contract Documents.

1.22 WEATHER CONDITIONS

A. No work shall be done when the weather is unsuitable. The CONTRACTOR shall take necessary precautions (in the event of impending storms) to protect all work, materials, or equipment from damage or deterioration due to floods, driving rain, or wind, and snowstorms. The OWNER reserves the right to order that additional protection measures over and beyond those proposed by the CONTRACTOR, be taken to safeguard all components of the Project. The CONTRACTOR shall not claim any compensation for such precautionary measures so ordered, nor claim any compensation from the OWNER for damage to the work from weather elements.

C. The ENGINEER shall have permissive authority over the work which is proposed to be done during the winter months. The CONTRACTOR shall provide adequate weather protection, temporary heating, ground thawing equipment and take any other measures which are necessary to insure that the work performed during the winter months is properly installed and protected against damage from freezing.

D. Any and all work performed during adverse conditions shall adhere to the applicable Codes and Standards (i.e., ACI, ASTM, etc.).

1.23 USE OF FACILITIES BEFORE COMPLETION

A. The OWNER reserves the right to enter and use any portion of the park facilities before final completion of the whole work to be done under this Contract. However, only those portions of the facilities which have been completed to the OWNER’s satisfaction, as evidenced by issuing a Certificate of Partial Completion covering that part of the work, shall be placed in service.

B. It shall be the OWNER's responsibility to prevent premature usage of or to use of any portion of the installed facilities by private or public parties, persons, or groups of persons, before the OWNER issues the Certificate of Partial Completion covering that portion of the work to be placed in service.

C. Consistent with the approved progress schedule, the CONTRACTOR shall cooperate with the OWNER, his agents, and the ENGINEER to accelerate completion of those facilities, or portions thereof, which have been designated for early use by the OWNER.

1.24 DELIVERY, STORAGE, AND HANDLING

A. All materials, supplies and equipment, whether furnished by the CONTRACTOR or by the OWNER, shall be delivered, stored, and handled as to prevent the inclusion of foreign materials and/or damage by water, freezing, breakage or other causes. The ENGINEER may require the CONTRACTOR to provide an enclosed storage shed for the storage of the above-mentioned materials, supplies and equipment.

B. Packaged materials shall be delivered in the original unopened containers and shall be stored until ready for use. All materials which have been stored shall meet the requirements of the Specifications at the time they are used in the project.

1.25 DIGITAL PHOTOGRAPHIC RECORD

A. The CONTRACTOR shall furnish to the OWNER a digital photographic record for all areas where work will be undertaken to serve as a record of existing conditions.

B. The photographs shall be stored on an electronic file of such quality to accurately show the existing conditions.

C. The photographic record shall include date, time, and location at appropriate intervals. The location shall be easily referenced to the Contract Drawings.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Submittal Procedures

B. Certifications

C Shop Drawings

D. Product Data

E. Samples

F. Manufacturers' Instructions

G. Manufacturers' Field Reports

H. Construction Schedule

I. Submittal Schedule

1.2 SUBMITTAL PROCEDURES

A. Package each submittal appropriately for shipping and handling. This shall include an index either on the transmittal or within the submittal itself. Transmit each submittal from CONTRACTOR to ENGINEER using a transmittal form. Submittals received from sources other than CONTRACTOR will be returned without action. Use separate transmittals for items from different specification sections. Number each submittal consecutively. Resubmittals should have the same number as the original, plus a letter designation for each Resubmittal (i.e. 7-A, 7-B, etc.)

B. Indicate on the transmittal relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include CONTRACTOR's certification that information complies with Contract Document requirements. On Resubmittal, all changes shall be clearly identified for ease of review. Resubmittals shall be reviewed for the clearly identified changes only. Any changes not clearly identified will not be reviewed and original submittal shall govern.

C. Include the following information on the label for processing and recording action taken.

1. Project name.

2. Date.

3. Name and address of ENGINEER.

4. Name and address of CONTRACTOR.

5. Name and address of subcontractor.

6. Name and address of supplier.

7. Name of manufacturer.

8. Number and title of appropriate specification sections.

9. Drawing number and detail references, as appropriate.

D. Schedule submittals to expedite the Project, and deliver to ENGINEER at business address. Coordinate submission of related items. Coordinate related activities that require sequential activity.

E. Submit a schedule of shop drawing submittals.

F. Review and approve shop drawings, project data, and samples before submitting them.

G. Verify field measurements, field construction criteria, catalog numbers, and similar data. Indicate on the submission exactly what was verified.

H. Any markings done by CONTRACTOR shall be done in a color other than red. Red is reserved for ENGINEER's marking.

I. The number of copies to be submitted will be determined at the pre-construction conference. Reproducible may be submitted and will be marked and returned to CONTRACTOR. Blue or black line prints shall be submitted in sufficient quantity for distribution to ENGINEER and OWNER recipients.

J. Coordinate each submittal with the requirements of the Contract Documents.

K. Provide space for CONTRACTOR and ENGINEER review stamps.

L. Apply CONTRACTOR's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

M. Submit the number of copies that the CONTRACTOR requires, plus four copies that will be retained by the OWNER and ENGINEER.

N. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

O. No claim will be allowed for damages or extension of time because of delays in the work resulting from rejection of material or from revision and resubmittal of shop drawings, project data, or samples.

P. No extension of contract time will be authorized because of failure to transmit submittals to ENGINEER sufficiently in advance of the work to permit processing.

Q. ENGINEER reserves the right to withhold action on a submittal required coordination with other submittals until related submittals are received.

R. Do not install materials or equipment which requires submittals until the submittals are returned with ENGINEER's/OWNER's stamp and initials or signature indicating approval. The OWNER shall have final approval authority.

S. CONTRACTOR's responsibility of errors, omissions, and deviations from requirements of Contract Documents in submittals is not relieved by the ENGINEER's review.

T. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with requirements.

U. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.

V. Submittals not requested in conformance with this Specification will not be recognized or processed.

W. Revise and resubmit as required, identify all changes made since the previous submittal.

X. In the event that more than two (2) re-submittals of any submittal are necessary to achieve conformance to the contract requirements, CONTRACTOR shall be charged for excess engineering. The OWNER shall deduct these charges from the CONTRACTOR's final payment. Charges will be $135.00/hr. minimum 4 hours, for each additional submittal of an item. A tabulated record of such charges will be provided for the CONTRACTOR's review prior to the processing of the final payment.

Y. Submit new project data and samples when the initial submittal is returned disapproved.

Z. In addition to the hard copy submittals, electronic submittals shall be provided via email.

1.3 CERTIFICATIONS

A. When specified in individual specification sections, submit certification by the manufacturer, installation/application subcontractor, or the CONTRACTOR to ENGINEER, in quantities specified for Product Data.

B. Indicate that the material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certifications may be recent or previous test results of the material or product, but must be acceptable to ENGINEER.

1.4 SHOP DRAWINGS

A. Shop Drawings: Submit to ENGINEER for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Produce copies and distribute in accordance with Paragraph 1.2 - Submittal Procedures.

B. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of shop drawings. Standard information prepared without specific reference to the project is not considered shop drawings.

C. Shop drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings. Include the following information:

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1. Dimension.

2. Identification of products and materials included.

3. Compliance with specified standards.

4. Notation of coordination requirements.

5. Notation of dimensions established by field measurements.

D. Nameplate data for equipment including electric motors shall be included on shop drawings. Electric motor data shall state the manufacturer, horsepower, service factor, voltage, enclosure type, oversize wiring box, etc.

E. Shop drawings shall indicate shop painting requirements to include type of paint and manufacturer.

F. Standard manufactured items in the form of catalog work sheets showing illustrated cuts of the items to be furnished, scale details, sizes, dimensions, quantity, and all other pertinent information should be submitted and approved in a similar manner.

G. Measurements given on shop drawings or standard catalog sheets, as established from contract drawings and as approved by ENGINEER, shall be followed. When it is necessary to verify field measurements, they shall be checked and established by CONTRACTOR. The field measurements so established shall be followed by CONTRACTOR and by all affected trades.

H. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

1.5 PRODUCT DATA

A. Product Data: Submit to ENGINEER for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Produce copies and distribute in accordance with Paragraph 1.2 - Submittal Procedures.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

C. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

1.6 SAMPLES

A. Submit full-size, fully fabricated samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers or materials, color range sets, and swatches showing color, texture, and pattern.

B. Mount, display, or package samples in the manner specified to facilitate review of qualities indicated. Prepare samples to match ENGINEER’s sample. Include the following:
1. Generic description of the sample.

2. Sample source.

3. Product name or name of manufacturer.

4. Compliance with recognized standards.

5. Availability and delivery time.

C. Submit samples for review of kind, color, pattern, and texture, for a final check of these characteristics with other elements, and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed.

D. Refer to other specification sections for requirements for samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.

E. Preliminary Submittals: Where samples are for selection of color, pattern, texture, or similar characteristics from a range of standard choices, submit a full set of choices for the material or product.

1. Preliminary Submittals will be reviewed and returned with ENGINEER's mark indicating selection and other action.

F. Except for samples illustrating assembly details, workmanship, fabrication techniques, connections, operation and similar characteristics, submit 3 sets; one will be returned marked with the action taken.

G. Maintain sets of samples, as returned, at the site, for quality comparisons throughout the course of construction.

H. Unless noncompliance with Contract Document provisions is observed the submittal may serve as the final submittal.

I. Sample sets may be used to obtain final acceptance of the construction associated with each set.

1.7 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to ENGINEER for delivery to OWNER in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.8 MANUFACTURER'S FIELD REPORTS

A. Submit reports for the OWNER.

B. Submit report in duplicate, within 7 days of observation, to ENGINEER and OWNER for Information.

C. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

1.9 CONSTRUCTION SCHEDULE

A. Bar Chart Schedule:

1. Prepare a fully developed, horizontal bar chart type construction schedule. Schedule shall be prepared electronically in Microsoft Project with critical path and links shown. Submit color copies of the schedule within 30 days of the date established for commencement of the work.

2. Provide a separate item bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the work as indicated on schedule of values.

3. Prepare schedule of sheet, or series of sheets, of stable transparency, or other reproducible media, of sufficient width to show data for entire construction period.

4. Secure time commitments for performing critical elements of the work from parties involved. Coordinate each element on schedule with other construction activities; include minor elements involved in the sequence of the work. Show each activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the work.

5. Coordinate construction schedule with schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other schedules.

6. Indicate completion in advance of the date established for substantial completion. Indicate substantial completion of schedule to allow time for ENGINEER's procedures necessary for certification of substantial completion

B. Schedule Updating: Provide an updated construction schedule at each progress meeting. Color copies of the updated schedule shall be prepared for all attendees.

1.10 SUBMITTAL SCHEDULE

A. After development and acceptance of the construction schedule, prepare a complete schedule of submittals. Submit schedule within 10 days of the date required for establishment of construction schedule.

B. Coordinate submittal schedule with the list of subcontracts, schedule of values, and the list of products as well as construction schedule.

C. Prepare schedule in chronological order; include submittals required during the first 90 days. Provide the following information:

1. Scheduled date for the first submittal.

2. Related section number.

3. Submittal category.

4. Name of subcontractor.

5. Description of the part of the work covered.

6. Scheduled date for Resubmittal.

7. Scheduled date ENGINEER's final release or approval.

D. The submittal schedule shall reflect critical path shop drawings that must be expedited.

E. Following response to initial submittal, print and distribute copies to ENGINEER, OWNER, subcontractors, and other parities required to comply with submittal dates indicated. Post copies in the project meeting room and field office.

F. When revisions are made, distribute to the same parities and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the work and are no longer involved in construction activities.

G. Schedule Updating: Provide an updated submittal schedule at each progress meeting.

1.11 DIGITAL FILE MANAGEMENT

A. The CONTRACTOR shall setup a Sharepoint (or similar secure cloud location) to file all construction submittals including correspondence, meeting minutes, photos, shop drawings, etc. CONTRACTOR shall be responsible for keeping all documentation organized and readily available to the OWNER and ENGINEER. At project completion, all files shall be transferred to a USB drive and delivered to the OWNER.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.1 ENGINEER'S ACTION

A. Except for submittals for record, information or similar purposes, where action and return is required or requested, ENGINEER will review each submittal, mark to indicate action taken, and return promptly.

1. Compliance with specified characteristics is CONTRACTOR's responsibility.

B. Action Stamp: ENGINEER will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:

1. Final Unrestricted Release: Where submittals are marked "No Exceptions Taken" that part of the work covered by the submittal may proceed provided it complies with the requirements of the Contract Documents; final acceptance will depend upon the compliance.

2. Final-But-Restricted Release: When submittals are marked "Make Corrections Noted" that part of the work covered by the submittal may proceed, provided it complies with notation or correction on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.

3. Returned for Resubmittal: When submittal is marked "Rejected" or "Revise and Resubmit" do not proceed with the part of the work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a

new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.

a. Do not permit submittals marked “Rejected” or “Revise and Resubmit” to be used at site, or elsewhere where work is in progress.

4. Additional Information Needed: When submittal is marked “Submit Specified Item” CONTRACTOR shall submit requested information.

5. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked “Acknowledge Receipt”.

6. The approval of ENGINEER shall not relieve CONTRACTOR of responsibility for errors on drawings or submittals as ENGINEER’s checking is intended to cover compliance with drawings and specifications and not enter into every detail of the shop work.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Substantial Completion

B. Final Inspection

C. Request for Final Payment

1.2 SUBSTANTIAL COMPLETION

A. Before requesting inspection for Certification of Substantial completion, complete the following. List exceptions in the request.

1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the work claimed as substantially complete. Include supporting documents for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the contract price.

2. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the work is not complete.

3. Advise OWNER of pending insurance changeover requirements.

4. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.

5. Obtain and submit releases enabling OWNER unrestricted use of the work and access to services and utilities; include occupancy permits, operating certificate, and similar releases.

6. Complete final cleanup requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.

B. Inspection Procedures: On receipt of a request for inspection, ENGINEER will either proceed with inspection or advise CONTRACTOR of unfilled requirements.

1. ENGINEER will prepare the Certificate of Substantial Completion following inspection, or advise CONTRACTOR of construction that must be completed or corrected before the certificate will be issued.

2. ENGINEER will repeat inspection when requested and assured that the work has been substantially completed.

3. Results of completed inspection will form the basis of requirements for final acceptance.

4. Date of Substantial Completion will begin the warranty period unless noted otherwise.

1.3 FINAL ACCEPTANCE

A. Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

2. Submit an updated final statement, accounting for final additional changes to the contract price.

3. Submit a copy of ENGINEER's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance. The list shall be endorsed and dated by the ENGINEER.

4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion, or when OWNER took possession of and responsibility for corresponding elements of the work.

5. Submit consent of surety to final payment.

6. Submit a final liquidated damages settlement statement.

7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

8. Submit record drawings, maintenance manuals, damage or settlement survey, property survey, and similar final record information.

9. Deliver tools, spare parts, extra stock, and similar items.

10. Make final changeover of permanent locks and transmit keys to OWNER. Advise OWNER's personnel of changeover in security provisions.

11. Complete commissioning and training of OWNER's personnel.

12. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.

13. Complete final site cleanup.

B. Reinspection Procedure: ENGINEER will inspect the work upon receipt of notice that work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the ENGINEER.

1. Upon completion of reinspection, ENGINEER will prepare a certificate of final acceptance, or advise CONTRACTOR of work that is incomplete or of obligations that have not been fulfilled bet are required for final acceptance.

2. If necessary, reinspection will be repeated.

1.4 REQUEST FOR FINAL PAYMENT

A. Submit request for final payment in accordance with the Agreement and General Conditions, as may be modified by the Supplementary Conditions, using procedure specified below.

B. Request for final payment shall include:

1. Documents required for progress payments, which include AIA application for payment, partial waivers of lien, and sworn statement.

2. Documents required in the General Conditions, as may be modified by the Supplementary Conditions.

3. Releases or Waivers of Lien Rights:

a. When submitting releases or waivers of Lien rights, provide release or waiver by CONTRACTOR and each Subcontractor and Supplier that provided CONTRACTOR with labor, material, or equipment.

b. Provide list of Subcontractors and Suppliers for which release or waiver of Lien is required.

c. Each release or waiver of Lien shall be signed by an authorized representative of entity submitting release or waiver to CONTRACTOR, and shall include Subcontractor's or Supplier's corporate seal if applicable.

d. Release or waiver of Lien may be conditional upon receipt of final payment.

4. Consent of Surety.

5. Documentation that all punch list items are complete.

6. Warranties.

7. Operation and Maintenance Manuals.

8. Record Drawings being maintained by the CONTRACTOR.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1 DESCRIPTION

A. Concrete work shall include the furnishing of all labor, materials, formwork, reinforcing, tools and equipment required to manufacture, transport, place, protect, repair, cure, and finish all concrete work for a complete and functioning installation in accordance with the Contract Documents.

B. The CONTRACTOR shall be responsible for all items (openings, rebar, sleeves, inserts, anchorages, etc.) shown on the Plans and those which may not be shown on the Plans but are required to be placed in the concrete work.

C. Progress of Work

1. If unacceptable concrete strength or air content occurs and additional testing or remedial actions or modifications are required, further concrete work will not be permitted until such testing has revealed the probable cause of the low strength or low air levels and a program of remedial actions or modifications has been implemented.

1.2 DEFINITIONS

A. The following supplemental definitions cover the meanings of certain words and terms as used in this Section.

1. Reviewed or Permitted: Reviewed by the OWNER and/or OWNER's REPRESENTATIVE.

2. Exposed Construction: Exposed to view. Situated so that it can be seen from eye level from any location after completion of the structure.

3. Normal Weight Concrete: Concrete for which density is not a controlling attribute, made with aggregates of the types covered by "Specification for Concrete Aggregates" (ASTM C-33), and having unit weights in the range of 135 to 160 lb/cu ft.

B. Other words and terms used in these specifications are defined in Cement and Concrete Terminology (ACI-SP-19).

1.3 STANDARDS

A. The latest edition of the standards from the American Society for Testing and Materials, American Concrete Institute, American Welding Society, and Concrete Reinforcing Steel Institute, referred to in these Specifications, are listed below with their serial designation and are declared to be a part of these Specifications, the same as if fully set forth herein, except as modified in this Specification.

1. American Society for Testing and Materials, 1916 Race St., Philadelphia, PA 19103:

A 82-85 Standard Specification for Cold-Drawn Steel Wire for Concrete Reinforcement

A 184-86 Standard Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement

A 185-85 Standard Specification for Welded Steel Wire Fabric for Concrete Reinforcement

A 496-85 Standard Specification for Deformed Steel Wire for Concrete Reinforcement

A 497-86 Standard Specification for Welded Deformed Steel Wire Fabric for Concrete Reinforcement

A 615-87 Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

C 31-87a (1980) Standard Method of Making and Curing Concrete Test Specimens in the Field

C 33-86 Standard Specification for Concrete Aggregates

C 39-86 Standard Method of Test for Compressive Strength of Cylindrical Concrete Specimens

C 42-84a Standard Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

C 94-86b Standard Specification for Ready-Mixed Concrete

C 109-86 Standard Method of Test for Compressive Strength of Hydraulic Cement Mortars (using 2-inch (50-mm) cube specimens)

C 138-81 Standard Method of Test for Unit Weight Yield, and Air Content (Gravimetric) of Concrete

C 143-78 Standard Method of Test for Slump of Portland Cement Concrete

C 144-87 Standard Specification for Aggregate for Masonry Mortar

C 150-86 Standard Specification for Portland Cement

C 172-82 Standard Method of Sampling Fresh Concrete

C 173-78 Standard Method of Test for Air Content of Freshly Mixed Concrete by the Volumetric Method

C 192-81 Standard Method of Making and Curing Concrete Test Specimens in the Laboratory

C 231-82 Standard Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method

C 260-86 Standard Specification for Air-Entraining Admixtures for Concrete

C 309-81 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

C 387-87 Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete

C 494-86 Standard Specification for Chemical Admixtures for Concrete

D 994-71 Standard Specification for Preformed expansion Joint Filler for Concrete (Bituminous Type)

D 1751-83 Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)

E 329-77 Standard Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction

2. American Concrete Institute, Box 19150, Redford Station, Detroit, Michigan 48219

SP-1 5 Field Reference Manual: Specifications for Structural Concrete for Buildings ACI 301-89 with Selected ACI and ASTM References, 1989.

ACI 116 Cement and Concrete Terminology.

ACI 211.1 Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete

ACI 212.3 Chemical Admixtures in Concrete

ACI 214 Recommended Practice for Evaluation of Strength Test Results of Concrete

ACI 302.1 Guide for Concrete Floor and Slab Construction

ACI 303 Guide to Cast-In-Place Architectural Concrete Practice

ACI 304 Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete

ACI 302 Placing Concrete by Pumping Methods

ACI 305 Hot Weather Concreting

ACI 306 Cold Weather Concreting

ACI 308 Standard Practice for Curing Concrete

ACI 309 Recommended Practice for Consolidation of Concrete

ACI 315 Details and Detailing of Concrete Reinforcement

ACI 318 Building Code Requirements for Reinforced Concrete

ACI 318.1 Building Code Requirements for Structural Plain Concrete

ACI 347 Recommended Practice for Concrete Formwork

ACI 350 Concrete Sanitary Engineering Structures

ACI 503 Use of Epoxy Compounds with Concrete

3. American Welding Society, 550 N.W. LeJenne Road, P.O. Box 351040, Miami, FL 33135; “Structural Welding Code - Reinforcing Steel” (AWS D1.4-79).

4. Concrete Plant Manufacturers Bureau, 900 Spring Street, Silver Spring, MD 20910: “Concrete Plant Mixer Standards of the Plant Mixer Manufacturer’s Division”.

5. National Ready Mix Concrete Association, 900 Spring Street, Silver Spring, MD 20910: “Check List for Certification of Ready Mixed Concrete Production Facilities”.

6. Concrete Reinforcing Steel Institute, 228 North LaSalle Street, Chicago, Illinois 60601: “Placing Reinforcing Bars,” and “Reinforcement Anchorages and Splices,” latest editions.

B. Field Reference Manual

1. The CONTRACTOR shall keep at least one copy of “Specifications for Structural Concrete for Buildings (ACI 301) with Selected ACI and ASTM References “ACI Field Reference Manual SP-15, in the field office at all times.

1.4 SUBMITTAL REQUIREMENTS

A. Shop Drawings: Submit in accordance with the General Conditions, covering the items included under this Section.

1. Shop Drawings of Reinforcement: Submit original Shop Drawings for fabrication, bending, and placement of concrete reinforcement. Comply with Reinforcement Shop Drawing Checklist below as applicable:

a. Reinforcement Shop Drawing Checklist:

1) Specify ASTM number and grade of reinforcing on submitted Shop Drawings (e.g., ASTM A 615, Grade 60).

2) Specify clear coverages and bar support spacing per Placing Reinforcement Specification in Article 2.09.

3) Specify lap lengths as shown on the Structural Drawings.

4) Submit Bar Bending Schedule.

5) Use closed stirrups and ties with 135-degree hooks, unless noted otherwise in Drawings.

6) Specify major Contract reference Drawings on submitted detail sheets. Use same section cut numbers and letters when practical.

7) Show stirrup spacing.

8) Show details for additional reinforcing items. Examples are reinforcing around openings, control joints, equipment pads, masonry reinforcement.

9) Show numeric elevation references on sections shown on submitted Shop Drawings.

10) Locate expansion and control joints.

11) Organize and present sheets in logical sequence.

12) Submit "small" submittal packages when practical.

13) Show inside and outside or near face and far face on walls.

14) Show bar spacings and quantities on Shop Drawing submittals.

15) Immediately contact OWNER and/or OWNER's REPRESENTATIVE if Contract Documents are unclear.

16) For epoxy coated reinforcement, coating applicator must furnish written certification that the coated reinforcing bars were cleaned, coated, and tested according to ASTM D3963.99.

b. Mix Designs: Submit the following for all concrete classes:

1) Water/cement ratio (total gallons of water per cubic yard)

2) Brand, type, and quantity of cement

3) Type and quantity of aggregates

4) Type and quantity of admixtures

5) Unit weight (wet density)

6) History of composition strength based on 28-day compression test. Test reports shall be current and within 90 days of submittal. Concrete supplier must demonstrate a familiarity with his supplied mix.

7) Submit laboratory test reports and certification letters for concrete mix design, cement, aggregates (particularly deleterious materials in coarse aggregate), four weeks before scheduled pouring.

B. Product Data: Submit data for proprietary materials and items, including admixtures, patching compounds, waterstops, joint systems, curing compounds, and other materials installed under this Section.

C. Submit samples of materials as requested by OWNER and/or OWNER's REPRESENTATIVE, including names, sources and descriptions.

D. Quality Assurance Submittals:

1. Submit written reports to ENGINEER documenting testing and inspection results.

2. Submit mill test reports on reinforcement.

3. Submit materials certificates in lieu of laboratory test reports on other materials. Manufacturer and CONTRACTOR shall sign material certificates certifying that each material item complies with, or exceeds, specified requirements. Submit certification from admixture manufacturers that chloride content complies with specification requirements.

4. CONTRACTOR shall be experienced with the placement, finishing, and curing of the specified concrete mixes and admixtures, and provide a minimum of five (5) reference projects.

1.5 PROJECT CONDITIONS

A. Protection against Freezing: Cover completed Work with sufficient temporary cover to protect against possibility of freezing. Provide supplemental heat and maintain cover for curing period or until temperatures cannot affect concrete.

B. Protect adjacent finish materials against spatter during concrete placement.

1.6 MANUFACTURERS

A. Subject to compliance with the specified requirements, manufacturers which may be incorporated in Work include:

1. Fiber Reinforcement:

    a. "Fiberstrand 100", Euclid Chemical Co.

    b. "Fibermesh", Fibermesh Co.

    c. "Forta", Forta Corporation

    d. "Grace Fibers", W.R. Grace & Co.

    e. “Fibrasol F”, Axim Technologies

2. Air-Entraining Admixture:

    a. AEA 15, Sika Corp.

3. Corrosion Inhibitor and Bonding Agent:

    a. Armatech 110-EpoCem, Sika Corporation

4. Water-Reducing Admixture:

    a. "Plastocrete 161", Sika Chemical Corporation

5. High-Range Water-Reducing Admixture:

    a. ViscoCrete 2100, Sika Corporation

6. Water Reducing, Non-Chloride Accelerator Admixture:

    a. Sika Corporation

7. Water-Reducing, Retarding Admixture:

    a. Sika Corporation

8. Expansion and Isolation Joint Filler (excluding pavements):

    a. "Sealtight Sponge Rubber", W.R. Meadows

    b. "1300 Series Sponge Rubber", Williams Products

9. Expansion and Isolation Joint Sealant, one part polyurethane:

    a. "Vulkem 45 or 116", Mameco International

    b. "Sonolastic NP1", Sonneborn-Contech

    c. "Dynaseal W-517 or 907", Williams Products

10. Non-Shrink Grout:

    a. Dayton-Superior

    b. Euclid Chemical Co.

    c. Master Builders

    d. U.S. Grout Corporation

11. Chemical Hardener:

    a. "Burk-O-Lith", The Burke Co.

    b. "Day-Chem Hardener", Dayton-Superior

    c. "Surfhard", Euclid Chemical Co.

    d. "Mastertop CST", Master Builders

    e. "Lapidolith", Sonneborne-Rexnord

12. Moisture-Retaining Cover:

    a. Polyethylene-coated burlap.

13. Epoxy Anchors:

    a. “HIT HY150”, Hilti Systems

PART 2 - PRODUCTS

2.1 CEMENT

A. Cement shall be Portland cement Types I or III, and shall conform to ASTM C150 and contain less than 0.60 percent alkalies. Different cements shall not be used interchangeably in the same element or portion of the work.

2.2 ADMIXTURES

A. The following admixtures will be permitted or required in the concrete as stated.

1. Air-entraining admixture conforming to ASTM C260.

2. Water reducing, retarding and accelerating admixtures conforming to ASTM C494 will be permitted in concrete made with Type I Cement. Water reducing admixture conforming to ASTM C494 will be permitted in concrete made with Type III Cement.

3. Fly Ash

a. Fly ash shall be Type Class C or F, meeting the requirements of ASTM C618 and the carbon content shall be less than one percent.

B. Admixtures used in the concrete shall be of the same composition as used in establishing the required concrete proportions (See paragraph 2.07 of this Section of the Specifications).

C. Calcium chloride or admixtures containing calcium chloride will not be permitted in the concrete work.

D. The name, manufacturer, and technical information for all admixtures shall be submitted for approval.

E. All admixtures shall be used in accordance with the manufacturer's instructions.

F. Admixtures shall be supplied by a single manufacturer to ensure compatibility.

2.3 WATER

A. Mixing water for concrete shall be fresh, clean, and free from injurious amounts of oil, acid, alkalies, salts, sewage, organic matter, or other deleterious substances and meet the requirements of ASTM C94.

2.4 AGGREGATES

A. Aggregates shall conform to ASTM C33. Coarse aggregates shall meet the grading requirements for size 67 for all concrete work unless noted otherwise.

B. Fine and coarse aggregates shall be regarded as separate ingredients. Each size of coarse aggregate, as well as the combination of sizes when two or more are used, shall conform to the appropriate grading requirements of the applicable ASTM specifications.

C. Aggregates shall be tested for reactivity. To minimize alkali-silica reactions, high alkali content shall not be permitted.

2.5 FIBER REINFORCEMENT

A. Polypropylene fibers designed as secondary reinforcing. Fibers to comply with ASTM C1116, Type III, not less than ¾-inch long.

2.6 STORAGE OF MATERIALS

A. Cement shall be stored in weather-tight buildings, bins, or silos which will exclude moisture and contaminants.

B. Aggregate stockpiles shall be arranged and used in a manner to avoid excessive segregation and to prevent contamination with other materials or with other sizes of like aggregates. To ensure that this condition is met, any test for determining conformance to requirements for cleanness and grading shall be performed on samples secured from the aggregates at the point of batching. Frozen or partially frozen aggregates shall not be used.

C. Natural or manufactured sand shall be allowed to drain until it has reached relatively uniform moisture content before it is used.

D. To prevent excessive variations in moisture content, predampened aggregates must remain in the stockpiles for a minimum of 12 hours before use.

E. Admixtures shall be stored in such a manner as to avoid contamination, evaporation, or damage. For those used in the form of suspensions or non-stable solutions, agitating equipment shall be provided to assure thorough distribution of the ingredients. Liquid admixtures shall be protected from freezing and from temperature changes which would adversely affect their characteristics.

F. Moisture retaining covers shall be one of the following, complying with ASTM C17:

1. Waterproof Paper
2. Polyethylene Film, Burleen

2.7 PROPORTIONING

A. General

1. Concrete for all parts of the work shall be of the specified quality capable of being placed without excessive segregation. When hardened, concrete shall develop all characteristics required by these Specifications.

2. Use Portland Cement Type I or III.

3. Fly ash shall be used to partially supplant cement content in concrete. Replacement quantity shall be not less than 15%, nor more than 20% of cement content by weight.

4. Concrete shall not have less than one inch slump as determined by ASTM C143.

5. The nominal maximum size of the aggregate shall not be more than one-fifth of the narrowest dimension between sides of forms, one-third of the depth of slabs, nor three-fourths of the minimum clear spacing between reinforcing bars.

B. Design Mixes

1. Locations for concrete classes are attached at the end of this section.

2. Properties for concrete classes are attached at end of this section.

3. Adjustment of Concrete Mixes: Mix designs may be adjusted when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, when approved by ENGINEER, at no additional cost to OWNER. Submit laboratory test data for revised mix design and strength results to ENGINEER before using in work.

4. Admixtures:

a. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete for placement and workability.

b. Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50 degrees F (10 degrees C).

c. Add air-entraining admixture at manufacturer's prescribed rate to result in placed concrete having total air content specified.

d. Refer to the mix designs attached at the end of this section for other specific admixture usage.

2.8 FORMWORK

A. General

1. Forms shall be used to confine the concrete and shape it to the required dimensions. Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete, and shall have sufficient rigidity to maintain specified tolerances.

2. Formwork shall conform to ACI 347.

3. Earth cuts may be used to form footings, trench footings, and mass footings provided that the cut is clean, reasonably straight, and meets the tolerances of this Section. Review by the ENGINEER is required in order to use earthcuts. If the earth cannot hold the shapes required by the Drawings these items shall be formed.

B. Design and Installation of Formwork

1. The design and engineering of the formwork, as well as its construction, shall be the responsibility of the CONTRACTOR.

2. The formwork shall be designed for the loads, lateral pressure, and allowable stresses outlined in ACI 347, Design of "Recommended Practice for Concrete Formwork" as well as for the design considerations, wind loads, allowable stresses, and other applicable requirements of the controlling local building code.

3. Requirements for facing materials are given in following items of this Section of the Specifications. The maximum deflection of facing materials reflected in concrete surfaces exposed to view shall be 1/240 of the span between structural members.

4. Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Chamfer strips (1" x 1" x 1-1/2") shall be placed in the corners of forms to produce beveled edges on permanently exposed surfaces unless detailed otherwise. Interior corners on such surfaces and the edges of formed joints will not require beveling. Exposed surfaces include surfaces exposed to view or water in the finished construction.

5. Positive means of adjustment (wedge or jacks) of shores and struts shall be provided and all settlement shall be taken up during concrete placing operation. Forms shall be securely braced against lateral deflections. Formwork shall be cambered to compensate for anticipated deflections in the formwork prior to hardening of the concrete.

6. Temporary openings shall be provided at the base of column forms and wall forms and at other points where necessary to facilitate cleaning and observation immediately before concrete is placed.

7. Form accessories to be partially or wholly embedded in the concrete, such as ties and hangers, shall be of a commercially manufactured type. Non-fabricated wire shall not be used.

8. Form ties shall be constructed so that the end or end fasteners can be removed without causing appreciable spalling at the faces of the concrete. Form ties shall have cones on each end.

   a. Non-Exposed Concrete Work: After the ends or end fasteners of form ties have been removed, the embedded portion of the ties shall terminate not

less than 2 diameters or twice the minimum dimension of the tie from the formed faces of concrete and in no case shall this distance be less than 3/4 inch.

b. Exposed Concrete Work (this shall apply to areas where one or both faces of the work is exposed to view; i.e., retaining wall): Form, ties, assemblies for concrete exposed to water, influent, effluent, weather, freeze/thaw and similar exposures shall permit tightening of the forms and shall leave no metal or other material within 1-1/2 inch of the surface. The assembly should provide cone-shaped depressions at the form/concrete surface interface of at least one inch diameter and 1-1/2 inch deep to permit filling and patching. Tie shall be tight fitting or tie holes shall be sealed to prevent leakage. Single rod ties shall be equipped with a tightly fitted washer at midpoint when part of the tie is to remain in concrete exposed to liquids.

c. Tie systems shall provide positive pressure at all joints to preclude mortar/grout leakage.

9. At construction joints, contact surface of the form sheathing for flush surfaces shall overlap the hardened concrete in the previous placement by not more than 1 inch. The forms shall be held against the hardened concrete to prevent offsets or loss of mortar at the construction joint and to maintain a true surface.

10. Wood forms for wall openings shall be constructed to facilitate loosening, if necessary, to counteract swelling of the forms.

11. Wedges used for final adjustment of the forms prior to concrete placement shall be fastened in position after the final check.

12. Formwork shall be so anchored to shores or other supporting surfaces or members that upward or lateral movement of any part of the formwork system during concrete placement will be prevented.

13. Runways for moving equipment shall be provided with struts or legs and shall be supported directly on the formwork or structural member without resting on the reinforcing steel.

14. Provide temporary openings at base of wall and column forms and other interior areas of formwork where it is inaccessible for cleanout, for observation before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

15. Provisions for other trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing these items. Accurately place and securely support items built into forms.

C. Tolerances

1. The formwork shall be constructed so that the concrete surfaces will conform to the tolerance limits listed in Table 2.08.C.1.

Table 2.08.C.1
Tolerances for Formed Surfaces

(1) Variation from plumb:

a. In the lines and surfaces of columns, piers, walls, and in arises:

in any l0 ft of length	¼ - inch
maximum for entire length	1 inch

b. For exposed corner columns, control joint grooves and other conspicuous lines:

in any 20'- 0" length	¼ - inch
maximum for the entire length	½ - inch

(2) Variation from the level or from the grades specified in the Contract Documents:

a. In slab soffits, ceilings, beam soffits and in arises, measured before removal of supporting shores

in any 10 ft of length	¼ - inch
in any bay or any 20 ft length	⅜ - inch
maximum for entire length	¾ - inch

b. In exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines:

in any bay or in 20 ft length	¼ - inch
maximum for entire length	½ - inch

(3) Variation of the linear building lines from established position in plan and related position of columns, walls, & partitions:

in any bay	½ - inch
in any 20 ft of length	½ - inch
maximum for entire length	1 inch

(4) Variation in the sizes and location of sleeves, floor openings, & wall openings

± ¼ - inch

(5) Variation in cross-sectional dimensions of columns and beams and in the thickness of slabs and walls

minus	¼ - inch
plus	½ - inch

(6) Footings

a. Variations in dimensions in plan:

minus	½ - inch
plus	2 inches

b. Misplacement of eccentricity:

2% of footing width in direction of misplacement but no more than 2 inches

c. Thickness:

decrease in specified thickness	0 inch
increase in specified thickness	1 inch

(7) Variation in steps:

a. In a flight of stairs:

Rise	± ⅛ - inch
Tread	± ⅛ - inch

b. In consecutive steps:

Rise	± 1/16 - inch
Tread	± ⅛ - inch

2. The CONTRACTOR shall establish and maintain in an undisturbed condition and until final completion and acceptance of the project sufficient control points and benchmarks to be used for reference purposes to check tolerances.

3. Regardless of the tolerances listed in Table 208.C.1, no portion of the building shall extend beyond the legal boundary of the project.

D. Preparation of Form Surfaces

1. All surfaces of forms and embedded materials shall be cleaned of any accumulated mortar or grout from previous concreting and of all other foreign material before concrete is placed in them. Local defects such as chipped plywood or kinks in steel forms will not be permitted.

2. Unless otherwise specified or approved, surfaces of forms shall be treated as follows:

a. Before placing of either the reinforcing steel or the concrete, the surfaces of the forms shall be covered with an approved coating material that will effectively prevent absorption of moisture and prevent bond with the concrete, and will not stain the concrete surfaces. A field applied form release agent or sealer of approved type or a factory applied non-absorptive liner may be used.

b. Excess form coating material shall not be allowed to stand in puddles in the forms nor shall such coating be allowed to come in contact with reinforcing steel or with hardened concrete against which fresh concrete is to be placed.

3. The CONTRACTOR shall submit the name of the form coating agent material proposed to be used with sufficient supportive documentation to the ENGINEER for review.

E. Removal of Forms

1. Forms shall be removed as soon as the concrete has hardened sufficiently to resist damage from removal operations after review by the ENGINEER.

2. Top forms on sloping surfaces of concrete shall be removed as soon as the concrete has attained sufficient stiffness to prevent sagging. Any needed repairs or treatment required on such sloping surfaces shall be performed at once and be followed by specified curves.

3. Wood forms for wall openings shall be loosened as soon as this can be accomplished without damage to the concrete.

4. Formwork for columns, walls, sides of beams, and other parts not supporting the weight of the concrete may be removed as soon as the concrete has hardened sufficiently to resist damage from removal operations.

5. Forms and shoring in the formwork used to support the weight of concrete in beams, slabs, arches and other structural members shall remain in place until the concrete has reached 28-day compressive strength.

6. When shores and other vertical supports are so arranged that the non-load-carrying form facing material may be removed without loosening or disturbing the shores and supports, the facing material may be removed at an earlier age as permitted by the ENGINEER.

F. Removal Strength

1. When removal of formwork is based on the concrete reaching a specified strength, the concrete shall be presumed to have reached this strength when the following conditions have been met:

a. When the concrete has been cured in accordance with the provisions of Article 3.06 for the same length of time as the age at test of laboratory-cured cylinders which reached the specified strength for form removal. The length of time the concrete has been cured in the structure shall be determined by the cumulative number of days or fractions thereof, not necessarily consecutive, during which the temperature of the air in contact with the concrete is above 50˚F and the concrete has been damp or thoroughly sealed from evaporation and loss of moisture.

2.9 REINFORCEMENT

A. General

1. Shop Drawings, showing all fabrication dimensions and locations for placing of the reinforcing steel and accessories shall be submitted for review in accordance with provisions in Article 1.04. Review shall be obtained before fabrication.

2. Details of concrete reinforcement and accessories not covered herein shall be in accordance with ACI 315.

B. Reinforcing Steel

1. All reinforcement shall be Grade 60 (fy = 60,000 psi) and shall conform to the appropriate Specification listed below, except as follows:

a. Yield strength shall be determined by testing of full size bars.

b. For bars, wire, or wire fabric with a specified yield strength fy exceeding 60,000 psi, fy shall be the stress corresponding to a strain of 0.35 percent.

2. Reinforcing bars shall conform to ASTM A615 Grade 60 and the supplementary requirement S1 shall apply.

3. All cutting, bending, fabrication, and erection of reinforcing steel shall conform to the "Manual for Concrete Structures". (ACI 315 latest edition).

4. All splicing of reinforcing steel shall conform to "Reinforcing Bar Splices" latest edition by the Concrete Reinforcing Steel Institute and the "Building Code Requirements for Reinforced Concrete" (ACI 318-99).

5. Mats: Bar and rod mats for concrete reinforcement shall be of the clipped type conforming to "Specification for Fabricated Steel Bar or Rod Mats for Concrete Reinforcement" (ASTM A 184).

6. The use of plain bars is not permitted.

7. Supports for reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar supports complying with CRSI specifications.

8. For slabs-on-grade, use supports with sand plates or horizontal runners where base material does not support chair legs.

9. For exposed-to-view concrete surfaces, where support legs are in contact with forms, use supports with legs which are plastic protected (CRSI, Class I) or stainless steel-protected (CRSI, Class 2).

C. Welding

1. When required or permitted, all welding of reinforcing bars shall conform to AWS D14. Unless otherwise accepted, welding of cross bars (tack welding) for assembly of reinforcement is prohibited. Reinforcing to be welded must be certified as weldable.

2. Welding of wire to wire, and of wire or welded wire fabric to reinforcing bars or structural steels, shall conform to applicable provisions of AWS D14 and supplementary requirements specified by the Architect/ENGINEER.

D. Fabricating and Placing Tolerances

1. Bars shall be fabricated in accordance with the tolerances given in ACI 315.

2. Reinforcement shall be placed to the following tolerances:

	Tolerances, In.
Clear distance	
To formed soffits	- ¼
To other formed surfaces	¼
Minimum spacing between bars	- ¼
Clear distances from unformed surface to top reinforcement	
Members 8 in. deep or less	¼
Members more than 8 in. deep but less than 24 in. deep	- ¼, + ½
Members 24 in. deep or greater	- ¼, + 1
Uniform spacing of bars, but the required number of bars shall not be reduced	2
Uniform spacing of stirrups and ties, but the required number of stirrups and ties shall not be reduced	1
Longitudinal locations of bends and ends of reinforcement	
General	2
Discontinuous ends of members	½ - 1½
Length of bar laps	- 1½
Embedded length	
For bar sizes No. 3 through 11	- 1
For bar sizes No. 14 and 18	- 2

3. Bars may be moved as necessary to avoid interference with other reinforcing steel, or embedded items. If bars are moved more than one bar diameter, or enough to exceed the above tolerances, additional reinforcing as directed by the ENGINEER may be required.

E. Placing

1. Minimum concrete cover for reinforcement, except for extremely corrosive atmosphere, other severe exposures, or fire protection, shall be as follows unless shown otherwise on the Drawings:

	Minimum cover, in.
Concrete deposited against the ground	3
Formed surfaces exposed to weather or in contact with the ground	
For bar sizes No. 6 or larger	2
For bar sizes No. 5 and smaller, and W31 or D31 wire and smaller	1½
Formed surfaces not exposed to weather or not in contact with the ground	
Beams, girders, and columns	1½
Slabs, walls, and joists	
For bar sizes No. 11 or smaller	¾
For bar sizes No. 14 and 18	1½

2. All reinforcement, at the time concrete is placed, shall be free of mud, oil or other materials that may adversely affect or reduce the bond. Reinforcement with rust, mill scale or a combination of both will be accepted as being satisfactory without cleaning or brushing provided the dimensions and weights, including heights of deformations, of a cleaned sample are not less than required by the applicable ASTM specification.

3. All reinforcement shall be supported and fastened together to prevent displacement by construction loads or the placing of concrete beyond the tolerances of paragraph 2.08.D. On ground, where necessary, supporting concrete blocks may be used. Over formwork, metal, plastic or other approved bar chairs and spacers shall be used. All accessories within ½ inch of the formed concrete surface shall be plastic coated.

4. Vertical bars in columns shall be offset at least one bar diameter at lapped splices. To insure proper placement, templates shall be furnished for all column dowels.

5. All splices not shown in the Contract Documents shall be subject to review by the ENGINEER.

   Splicing shall be a minimum of 48 bar diameters (typ uno)

6. Reinforcement shall not be bent after being embedded in hardened concrete.

2.10 JOINTS AND EMBEDDED ITEMS

A. Construction Joints

1. Joints not shown in the Contract Documents shall receive prior review by the ENGINEER and shall be so made and located at least to impair the strength of the structure. In general, they shall be located near the middle of the spans of slabs, beams, and girders unless a beam intersects a girder at this point, in which case the joint in the girder shall be offset a distance equal to twice the width of the beam. Joints in walls and columns shall be at the underside of floors, slabs, beams, or girders and at the tops of footings or floor slabs. Beams, girders, brackets, column capitals, haunches, and drop panels shall be placed at the same time as slabs. Joints shall be perpendicular to the main reinforcement.

2. All reinforcement shall be continued across joints. Keys and inclined dowels shall be provided as directed by the ENGINEER. Longitudinal keys at least 1-1/2 in. deep shall be provided in all joints in walls and between walls and slabs or footings.

3. The surface of the concrete at all joints shall be thoroughly cleaned and all laitance removed prior to placing adjoining concrete.

4. Bond shall be obtained by roughening the surface of concrete in an approved manner which will expose the aggregate uniformly and will not leave laitance, loosened particles of aggregate or damaged concrete at the surface.

5. Construction joints shall be located as shown on the Contract Documents. In general, slab and wall pours shall not exceed 1200 sq ft surface area in one concrete placement between construction joints, the longer edge shall not be greater than twice the shorter edge for any one concrete pour between construction joints, and pour sequences shall be scheduled and located so that shrinkage and creep effects are minimized.

B. Expansion Joints

1. Reinforcement or other embedded metal items bonded to the concrete (except dowels in floors bonded on only one side of joints) shall not be permitted to extend continuously through any expansion joint.

2. Premolded expansion and isolation joint filler shall be of the type required and located by the Contract Documents and shall conform to the following specifications.

a. "Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)" (ASTM D 994), at intersections of walls and pavements unless otherwise shown.

b. "Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)" (ASTM D 1751), at pavements where pavement to pavement is jointed.

c. “Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction” (ASTM D1752 Type 1) at all expansion and isolation joints in structural concrete.

3. Expansion and Isolation Joint Sealant, one part polyurethane: Concrete gray color unless otherwise required by ENGINEER. Before applying, wipe surface clean with solvent supplied by manufacturer.

C. Other Embedded Items

1. All sleeves, inserts, anchors, and embedded items required for adjoining work or for its support shall be placed prior to concreting.

D. Placing Embedded Items

1. Expansion joint material and other embedded items shall be positioned accurately and supported against displacement. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable material to prevent the entry of concrete into the voids.

2. Set and build into Work anchorage devices and other embedded items required for other work that are attached to, or supported by, cast-in-place concrete. Use setting Drawings, diagrams, instructions and directions provided by suppliers of attachment items.

3. Conduits and pipes of aluminum shall not be embedded in structural concrete unless they are effectively coated or covered to prevent aluminum-concrete reaction or electrolytic action between aluminum and steel.

PART 3 - EXECUTION

3.1 PRODUCTION OF CONCRETE

A. Ready-Mixed Concrete

1. Except as otherwise provided in this Section, ready-mixed concrete shall be batched, mixed and transported in accordance with "Specification for Ready-Mixed Concrete" (ASTM C 94) and ACI 304. Plant equipment and facilities shall conform to the "Check List for Certification of Ready Mixed Concrete Production Facilities" of the National Ready Mixed Concrete Association.

2. Concrete produced by on-site volumetric batching and continuous mixing shall be batched and mixed in accordance with and shall conform to all requirements of ASTM C685.

B. Control of Admixtures

1. Air-entraining admixtures, and other chemical admixtures shall be measured by means of an approved mechanical dispensing device. The liquid shall be considered a part of the mixing water. Admixtures that cannot be added in solution may be weighed or may be measured by volume if so recommended by the manufacturer.

2. If two or more admixtures are used in the concrete, they shall be added separately to avoid possible interaction that might interfere with the efficiency of either admixture or adversely affect the concrete.

3. Addition of retarding admixtures shall be completed within 1 minute after addition of water to the cement has been completed, or prior to the beginning of the last three-quarters of the required mixing, whichever occurs first.

C. Tempering and Control of Mixing Water

1. Concrete shall be mixed only in quantities for immediate use. Concrete which has set shall not be retempered, but shall be discarded.

2. The addition of water at the construction site will not be permitted.

D. Weather Conditions

1. Cold Weather - Ambient Temperature 45°F or below

a. In cold weather, the temperature of the concrete when delivered at the site of the work shall conform to the following temperature limitations:

Minimum Temperature (°F)	Minimum Concrete Temperature (°F)
30 to 45	60
15 to 30	65
below 15	no concreting permitted

b. If water or aggregate is heated above 100°F, the water shall be combined with the aggregate in the mixer before cement is added. Cement shall not be mixed with water or with mixtures of water and aggregate having a temperature greater than 100°F.

c. When the temperature of the surrounding air is expected to be below 40°F during placing or within 24 hours thereafter, special precautions for concrete, placing, and protection shall be followed as required by "Recommended Practice for Cold Weather Concreting" ACI 306 and modifications herein, see Article 3.06.

d. The CONTRACTOR shall provide all labor, equipment, and materials to meet the above cold weather requirements.

2. Hot Weather Ambient Temperature 90°F or Above

a. The ingredients shall be cooled before mixing, or flake ice or well-crushed ice of a size that will melt completely during mixing may be substituted for

all or part of the mixing water if, due to high temperature, low slump, flash set or cold joints are encountered.

b. Concreting under hot weather conditions shall conform to "Recommended Practice for Hot Weather Concreting" ACI 305 and modifications herein. See Article 3.06. The use of an approved set retarder will be permitted under hot weather conditions.

3.2 PLACING

A. Preparation Before Placing

1. Hardened concrete and foreign materials shall be removed from the inner surfaces of the conveying equipment.

2. Formwork shall have been completed; snow, ice and water shall have been removed; reinforcement shall have been secured in place; expansion joint material, anchors, and other embedded items shall have been positioned.

3. Semi-porous subgrades shall be sprinkled sufficiently to eliminate suction and porous subgrades shall be sealed in an approved manner. See paragraph 3.05.B.4.

4. Concrete shall not be placed on frozen ground.

B. Conveying

1. Concrete shall be handled from the mixer to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of ingredients and in a manner which will assure that the required quality of the concrete is maintained.

2. Conveying equipment shall be approved and shall be of a size and design such that detectable setting of concrete shall not occur before adjacent concrete is placed. Conveying equipment shall be cleaned at the end of each operation or workday. Conveying equipment and operations shall conform to the following additional requirements:

a. Truck mixers, agitators, and non-agitating units and their manner of operation shall conform to the applicable requirements of "Specification for Ready-Mixed Concrete" (ASTM C 94).

b. Belt conveyors shall be horizontal or at a slope which will not cause excessive segregation or loss of ingredients. Concrete shall be protected against undue drying or rise in temperature. An approved arrangement shall be used at the discharge end to prevent apparent segregation. Mortar shall not be allowed to adhere to the return length of the belt. Long runs shall be discharged into a hopper or through a baffle.

c. Chutes shall be metal or metal-lined and shall have a slope not exceeding 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20 feet long and chutes not meeting the slope requirements may not be used.

d. Pumping or pneumatic conveying equipment shall be of suitable kind with adequate pumping capacity and shall conform to ACI committee report 304. Pneumatic placement shall be controlled so that segregation is not apparent in the discharged concrete. The loss of slump in pumping or

pneumatic conveying equipment shall not exceed 1-1/2 inches. Concrete shall not be conveyed through pipe made of aluminum or aluminum alloy.

C. Depositing

1. General: Concrete shall be deposited continuously, or in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, construction joints shall be located as shown in the Contract Documents or as approved. Placing shall be carried on at such a rate that the concrete which is being integrated with fresh concrete is still plastic. Concrete which has partially hardened or has been contaminated by foreign materials shall not be deposited. Temporary spreaders in forms shall be removed when the concrete placing has reached an elevation rendering their service unnecessary. They may remain embedded in the concrete only if made of metal or concrete and if prior approval has been obtained. Communication between the batching plant and the point of delivery shall be such that concrete placement can proceed without interruption and without trucks waiting more than 15 minutes to make delivery.

2. Placing: Placing of concrete in supported elements shall not be started until the concrete previously placed in columns and walls is no longer plastic and has been in place at least two hours. Wall and column placement and consolidation shall be in approximately horizontal layers not exceeding 2 feet in height. Concrete shall not be allowed to drop freely more than 4 ft or through a reinforcing steel cage. Sections of walls between joints shall be placed continuously to produce a monolithic unit. At least 48 hours shall elapse between casting of adjoining wall units.

3. Segregation: Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to rehandling or flowing. Concrete shall not be subjected to any procedure which will cause segregation. Horizontal flow shall not exceed five feet. Where concrete placing operations involve dropping concrete freely more than 4 feet vertically, spouts or pipes shall be used. Such pipes or spouts shall be of suitable diameter for the large aggregate being used, shall be kept within 3 feet of the concrete, and shall have suitable hoppers on their upper ends. Temporary openings or portholes in wall or column forms may be used to limit concrete free-fall to less than 4 ft. The ports should be spaced no more than 6 to 8 ft apart to limit horizontal concrete flow.

4. Placement Time: Concrete shall be placed no more than 90 minutes after the cement is first introduced into the drum. The batch will be rejected and removed from the site if this limit is exceeded.

5. Consolidation: All concrete shall be consolidated by vibration, spading, rodding or forking so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into corners of forms, eliminating all air or stone pockets which may cause honeycombing, pitting, or planes of weakness. Internal vibrators shall have a minimum frequency of 8000 vibrations per min., and sufficient amplitude to consolidate the concrete effectively. They shall be operated by competent workmen. Use of vibrators to transport concrete within forms shall not be allowed. Vibrators shall be inserted and withdrawn at points approximately 18 inches apart. At each insertion, the duration shall be sufficient to consolidate the concrete but not sufficient to cause segregation. A spare vibrator shall be kept on the job site during all concrete placing operations. Where the concrete is to have an as-cast finish, a full surface of mortar shall be brought against the form by the vibration process, supplemented if necessary by spading to work the coarse

aggregate back from the formed surface. Consolidation shall conform to "Recommended Practice for Consolidation of Concrete" (ACI 309).

D. Protection

1. Adhere to the requirements of:

b. ACI 305 Hot Weather Concreting

c. ACI 306 cold Weather Concreting

2. Unless adequate protection is provided concrete shall not be placed during rain, sleet, or snow.

3. Rainwater shall not be allowed to increase the mixing water nor to damage the surface finish.

4. Placing Temperature: When the temperature of the surrounding air is expected to be below 40°F during placing or within 24 hours thereafter, the temperature of the plastic concrete, as placed, shall be no lower than 55°F. The temperature of the concrete as placed shall not be so high as to cause difficulty from loss of slump, flash set, or cold joints and shall not exceed 90°F.

E. Bonding

1. When specified, the surface of joints shall be prepared in accordance with one of the methods specified in paragraph 2.10.

2. The hardened concrete of wall construction joints and of construction joints between floor slabs shall be dampened (but not saturated) immediately prior to placing of fresh concrete.

3. The hardened concrete of joints in exposed work; joints in the middle of beams, girders, and joists; and horizontal joints in work designed to contain liquids shall be dampened (but not saturated) and then thoroughly covered with a coat of cement grout of similar proportions to the mortar in the concrete. The grout shall be as thick as possible on vertical surfaces and at least one inch (1") thick on horizontal surfaces. The fresh concrete shall be placed before the grout has attained its initial set.

3.3 REPAIR OF SURFACE DEFECTS

A. General

1. Surface defects, including tie holes, shall be repaired immediately after form removal.

B. Repair of Defective Areas

1. All honeycombed and other defective concrete shall be chipped down to sound concrete. The edges shall be perpendicular to the surface or slightly undercut. No feather edges will be permitted. The area to be patched and an area at least 6 inches wide surrounding it shall be dampened to prevent absorption of water from the patching mortar. A bonding grout shall be prepared using a mix of approximately 1 part cement to 1 part fine sand passing a No. 30 mesh sieve, mixed to the consistency of thick cream, and then well brushed into the surface.

2. The patching mixture shall be made of the same materials and of approximately the same proportions as used for the concrete, except that the coarse aggregate shall be omitted, and the mortar shall consist of not more than 1 part cement to 2-1/2 parts sand by damp loose volume. The quantity of mixing water shall be no more than necessary for handling and placing. The patching mortar shall be mixed in advance and allowed to stand with frequent manipulation with a trowel, without addition of water, until it has reached the stiffest consistency that will permit placing. Use of latex bonding agent is required.

3. After surface water has evaporated from the area to be patched, the bond coat shall be well brushed into the surface. When the bond coat begins to lose the water sheen, the premixed patching mortar shall be applied. The mortar shall be thoroughly consolidated into place and struck off so as to leave the patch slightly higher than the surrounding surface. To permit initial shrinkage, it shall be left undisturbed for at least 1 hour before being finally finished. The patched area shall be kept damp for 7 days. Metal tools shall not be used in finishing a patch in a formed wall which will be exposed.

C. Tie Holes

1. After being cleaned and thoroughly dampened, the tie holes shall be filled solid with a non-metallic non-shrink patching mortar. The layout of tie holes and exterior finish of the tie holes on surfaces permanently exposed to view on the outside shall be submitted to the ENGINEER for review.

D. Proprietary compounds for adhesion or as patching ingredients may be used in lieu of or in addition to the foregoing patching procedures providing that prior review is done by the ENGINEER. The ENGINEER may require such compounds in certain patching locations.

3.4 FINISHING OF FORMED SURFACES

A. Finish on all surfaces shall be as cast finish as follows:

1. Smooth Form Finish: The form facing material shall produce a smooth, hard, uniform texture on the concrete. It may be plywood, tempered concrete-form-grade hardboard, metal, plastic, paper, or other approved material capable of producing the desired finish. The arrangement of the facing material shall be orderly and symmetrical, with the number of seams kept to the practical minimum. It shall be supported by studs or other backing capable of preventing excessive deflection. Material with raised grain, torn surfaces, worn edges, patches, dents, or other defects which will impair the texture of the concrete surface shall not be used. Tie holes and defects shall be patched. All fins, projections, and seams shall be completely removed.

B. Related Unformed Surfaces

1. Tops of walls or buttresses, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces shall be struck smooth after concrete is placed and shall be floated to a texture reasonably consistent with that of the formed surfaces. Final treatment on formed surfaces shall continue uniformly across the unformed surfaces.

3.5 SLABS

A. General

1. Concrete work for slab construction shall conform to "Recommended Practice for Concrete Floor and Slab Construction (ACI-302).

B. Preparation of Subgrade for Slabs on Ground

1. The subgrade shall be well drained and of adequate and uniform load bearing nature. The in-place density of the subgrade soils shall be at least the minimum required in the Specifications.

2. The subgrade shall be free of frost before concrete placing begins. If the temperature inside a structure where concrete is to be placed is below freezing it shall be raised and maintained above 50°F long enough to remove all frost from the subgrade.

3. The subgrade shall be moist at the time of concreting. If necessary, it shall be dampened with water in advance of concreting, but there shall be no free water standing on the subgrade nor any muddy or soft spots when the concrete is placed.

4. Floor slabs on granular fill shall be placed over a 6-mil polyethylene vapor barrier. Lap all joints of vapor barrier 12 inches minimum.

5. Soil Testing

a. The CONTRACTOR shall obtain and pay for, the services of a soils testing firm (acceptable to the ENGINEER) for the following:

1) Certify that materials proposed by CONTRACTOR meet specifications Certification test reports will be submitted by the CONTRACTOR.

2) Conduct compaction testing of engineered fill below footings and slabs and backfilling for utility trenches. The testing frequency shall be one test per lift per 400 square feet of fill.

3) Copies of test reports shall be furnished to the OWNER and distributed to parties designated by the OWNER, including the ENGINEER.

4) Any area falling compaction test shall be compacted and re-tested at the CONTRACTOR's expense.

C. Edge Forms and Screeds

1. Edge forms and intermediate screed strips shall be set accurately to produce the designated elevations and contours of the finished surface and shall be sufficiently strong to support vibration. The concrete surface shall be aligned to the contours of screed strips by the use of strike-off templates.

2. When formwork is cambered, screeds shall be set to a like camber to maintain the proper concrete thicknesses.

3. Screeds shall be removed before initial concrete set and depressions immediately filled to form a smooth monolithic surface.

D. Placement

1. Mixing and placing shall be carefully coordinated with finishing. Concrete shall not be placed on the subgrade or forms more rapidly than it can be spread, straightedged, and darbied or bullfloated. These operations must be performed before bleeding water has an opportunity to collect on the surface.

2. To obtain good surfaces and avoid cold joints, the size of finishing crews shall be planned with due regard for the effects of concrete temperature and atmospheric conditions on the rate of hardening of the concrete. If construction joints become necessary, they shall be constructed as required in subparagraph 2.10.A of this Section.

E. Jointing

1. Joints in slabs on grade shall be located and detailed as indicated in the Contract Documents. If saw-cut joints are required or permitted, cutting shall be timed properly with the set of the concrete: cutting shall be started as soon as the concrete has hardened sufficiently to prevent aggregates being dislodged by the saw, and shall be completed before shrinkage stresses become sufficient to produce cracking.

F. Consolidation

1. Concrete in slabs shall be thoroughly consolidated. Internal vibration shall be used in beams and girders of framed slabs and along the bulkheads of slabs on grade. Consolidation of slabs shall be obtained with internal vibrators.

G. Finishes (See paragraph 3.05.H for Finishing Tolerance)

1. All concrete flatwork such as slabs on grade inside and outside of the building and supported slabs shall at first receive a "floated finish". After the concrete has been placed, consolidated, struck off, and leveled, the concrete shall not be worked further until ready for floating. Floating shall begin when the water sheen has disappeared and when the surface has stiffened sufficiently to permit the operation. During or after the first floating, planeness of surface shall be checked by the CONTRACTOR with a 10-ft. straightedge applied at not less than two different angles. All high spots shall be cut down and all low spots filled during this procedure to produce a surface within Class B tolerance throughout. The slab shall then be refloated immediately to a uniform sandy texture. Additional finishing shall be required. See G.2 or G.3.

2. Outside sidewalk, ramp slabs, loading dock and walkway top slabs shall receive a broom or belt finish. Immediately after concrete has received the "float finish" as specified in 3.05.G.1 above, it shall be given a coarse transverse scored texture by drawing a broom or burlap belt across the surface.

3. A "troweled finish" shall be used for all concrete flatwork which does not receive a broom finish or which does not receive a grout finish. The surface shall first be float-finished as specified in item 3.05.G.1 above. It shall next be power troweled, and finally hand troweled. The first troweling after power floating shall produce a smooth surface which is relatively free of defects, but which may still show some trowel marks. Additional troweling shall be done by hand after the surface has hardened sufficiently. The final troweling shall be done when a ringing sound is produced as the trowel is moved over the surface. The surface shall be thoroughly consolidated by the hand troweling operations. The finished surface shall be essentially free of

trowel marks, uniform in texture and appearance and shall be plane to a Class A tolerance, except tolerance for concrete on metal deck shall be Class B. On surfaces intended to support floor coverings, any defects of sufficient magnitude to show through the floor covering shall be removed by grinding.

H. Finishing Tolerances

1. Finishes with Class A tolerances shall be true planes within 1/8 inch in 10 ft as determined by a 10-foot straightedge placed anywhere on the slab in any direction.

2. Finishes with Class B tolerances shall be true planes within 1/4-inch on 10 ft as determined by a 10-foot straightedge placed anywhere on the slab in any direction.

3. Finishes with Class C tolerances shall be true planes within 1/4 inch in 2 ft as determined by a 2-ft straightedge placed anywhere on the slab in any direction.

3.6 CURING AND PROTECTION

A. General

1. Beginning immediately after placement, concrete shall be protected from premature drying, excessively hot or cold temperatures, and mechanical injury, and shall be maintained with minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete. The materials and methods of curing shall be in accordance with ACI 308 and subject to review by the ENGINEER.

B. Preservation of Moisture

1. For concrete surfaces not in contact with forms, ponding or continuous sprinkling shall be applied immediately after completion of placement and finishing and be continued for a minimum of three (3) days. After the initial 3-day period, one of the following procedures shall be applied:

a. Ponding or continuous sprinkling;

b. Application of absorptive mats or fabric kept continuously wet;

c. Continuous application of mist spray;

e. Application of other moisture-retaining covering as approved.

f. The use of curing compounds shall not be permitted.

2. Moisture loss from surfaces placed against wooden forms or metal forms exposed to heating by the sun shall be minimized by keeping the forms wet until they can be safely removed. After form removal, the concrete shall be cured until the end of the time prescribed in 3.06.B.3 below by one of the methods of 3.06.B.1 above.

3. Curing in accordance with 3.06.B.1 and 2 above shall be continued for at least 14 days in the case of all concrete.

C. Temperature, Wind, and Humidity

1. Adhere to the requirements of:

a. ACI 305 Hot Weather Concreting

b. ACI 306 Cold Weather Concreting

2. Cold Weather: When the mean daily outdoor temperature is less than 40˚F, the temperature of the concrete shall be maintained between 50˚F and 70˚F for 14 days. Arrangements for heating, covering, insulating, and housing the concrete work shall be made in advance of placement and shall be adequate to maintain the required temperature without injury due to concentration of heat. Combustion heaters shall not be used during the first 24 hours unless precautions are taken to prevent exposure of the concrete to exhaust gases.

3. Hot Weather: When necessary, provision for windbreaks, shading, fog spraying, sprinkling, ponding, or wet covering with a light-colored material shall be made in advance of placement, and such protective measures shall be taken as quickly as concrete hardening and finishing operations will allow.

4. Rate of Temperature Change: Changes in temperature of the air immediately adjacent to the concrete during and immediately following the curing period shall be kept as uniform as possible and shall not exceed 5°F in any one hour or 50°F in any 24-hour period.

D. Protection from Mechanical Injury

1. During the curing period, the concrete shall be protected from damaging mechanical disturbances, such as load stresses, heavy shock, and excessive vibration. All finished concrete surfaces shall be protected from damage by construction equipment, materials, or methods, by application of curing procedures, and by rain or running water. Structures shall not be loaded in such a way as to overstress the concrete.

3.7 TESTING

A. General

1. Concrete materials and operations will be tested and inspected as the work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered nor shall it obligate the ENGINEER for final review.

B. Testing Agencies

1. All testing agencies shall meet the requirements of "Inspection and Testing Agencies for Concrete and Steel as Used in Construction," (ASTM E329).

C. Testing Services

The following testing services shall be performed by the designated agency:

1. Review and test the CONTRACTOR's proposed materials for compliance with the Specifications.

2. Review and test the CONTRACTOR's proposed mix design as required by the ENGINEER.

3. Secure production samples of materials at plants or stockpiles during the course of the work and test for compliance with the Specifications.

4. Conduct strength tests of the concrete during construction in accordance with the following procedures:

    a. Secure composite samples in accordance with "Method of Sampling Fresh Concrete" (ASTM C 172). Each sample shall be obtained from a different batch of concrete on a random basis, avoiding any selection of the test batch other than by a number selected at random before commencement of concrete placement.

    b. Mold and cure four specimens from each sample in accordance with "Method of Making and Curing Concrete Test Specimens in the Field" (ASTM C 31). Any deviations from the requirements of this standard shall be recorded in the test report.

    c. Test specimens in accordance with "Method of Test for Compressive Strength of Cylindrical Concrete Specimens" (ASTM C 39). Two specimens shall be tested at 28 days for acceptance and one shall be tested at 7 days for information. The fourth cylinder shall be held as a spare specimen to be tested as directed by the ENGINEER. The acceptance "strength test" result shall be the average of the strengths of the two specimens tested at 28 days. If one specimen in a test manifests evidence of improper sampling, molding or testing, it shall be discarded and the strength of the remaining cylinder shall be considered the "strength test" result. Should both specimens in a test show any of the above defects, the entire test shall be discarded. When high early strength concrete is used, the specimens shall be tested with two specimens at 14 days and one specimen at 3 days. The acceptance will be based on the 14-day test.

    d. Make at least one "strength test" (mold four cylinders) for each 50 cubic yards, or fraction thereof, of each mix design of concrete placed in any 1 day.

5. Determine slump of the concrete sample for each strength test and whenever consistency of concrete appears to vary, using "Method of Test for Slump of Portland Cement Concrete: (ASTM C 143).

6. Determine air content of normal weight concrete sample for each strength test in accordance with the "Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method" (ASTM C 231), "Method of Test for Air Content of Freshly Mixed Concrete by the Volumetric Method" (ASTM C 173) or "Method of Test for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete" (ASTM C 138).

7. Determine temperature of concrete sample for each strength test.

D. Additional Services When Required

The following services shall be performed by the designated agency when required by the ENGINEER:

1. Inspect concrete batching, mixing and delivery operations to the extent deemed necessary by the ENGINEER.

2. Sample concrete at point of placement and perform required tests.

3. Other testing or inspection services as required by the ENGINEER.

E. Other Services as Needed

The following services shall be performed by the designated agency when necessary and costs of said services shall be borne by the CONTRACTOR:

1. Additional testing and inspection required because of changes in materials or proportions requested by the CONTRACTOR.

2. Additional testing of materials or concrete occasioned by their failure by test or inspection to meet specification requirements. (See Article 3.08)

3. Testing to determine strength for early form removal. (See paragraph 2.08.E and F.)

F. Duties and Authorities of Designated Testing Agency

1. Representatives of the agency shall inspect, sample and test the materials and the production of concrete as specified herein. When it appears that any material furnished or work performed by the CONTRACTOR fails to fulfill specification requirements, the testing agency shall report such deficiency to the ENGINEER and the CONTRACTOR promptly.

2. The agency shall report all test and inspection results to the ENGINEER and CONTRACTOR immediately after they are performed. All test reports shall include the exact location in the work at which the batch represented by a test was deposited. Reports of strength tests shall include detailed information on storage and curing of specimens prior to testing.

3. The testing agency or its representatives are not authorized to modify any requirement of the Contract Documents, nor to approve, accept, disapprove or reject any portion of the work.

G. Responsibilities and Duties of CONTRACTOR

1. The use of testing services shall in no way relieve the CONTRACTOR of the responsibility to furnish materials and construction in full compliance with the Contract Documents.

2. The CONTRACTOR shall submit to the ENGINEER the concrete materials and the concrete mix designs proposed for use with a written request for review. This submittal shall include the results of all testing performed to qualify the materials and to establish the mix designs. No concrete shall be placed in the work until the CONTRACTOR has received such approval in writing.

3. To facilitate testing and inspection, the CONTRACTOR shall provide and maintain for the use of the testing agency and ENGINEER adequate facilities for safe storage and proper curing of concrete test specimens on the project site for the first 24 hours as required by "Method of Making and Curing Concrete Test Specimens in the Field" (ASTM C 31). The CONTRACTOR shall provide labor, tools, and equipment to assist in the sampling and testing of concrete on the job. The CONTRACTOR shall advise the designated testing agency sufficiently in advance of operations to allow for completion of quality tests and assignment of personnel.

3.8 EVALUATION AND ACCEPTANCE OF CONCRETE

A. Evaluation of Test Results

1. Test results for standard molded and standard cured test cylinders shall be evaluated separately for each specified concrete mix design. Such evaluation shall be valid only if tests have been conducted in accordance with procedures specified in Article 3.07.

B. Acceptance of Concrete

1. The following conditions must be met:

a. The strength level of the concrete will be considered satisfactory and acceptable so long as the average of all sets of three consecutive "strength test" results equals or exceeds the specified 28-day strength f'c and no individual "strength test" result falls below the specified 28-day strength f'c by more than 500 psi. The strength level of the concrete shall be measured at 14 days for high-early strength concrete. High-early strength concrete shall achieve the specified 28-day f'c at the age of 14 days.

b. The requirements described by paragraphs 3.09 Acceptance of Structure, A, B, C and D.

C. Testing of Concrete in Place

1. This Work shall be at the CONTRACTOR’s expense.

2. Testing by impact hammer, sonoscope, or other non-destructive device may be permitted or required by the ENGINEER to determine relative strengths at various locations in the structure as an aid in evaluating concrete strength in place and for selecting areas to be cored, if the strength level of the concrete is not satisfactory. Such tests shall not be used as a basis for acceptance or rejection.

3. Core Tests: Required when paragraph 3.08.B specifications are not met.

a. Cores at least 2 inches in diameter shall be obtained and tested in accordance with "Methods of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete" (ASTM C 42). Cores shall be taken as soon as practicable after determining that the concrete strength level is unsatisfactory in accordance with paragraph 3.08.B. If the concrete in the structure will be dry under service conditions, other cores shall be air dried (temperature 60° to 80°F, relative humidity less than 60 percent) for 7 days before test and shall be tested dry. If the concrete in the structure will be more than superficially wet under service conditions, the cores shall be tested after moisture conditioning in accordance with ASTM C 42.

b. At least three representative cores shall be taken from each member or area of concrete in place that is considered potentially deficient. The location and number of cores shall be determined by the ENGINEER so as least to impair the strength of the structure and best represent the condition of the potentially deficient concrete. If, before testing, one or more of the cores shows evidence of having been damaged subsequent to or during removal from the structure, they shall be replaced.

c. Concrete in the area represented by the core test will be considered adequate and acceptable if the average strength of the cores is equal to at least 85 percent of, and if no single core is less than 75 percent of, the specified 28-day strength f'c. If the above strengths are not met, the CONTRACTOR shall remove the deficient concrete.

d. Core holes shall be filled by the CONTRACTOR with low slump concrete or mortar. See Article 3.03, Repair of Surface Defects.

3.9 ACCEPTANCE OF STRUCTURE

A. General

1. Completed concrete work which meets all applicable specification requirements will be accepted without qualification.

2. Completed concrete work which fails to meet one or more of the specified requirements but which has been repaired to bring it into compliance will be accepted without qualifications.

3. If any concrete does not meet the specified strength levels in paragraph 03.08.B, Acceptance of Concrete, the ENGINEER will require additional material and other tests to determine the probable cause of the low strength levels. This may result in remedial actions or modifications being required in the methods or materials being employed. Such actions or modifications shall be at the CONTRACTOR's expense.

4. Completed concrete work which fails to meet the requirements of paragraph 03.08.C.2.c. will be rejected and the CONTRACTOR will be required to remove and replace the defective concrete. In this event, modifications will be required to assure that remaining work complies with the requirements.

B. Dimensional Tolerances

1. Formed surfaces resulting in concrete outlines smaller than permitted by the tolerances of paragraph 2.08.C shall be considered potentially deficient in strength and subject to the provisions of paragraph 3.09.D.

2. Formed surfaces resulting in concrete outlines larger than permitted by the tolerances of paragraph 2.08.C may be rejected and the excess material shall be subject to removal. If removal of the excess material is required, it shall be accomplished in such a manner as to maintain the strength of the section and to meet all other applicable requirements of function and appearance.

3. Concrete members cast in the wrong location will be rejected.

4. Inaccurately formed concrete surfaces exceeding the limits of paragraph 02.08.C may be rejected and shall be repaired or removed and replaced as required by the ENGINEER.

5. Finished slabs exceeding the tolerances of paragraphs 03.05.H may be required to be repaired provided that strength or appearance is not adversely affected. High spots may be removed with a terrazzo grinder, low spots filled with a patching compound, or other remedial measures performed as reviewed by the ENGINEER.

C. Appearance

1. All concrete with defects which adversely affect the appearance or function of the specified finish may be repaired only by approved methods.

D. Strength of Structure

1. The strength of the structure in place will be considered deficient if it fails to comply with any requirements, which control the strength of the structure, including but not necessarily limited to the following conditions:

   a. Low concrete strength as designated in Article 03.08.

   b. Reinforcing steel size, quantity, strength, position, or arrangement at variance with the requirements of Article 02.09, Reinforcement, or the Contract Documents.

   c. Concrete which differs from the required dimensions or location in such a manner as to reduce the strength.

   d. Curing less than that specified.

   e. Inadequate protection of concrete from extremes of temperature during early stages of hardening and strength development.

   f. Mechanical injury as defined in paragraph 03.06.D, construction fires, accidents or premature removal of formwork likely to result in deficient strength.

2. Additional testing will be required when the strength of the structure is considered potentially deficient. Cost of this testing will be borne by the CONTRACTOR.

3. Core tests in accordance with paragraph 03.08.C.2 will be required when ENGINEER determines that the strength of the concrete in place is considered potentially deficient. Cost of coring and testing will be borne by the CONTRACTOR.

4. Concrete work judged inadequate by failure to meet the requirements of paragraphs 03.08B and 03.08.C.2 shall be removed and replaced at the CONTRACTOR's expense.

5. The CONTRACTOR shall pay all costs incurred in providing the additional testing and/or analysis required by these Specifications, or the Contract Documents.

6. The OWNER will pay all costs of additional testing and/or analyses which are made at its request and which are not required by these Specifications, or the Contract Documents.

3.10 CLEANING UP

A. At the completion of the concrete work to the satisfaction of and review by the ENGINEER, all extraneous concrete debris, materials and equipment shall be removed from the job site and the concrete shall be left clean and in first class condition.

MIX DESIGN SCHEDULE

Concrete Class	B
Locations	Foundation
28-day Compressive Strength (psi)	4,000
Cement Content (per CYD of concrete)	594 (6 sack)
Coarse Aggregate	6AA (¾")
Water/Cement Ratio by Weight (maximum)	0.43
Air Content (% by volume)	6.0 +/- 1.0
Slump at point of placement (inches)	4" – 6" (will vary based on location)
Fiber Reinforcement	No
Fly Ash (% of cement content; maximum)	15 – 20%
Silica Fume	No

Concrete Class	C
Locations	Sidewalk, Pavements and Exterior Slabs
28-day Compressive Strength (psi)	4,000
Cement Content (per CYD of concrete)	594 (6 sack equivalent)
Coarse Aggregate	½ "
Water/Cement Ratio by Weight (maximum)	0.43
Air Content (% by volume)	6.0 +/- 1.0
Slump at point of placement (inches)	4" – 6" (will vary based on location)
Fiber Reinforcement	Yes
Fly Ash (% of cement content; maximum)	15 – 20%
Silica Fume	No

END OF SECTION

SECTION 26 05 00

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 – GENERAL

1.1 SUMMARY

A. The work included in this Division consists of providing all labor and material required for the installation of the complete electrical system, ready for operation.

B. The work shall include the following:

1. Athletic field lighting
2. Wiring including conduit, junction boxes, handholes, trenching, grounding etc.
3. Circuit breakers, lighting contactors and enclosures.
4. Control system.
5. Testing of the entire system.
6. All items incidental to and/or required to complete the installation;
7. 120-volt power to control equipment if required;
8. Equipment grounding;
9. Associated incidental wiring with raceways and conductors which is not shown on the Plans will be required.

1.2 CHARACTER OF WORK

A. The work shall be done in a first-class and workmanlike manner by skilled tradesmen and shall be complete in all details. It shall be executed so that the installation conforms and accommodates itself to the building structure, facilities, equipment and usage.

1.3 MATERIALS

A. All materials and equipment shall be new and, to the extent possible, standard products of the same manufacturer for similar equipment. Equipment or material not specifically identified shall conform to the general standard of quality established herein.

B. Factory assemble control panels and component assemblies.

C. All materials and equipment shall be listed and labeled by a nationally recognized testing laboratory.

D. All mounting hardware installed outdoors, in wet locations, or in contact with concrete shall be stainless steel.

E. Equipment and materials must be UL certified for intended purposes to get equipment listed as an assembly. Where there is no alternative to supplying equipment that is UL certified, obtain special approval from the Electrical Inspection Department. CONTRACTOR to pay all associated fees.

1.4 PERMITS

A. The CONTRACTOR shall obtain and pay for all permits and certificates of inspection for work herein specified. The cost of such permits and certificates shall be included in the CONTRACTOR's bid price.

B. CONTRACTOR to submit necessary interim and final certificates of inspection and approval required by Inspection Authorities as evidence that the work installed complies with laws and regulations of governing authorities.

C. Provide Inspection Authorities any additional necessary number of drawings and specifications for examination and approval prior to commencement of work.

D. Notify Project Manager / Administrator of changes required by Inspection Authorities prior to making changes.

E. Notify the Inspection Authorities in sufficient time for them to arrange to inspect work.

F. Furnish the final unconditional Certificates of Acceptance from Inspection Authorities having jurisdiction on completion of work to the client and the Project Manager / Administrator.

1.5 LAWS, ORDINANCES, REGULATIONS

A. The CONTRACTOR shall comply with, and all work and materials shall conform to, the requirements of all applicable federal, state and local laws, ordinances, regulations, as well as the rules and standards of the National Board of Fire Underwriters.

1.6 RECEIPT OF PORTABLE AND DETACHABLE PARTS

A. All portable and detachable portions of the installation, such as keys, etc., shall be retained. At the completion of the work, they shall be turned over to the OWNER and itemized receipts obtained.

1.7 CONTRACT DRAWINGS

A. Follow the Contract Drawings to become familiar with all conditions affecting the work and verify spaces in which the work will be installed.

B. Confirm underground conditions prior to project startup.

C. The Drawings for electrical work are performance Drawings, diagrammatic, intended to convey the scope of work and indicate general arrangement and approximate location of apparatus, fixtures and approximate sizes and location of equipment and outlets. Electrical work indicated on the Plans but not covered by these Specifications or vice versa shall be provided and installed by the CONTRACTOR.

D. Do not scale the Drawings to determine dimensions but obtain information for accurate dimensions by referring to architectural and structural Drawings, or by site measurements.

E. Review existing drawings as available at the site during the tender period. Become familiar with the condition of the existing Drawings and related equipment. Allow for errors and omissions in the existing Drawings and ensure that the tender price includes the provisions to make the necessary field reviews, field verifications, field changes, and Drawing changes to suit the intent of the modification required.

F. Work, which is indicated, but not completely detailed, shall be installed by common practice or as directed by the ENGINEER.

G. Make, at no additional cost, any changes or additions to materials, and/or equipment necessary to accommodate existing conditions (runs around existing utilities, etc.).

H. Alter, at no additional cost, the location of materials and/ or equipment as directed, provided that the changes are made before installation and do not necessitate additional material.

I. Leave space clear and install work to accommodate future materials and/or equipment as indicated and to accommodate equipment and/or material supplied by other trades. Verify spaces in which work is to be installed.

J. Confirm on the site the exact location of outlets and fixtures.

K. The Drawings, Specifications, and standards are complimentary to one another, meaning that, that which is called for on one is meant to be called for on all. Where conflict exists between the Sections, Standards and/or Drawings, it shall be referred to the ENGINEER for clarification and rectification before any material is purchased or electrical work commences. Code requirements shall be considered a minimum standard. When materials shown on Drawings as indicated in the specifications exceed code requirements, the plans and specifications shall govern.

1.8 CONSTRUCTION / SHOP DRAWINGS

A. Shop Drawings shall be prepared as defined in the General Conditions for all equipment supplied under Division 26, Electrical.

B. Submit data (Drawings) for review prior to commencement of manufacturing or installing with the exception of conduit, standard conduit fittings and low voltage wiring.

C. Assume responsibility for accuracy of equipment dimensions related to available space and accessibility for maintenance and service, and compliance with codes and inspection authorities.

D. Show all details of construction, dimensions, capacities, weights, and electrical performance characteristics of equipment or material.

E. Obtain manufacturer's installation directions to aid in properly executing the work. Submit two (2) copies of such directions to the Contract Administrator prior to installation, for use in inspecting the work.

F. Complete all work in accordance with reviewed Shop Drawings.

G. Where conduits and lay-in ducts are not detailed, submit conduit and wiring layout Drawings. Show conduit and cable sizes including number of cables/conductors in each conduit. Drawings shall be on the same size sheets as the contract Drawings.

H. Update single line electrical diagrams to include any modifications to the electrical distribution system.

I. Indicate the number or letter used on the Drawings/specifications as an identification symbol on product data for panelboards, light fixtures, and other equipment submitted.

J. Bind one complete set of construction/Shop Drawings showing “as built” conditions in each operating and maintenance instruction manual.

K. In addition to the requirements of the General Provisions, provide working Drawings with, but not necessarily limit to, the following additional information:

1. Manufacturer's and Supplier's name.

2. Manufacturer’s bulletins, leaflets and specifications of major electrical equipment.

3. Catalogue model number.

4. Number identifying item on the Drawings and/or in the specifications such as equipment, item number, panel identification letters, etc.

5. Indicate details of construction, dimensions, capacities, weights and electrical performance characteristics of equipment or material.

6. Where applicable, include wiring, single line and schematic diagrams.

7. Include wiring diagrams or diagrams showing interconnections with work of other sections.

8. Lighting fixtures, including photometric data.

1.9 RECORD DRAWINGS

A. Before commencing work, obtain one (1) sets of electrical drawings for showing “As Built” conditions. As job progresses, mark on field set of prints to indicate accurately all installed work. At completion stage, transfer all information onto master set of Drawings and indicate “CONTRACTORS Certified Approval of Accuracy” before submitting to Contract Administrator for review and record use.

B. Indicate on record Drawings “As Built” stamp.

C. Show on the record Drawings as-built, all outlets and equipment such as runs of conduit, locations of pull boxes, outlets, panels, etc., as well as all services entering and on the property.

D. Dimension underground services and concealed main and sub-feeder conduits at key points of every run-in relation to structure and building. Record all elevations for underground services in relation to the ground floor level of the building. Indicate on record Drawings, location of all buried services. This information is to be certified correct by ENGINEER before backfilling commences.

1.10 OPERATIONS AND MAINTENANCE MANUALS

A. The CONTRACTOR shall supply one (1) digital copy of Installation, Operation and Maintenance Manuals for all equipment supplied under Division 26, Electrical.

B. In addition to the requirements of General Provisions – Submittals, include in the Operations and Maintenance Manuals:

1. Details of design elements, construction features, component function and maintenance requirements, to permit effective start-up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of installation.

2. Technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical descriptions of items and parts lists. Advertising or sales literature not acceptable.

3. Wiring and schematic diagrams and performance curves.

4. Names and addresses of local suppliers for items included in Maintenance Manuals.

5. Copy of test data.

6. Recommended spare parts list.

1.11 OPERATION INSTRUCTIONS

A. Comply with the requirements of the General Provisions of the Contract for clean-up, start-up and commissioning.

B. Upon completion of testing, provide on-site operating instructions by certified and experienced personnel to the operating/maintenance personnel at their convenience.

C. Provide these services as necessary to put equipment in operation. Ensure that plant staff, operating/maintenance are conversant with its care and operation.

PART 2 – PRODUCTS

2.1 CONCRETE WORK

A. Concrete for foundations, manholes, concrete encased conduit, etc., shall be provided by the CONTRACTOR and performed as shown on the Plans and shall conform to the Concrete Work Section of these Specifications.

2.2 LEGEND PLATES

A. Electrical equipment shall be equipped with laminated plastic legend plates with black lettering engraved on white background. The legend plates shall be 1¼-inches high and 3½-inches wide and shall be attached to the equipment by means of stainless-steel machine screws. The plates shall be approximately 3/32-inch thick and shall have letter sizes and legends as reviewed by the ENGINEER.

B. Legend plates shall be installed on the doors or covers of all enclosed electrical equipment.

C. Non-corroding, visible and legible after equipment is installed.

D. Wording on nameplates to be approved by the ENGINEER.

2.3 MOUNTING HEIGHTS

A. Devices shall be installed at heights as listed below unless otherwise shown on the Drawings or directed in the field. Dimensions given are from the finished floor or grade to the centerline of the device unless otherwise noted:

Push button stations	4'-0"
Hand-off-auto selector switches	4'-0"
Receptacles	1'-6"
Lighting switches	4'-0"
Telephone outlets (for desk phones)	1 -6"
Telephone outlets (for wall phones)	4'-10"
Outdoor receptacles	3 0" above ground
Lighting panelboards	6'-6" to top of panel
Power panelboards,	6'-6" to highest starters, disconnect switches, actuating handle

2.4 ENCLOSURES AND AMBIENT ENVIRONMENTS

A. Unless noted otherwise, enclosures shall be NEMA 12 for interior locations; NEMA 4X for outdoor locations and for units indicated weatherproof on the Plans. Supply classified rated equipment where areas are deemed hazardous areas. Where CONTRACTOR is unsure what to provide, obtain ENGINEER confirmation. Installation of improperly rated equipment shall result in complete replacement at the CONTRACTOR's expense.

B. Unless otherwise indicated, supply equipment enclosures, boxes, electrical materials and products suitable for ambient environments of the following areas:

AREA	GEN CLASSIFICATION	EQUIPMENT ENCLOSURE TYPE
Electrical Rooms	Dry, clean	NEMA 12
Control Rooms	Dry, clean	NEMA 12
Other rooms / areas	Dry, clean	NEMA 12
Outdoor areas	Wet	4X (stainless steel)

2.5 BRANCH CIRCUIT BREAKERS

A. The breakers shall have each pole provide inverse time delay and instantaneous circuit protection.

B. The breakers shall be operated by a toggle type handle and shall have a quick-make, quick-break over-center switching mechanism that is mechanically trip free from the handle so that the contacts cannot be held closed against short circuits and abnormal currents.

C. Tripping due to overload or short circuit shall be clearly indicated by the handle automatically assuming a position midway between the manual ON and OFF positions.

D. All poles shall be so constructed that they open, close and trip simultaneously. Breakers must be complete, enclosed in a molded case. Ampere ratings shall be clearly visible.

E. The minimum interrupting ratings of the circuit breakers shall be 22,000 RMS symmetrical amps at 480 volts.

F. Circuit breakers shall be listed with Underwriter's Laboratories, Inc. Manufacturer shall be Eaton Electric, Square D, or equal.

2.6 UNDERGROUND-LINE WARNING TAPE

A. Tape shall be recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines. Printing on tape shall be permanent and shall not be damaged by burial operations. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.

B Color and printing shall comply with ANSI Z535.1 through ANSI Z535.5. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.

PART 3 – EXECUTION

3.1 FIELD MEASUREMENTS

A. The CONTRACTOR shall make all necessary field measurements where electrical installations are involved to insure the ability to execute the work in accordance with the working Drawings.

B. Should interferences occur which will necessitate deviation from the layout or dimensions shown on the Plans, the ENGINEER shall be notified for his review of the changes before proceeding with the work.

3.2 DEMOLITION

A. The CONTRACTOR shall remove and/or relocate all electrical equipment, devices, conduit and wiring work as called for on the Drawings and as necessary whether such items are actually indicated on the Drawings or not in order to accomplish the installation of the specified new work.

B. Equipment, materials and devices removed shall remain the property of the OWNER and shall be stored at locations as directed by the ENGINEER. Such items shall only be reused if specifically designated on the Drawings.

C. Demolition may require staging for main power supplies. CONTRACTOR to coordinate with all scheduling and maintain power at site for all equipment deemed necessary.

3.3 POWER INTERRUPTIONS

A. The CONTRACTOR shall coordinate with the ENGINEER any interruptions to power in the existing building. Every effort shall be made to give enough advance notice to allow proper scheduling of the affected work activities.

B. The CONTRACTOR shall provide temporary wiring or power generation to minimize the duration of electrical interruptions and to keep critical load energized.

3.4 CUTTING AND PATCHING

A. The CONTRACTOR shall be responsible for the proper location of all chases, recesses and openings required for the electrical work and shall advise other trades of the sizes and locations of those required for his work.

B. The CONTRACTOR shall provide all sleeves, etc., required for the introduction and placement of his work and shall be responsible for their correct location.

C. Cutting, coring, and patching required as a result of the omission or opening of sleeve shall be done by the CONTRACTOR at his own expense.

D. All cutting, coring, and patching shall be done by workers skilled in that trade.

3.5 PROTECTION

A. Protect the work of others from damage resulting from the work of this project.

B. Protect the work of the project from that others, mage good any damage, remove all debris and rubbish and leave the project site in a clean and tidy condition to the approval of the Project Manager / Administrator.

C. Protect exposed line equipment during construction for personnel safety. Shield and make live parts “Live 120-Volts”, or with appropriate voltage.

3.6 CLEANING

A. Clean during construction and make final cleaning in accordance with Division 1.

B. Before energizing and systems, inspect and clean all the inside of power panel boards and cabinets to ensure that they are completely free from dust and debris.

C. Clean all polished, painted and plated work brightly. Clean all lighting fixtures and replace all burned out lamps.

D. Remove all debris, surplus materials and tools.

E. At time of final cleaning, clean lighting reflectors, lenses, and other lighting surfaces that have been exposed to construction dust and dirt.

3.7 EXCAVATION, TRENCHING AND BACKFILLING

A. The CONTRACTOR shall perform all excavation and backfilling required for the complete installation of the electrical systems.

B. Excavations and backfilling shall be made at such time as will permit the uninterrupted progress of the work.

C. Trenches for conduit may be excavated manually or with mechanical trenching equipment. Where underground utilities are encountered, the trenching shall be done by hand. Trenches shall be opened the complete length and depth before conduit is placed so that if any obstructions are encountered proper provisions can be made to avoid them. The CONTRACTOR shall sheet and brace the trenches, where necessary, and shall furnish and keep in place such bridges and crossing as may be required.

D. All conduits shall be securely fastened in place during construction and shall be plugged or capped to prevent entrance of grout, water or dirt. Any conduit having a defective joint shall not be installed.

E. No conduit shall come into contact with tunnels, or gas, water or sewer pipes. The conduit where crossing gas, water or sewage pipes shall be separated therefrom by at least 6-inches of soil. Conduits laid parallel to tunnels or gas or water mains or sewers must be separated therefrom by at least 12-inches of soil.

F. Where it is necessary to cut existing paving, the CONTRACTOR shall restore the paving to its original condition.

G. Restore any disturbed grading or seeded areas to their original conditions.

3.8 CONDUIT AND CABLE INSTALLATION

A. Install conduit and sleeves prior to pouring of concrete. Sleeves through concrete: schedule 40 rigid PVC, sized for free passage of conduit, and protruding 50 mm.

B. Install cables, conduits and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.

C. Arrange for holes through exterior walls and roof to be flashed and made weatherproof. Co-ordinate with appropriate division.

D. Install underground-line warning tape during backfilling of trenches directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

3.9 TESTING

A. Following installation but not more than 120-hrs before energization, the CONTRACTOR shall test the electrical system and components in the manner described below. All test results shall be recorded in writing. If requested, the CONTRACTOR shall use test documents supplied by the ENGINEER to record data. A certified copy of all test results shall be submitted to the ENGINEER immediately after completion.

B. All necessary test instruments and equipment shall be furnished by the CONTRACTOR.

C. Tests shall be performed, and the system reviewed by the ENGINEER for acceptability before any work is covered up or concealed. If such work is concealed, it shall be re-opened so that the test may be performed.

D. The ENGINEER shall be given ample notification of tests to permit him or the OWNER to be present. If tests are conducted without notification, they shall be required to be redone.

E. A representative of the CONTRACTOR shall accompany the ENGINEER during the final inspection and checking out of the electrical system.

3.10 TESTS REQUIRED

A. All work shall be given a visual inspection for good workmanship and conformance with standard practice.

B. The CONTRACTOR shall make any tests or adjustments required or recommended in the manufacturer's installation instructions.

D. Megger tests shall be performed on all lighting circuits. Associated control shall be checked, and any burned out lamps shall be replaced.

E. All 480-volt distribution systems, including cabling for correct phasing, voltage, grounding and load balancing.

F. Communication, control and instrumentation, fire alarm and emergency power systems.

G. Light readings in accordance with Specification Section 25 56 50, Paragraph 3.5.

H. Test and check electrical instrumentation systems for correct operation and compliance with regulatory authorities.

I. Supply instruments, meters, consumable parts (such as fuses) and equipment. Arrange for qualified personnel to conduct tests.

3.11 FINAL INSPECTION

A. Make request, in writing, to the ENGINEER to arrange for a final inspection of all electrical systems with a schedule of inspections.

B. Do not issue this written request until.

C. All deficiencies noted during the job inspection have been completed.

D. All systems have been balanced and tested and are ready for operation.

E. Operating and maintenance instructions have been submitted and approved.

F. Identification of equipment and raceways is complete.

G. Certificates have been submitted.

H. Record Drawings are completed and approved.

I. OWNER's operating personnel have been instructed.

END OF SECTION

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 – GENERAL

1.1 SUMMARY

A. The work included in this Division consists of providing all labor and material required for the installation of wires, cables, connectors, splices and terminations rated 600 V and less.

PART 2 – PRODUCTS

2.1 CONDUCTOR TYPES AND SIZES

A. Unless otherwise noted, all general use cable shall be 600-volt, NEC Type THWN, or XHHW, annealed copper.

B. All shielded instrumentation cable shall be 300-volt, UL type PLTC, twisted pair/triad, with overall aluminum polyester cable shield, suitable for conduit and cable tray applications.

C. All conductors shall be stranded.

D. Unless otherwise noted all conductors shall be minimum No. 12 AWG, except No. 14 AWG may be used for control circuits. No. 18 AWG shall be used for all shielded instrumentation circuits.

E. Multi-conductor cable shall consist of two (2) or more insulated color-coded conductors with an overall PVC jacket. All multi-conductor cable shall be specifically approved for cable tray use, NEC Type TC, including conduit and other approved raceways in accordance with NEC Article 340.

2.2 600-VOLT CABLE

A. Conductors shall be annealed, uncoated, softdrawn copper wire, UL listed, AWG gauge, insulated for 600-volts with code grade insulation conforming to I.P.C.E.A. specifications. Manufacturers shall be Okonite, Rome Cable, American (AIW), Essex, Triangle, or equal.

2.3 CONNECTORS AND SPLICES

A. Factory-fabricated connectors and splices shall be of the size, ampacity rating, material, type, and class for application and service indicated.

B. Lugs shall be tin plated copper, one piece, seamless with compression termination. One hole up through 4/0 and two hole for conductors larger, all with long barrels.

PART 3 – EXECUTION

3.1 GENERAL

A. The inside of conduit and raceways shall be dry and clean before cables are pulled. Care shall be exercised in pulling to avoid damage to the cable. A UL approved wire lubricant shall be used where required to facilitate wire pulling.

B. All wire and cable shall be equipped with lugs and connectors, except where cable terminations are included with the equipment being connected.

C. Splices and taps shall be made only in junction boxes or cabinets.

D. Cable connections for No. 8 AWG and smaller shall be with a copper indent type pressure connector.

E. Cable connections for No. 6 AWG and larger shall be made with a compression or bolted type pressure connector.

F. Conductors terminating at outlets shall be left with not less than 8 inches free length within the outlet.

G. Conductors for control circuitry may be No. 14 AWG unless otherwise noted.

H. 480-volt circuits shall be run in individual conduits, one circuit per conduit.

I. Control and power circuits shall not be run in the same conduit or raceway unless otherwise noted.

J. Low voltage (24VDC) and 120-volt control conductors shall not be run in the same conduit or raceway unless otherwise noted.

K. DC and AC control conductors shall not be run in the same conduit or raceway unless otherwise noted.

L. All shielded instrumentation cables shall be run in individual conduits or raceways separate from power and control and shall not be spliced.

M. Each wire and cable shall be tagged at least once as it passes through each junction box, manhole, or handhole, and at each termination. Tags shall be vinyl cloth, plastic coated, self-adhesive tape markers.

N. Orientation of three phase circuits at terminations shall take the order: Phase X - Phase Y - Phase Z, left to right, top to bottom, or front to back.

O. Exposed Interlocked Armor Cable must be protected against mechanical damage. Sleeves shall be installed for each cable penetration through all concrete walls and foundations. Each penetration through an exterior building wall shall be sealed with a link seal.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SUMMARY

A. Electrical system neutrals and non-current carrying parts of electrical equipment shall be grounded in accordance with the national electrical code, except where additional requirements are shown on the plans or called for herein.

PART 2 – PRODUCTS

2.1 GROUND RODS

A. Ground rods shall be 5/8-inch diameter x 10 ft long copper-clad steel rods.

2.2 GROUND BUS

A. Ground bus shall be minimum No. 4/0 stranded, soft drawn bare copper, continuous length from ground rods to ground terminal of service entrance equipment.

2.3 GROUND CONDUCTORS

A. Ground conductors shall be stranded, soft drawn, bare or insulated copper, sized per NEC, but not smaller than No. 12 AWG.

2.4 MANUFACTURERS

A. Clamp or bolt connectors shall be Thomas & Betts, Everdur, or equal.

B. Exothermic weld connectors shall be Cadweld, Erico Products, or equal.

PART 3 – EXECUTION

3.01 STRUCTURAL FRAME AND EQUIPMENT CONNECTIONS

A. Ground connections to structural steel shall be made with exothermic welds.

3.02 UNDERGROUND AND CONCEALED CONNECTIONS

A. All underground and concealed ground connections shall be made with exothermic welds.

3.03 GROUND RODS AND BUS

A. Ground rods and underground ground bus shall be at least 18 inches below grade.

3.04 DISTRIBUTION AND LIGHTING PANELS

A. The neutral of all distribution and lighting panels shall be bonded to comply with NEC.

3.05 MOTOR CONTROL CENTERS

A. The ground bus of all motor control centers shall be connected to the common ground bus system.

3.06 480 VOLT POWER SYSTEM

A. The grounded conductor of 480-volt power circuits shall be bonded in accordance with NEC.

3.07 GROUND CONDUCTORS IN CONDUIT

A. Ground conductors run in conduit with circuit conductors shall be securely connected inside junction boxes or enclosures.

3.08 SYSTEM AND EQUIPMENT GROUNDING

A. The system and equipment grounding systems shall be bonded at the service entrance equipment in accordance with NEC. Connect to ground bus and to cold water service pipe, if available.

3.09 GROUNDING CONDUCTORS IN CONDUIT

A. Any ground conductor smaller than No. 6 AWG subject to mechanical injury shall be installed in steel conduit, grounded to the conduit at both ends.

3.10 FLEXIBLE AND PLASTIC CONDUIT

A. All plastic conduit shall contain a separate ground conductor.

B. All flexible steel conduit exceeding six (6) ft in length shall contain a separate ground conductor.

3.11 SUPPORT OF BARE GROUND CONDUCTORS

A. Bare ground conductors shall be supported at intervals not exceeding two (2) ft.

3.12 BONDING SURFACE PREPARATION

A. All bonding surfaces shall be thoroughly cleaned prior to making ground connection.

3.13 INSULATED GROUND CONDUCTORS

A. Where insulated ground conductors are used, all splices and connections shall be taped.

3.14 GROUNDING PENETRATION THROUGH BUILDING STRUCTURE

A. Where a grounding conductor passes through floors or walls, it shall be installed in rigid metal conduit, bonded to the conduit at both ends.

3.15 GROUNDING CONNECTIONS

A. Connections to grounding electrodes shall be made with ground conductors as shown on the Plans.

END OF SECTION

SECTION 26 05 33

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SUMMARY

A. The work included in this Division consists of providing all labor and material required for the installation of conduit and junction boxes.

B. All electrical wiring shall be installed in conduit.

1.2 CHARACTER OF WORK

A. The work shall be done in a first-class and workmanlike manner by skilled tradesmen and shall be complete in all details. It shall be executed so that the installation conforms and accommodates itself to the building structure, facilities, equipment and usage.

1.3 MATERIALS

A. All materials and equipment shall be new and, to the extent possible, standard products of the same manufacturer for similar equipment. Equipment or material not specifically identified shall conform to the general standard of quality established herein.

B. Factory assemble control panels and component assemblies.

C. All materials and equipment shall be listed and labeled by a nationally recognized testing laboratory.

D. All mounting hardware installed outdoors, in wet locations, or in contact with concrete shall be stainless steel.

E. Equipment and materials must be UL certified for intended purposes to get equipment listed as an assembly. Where there is no alternative to supplying equipment that is UL certified, obtain special approval from the Electrical Inspection Department. CONTRACTOR to pay all associated fees.

PART 2 – PRODUCTS

2.1 CONDUIT MATERIALS

A. All conduit, unless otherwise indicated, shall be rigid galvanized steel or aluminum.

B. Buried conduit shall be Schedule 80 PVC.

C. Conduit passing through concrete pads and walls shall be RGS.

2.2 CONDUIT SIZES

A. Minimum size of conduit shall be 3/4-inch unless otherwise indicated.

2.3 RIGID GALVANIZED STEEL CONDUIT

A. Rigid galvanized steel conduit shall be mild steel pipe with threaded connections, hot-dipped galvanized on both interior and exterior surfaces, conforming to ANSI Standard C80.1, "Specifications for Rigid Steel Conduit (zinc-coated)". Manufacturers shall be Allied, Triangle, Youngstown, Steelduct, or equal.

2.4 PLASTIC CONDUIT AND FITTINGS

A. Plastic conduit and fittings shall be rigid polyvinyl chloride (PVC), UL 651 labeled for 90°C and NEMA-80-PVC and meeting ASTM D 1784-81 standards for PVC compounds. Material shall permit chemical solvent sealing of joints in the field, providing continuity of mechanical strength and water tightness. Manufacturers shall be Amoco, Carlon, Olin, or equal.

2.5 POLYMER CONCRETE HANDHOLES

A. Description: Molded of sand and aggregate, bound together with a polymer resin, and reinforced with steel or fiberglass or a combination of the two.

B. Standard: Comply with SCTE 77. Comply with tier requirements in "Underground Enclosure Application" Article.

C. Configuration: Units shall be designed for flush burial and have monolithic bottom with drain and ground sleeve unless otherwise indicated.

D. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.

E. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.

F. Cover: Molded lettering, "LIGHTING."

G. Direct-Buried Wiring Entrance Provisions: Knockouts equipped with insulated bushings or endbell fittings, selected to suit box material, sized for wiring indicated, and arranged for secure, fixed installation in enclosure wall.

H. Duct Entrance Provisions: Duct-terminating fittings shall mate with entering duct for secure, fixed installation in enclosure wall.

I. Duct-Sealing Compound: Nonhardening, safe for contact with human skin, not deleterious to cable insulation, and workable at temperatures as low as 35 deg F. Capable of withstanding temperature of 300 deg F without slump and adhering to clean surfaces of plastic ducts, metallic conduit, conduit and duct coatings, concrete, masonry, lead, cable sheaths, cable jackets, insulation materials, and common metals.

J. Cover Hooks: Heavy duty, designed for lifts 60 lbf and greater. Two required.

PART 3 – EXECUTION

3.1 PREPARATION

A. Coordinate layout and installation of duct, duct bank, manholes, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in the field.

B. Coordinate elevations of conduit with other utilities, underground obstructions, and surface features. Revise locations and elevations as required to suit field conditions and to ensure that conduit will drain to handholes, and as approved by ENGINEER.

3.2 RACEWAYS

A. All exposed conduit shall be run in neat symmetrical lines parallel and perpendicular to building walls, beams, columns, and other building elements.

B. All conduit shall be dry, clean, and free of obstructions before conductors are pulled. If there is evidence of moisture, obstructions, or foreign matter in the conduit when the conductors are installed, the wiring shall be removed, and the conduit cleaned to the satisfaction of the ENGINEER. All wiring showing evidence of damaged insulation shall be replaced.

C. Assemble metallic conduit in such a manner that it will be electrically continuous.

D. Conduits shall be separated by at least one conduit diameter.

E. Maximum distance between pullboxes and/or outlets in any above ground conduit run shall not exceed 80 ft.

F. Concealed conduit shall be placed in the slabs before concrete is poured. The conduit shall be blocked and fastened in place to prevent any displacement during construction.

G. One (1) nylon fish cord shall be furnished and left remaining inside each run of conduit in which no conductors are installed. Splicing of fish cord will not be permitted.

H. Where plastic conduit is used, a ground conductor shall be installed.

I. Expansion joints for conduit shall be furnished to compensate for thermal expansion and contraction.

3.3 CONDUIT SUPPORTS

A. Groups of conduits shall be supported on trapeze hangers, "Unistrut," "Powerstrut," or equal. Hanger supports shall be rod or pipe with threaded connections.

B. Conduit pipe straps shall be one-hole malleable iron. Individual conduits not supported on pipe straps shall be provided with clevis hangers.

C. Conduit shall be supported at intervals not exceeding the maximum distances as specified by the N.E.C. for a given type/size conduit. Multiple runs of conduit shall be mounted with steel supports so arranged that each individual conduit is clamped in place.

D. Conduit installed on walls shall be mounted on spacers to provide not less than 1/4-inch space between the conduit and the wall.

E. Conduit and other equipment may be attached to structural steel only after review by the ENGINEER.

F. All conduit shall be secured to the supports by means of approved galvanized clamps which are designed for use with the support system.

3.4 PENETRATIONS/TERMINATIONS

A. Wherever a conduit enters an electrical equipment enclosure from an underground location, the opening shall be sealed with duct seal after the wires and/or cables are pulled.

B. The threads of all steel conduit connections concealed in concrete shall be coated at the time of installation with zinc-clad primary coating as manufactured by the Sherwin Williams Corp., General Electric Co., or equal.

C. All conduits, fittings, and enclosures shall be terminated with bonding and bushing fittings as required by NEC.

3.5 EARTHWORK

A. Excavation and Backfill: Comply with City of Ann Arbor Standard Specifications for excavation and backfill.

B. Restore surface features at areas disturbed by excavation, and re-establish original grades unless otherwise indicated. Replace removed sod immediately after backfilling is completed.

C. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary topsoiling, fertilizing, liming, seeding, sodding and mulching.

END OF SECTION

SECTION 26 56 50

ATHLETIC FIELD ELECTRICAL AND LIGHTING

PART 1 – GENERAL

1.1 SUMMARY

A. The work shall include providing all labor, materials, tools, and equipment necessary for the Electrical and Illumination Systems complete and fully operational in every respect. This includes, but is not limited to, the following:

1. Poles and luminaires complete.
2. Wiring including conduit, junction boxes, handholes, trenching, grounding etc.
3. Circuit breakers, lighting contactors and enclosures.
4. Control system.
5. Testing of the entire system.

1.2 RELATED SECTIONS

A. Section 26 05 00 – Electrical – Common Work Results for Electrical

1.3 CODES AND ORDINANCES

A. All equipment furnished, and work performed shall be in accordance with national, state and city electrical codes, established safety codes and other applicable local codes and ordinances.

1.4 PERMITS

A. The Contractor shall obtain all permits. The Contractor will pay all permit fees.

1.5 EXAMINATION OF SITE AND DOCUMENTS

A. The bidder is required to examine carefully the site of the proposed work, the proposal, plans and specifications and contract forms before submitting a bid. Upon submission of a bid, it is mutually agreed that the bidder is aware of all conditions which will affect his work.

1.6 CLEAN-UP

A. Upon substantial completion of the work and before final approval and payment, the contractor shall, at his own expense, remove from the site and adjoining property, and dispose of all surplus and discarded materials, rubbish, temporary buildings, equipment, and debris which may have accumulated during the execution of the work. All fixtures and equipment shall be left thoroughly cleaned and in proper operating condition.

1.7 WORKMANSHIP

A. All workmanship shall be the best approved method of the trade.

1.8 MATERIAL LIST AND DRAWINGS

A. The successful Contractor shall submit to the Engineer, WITHIN 14 CALENDAR DAYS after award of the Contract, a list of all material to be furnished. In addition, six copies of shop drawings of luminaires, controls, poles and all other major equipment shall be

furnished to the Engineer for approval before ordering. Submittals will be "Approved for Design Only". This shall mean the Engineer has reviewed said submittal and finds no objection (except as noted) to the inclusion of the items into the construction, if it complies with contract drawings and specifications as to quantities, space requirements, dimensions, non-interference with other trades and other affected contract requirements.

1.9 RECORD DRAWINGS

A. Work done shall be recorded as actually installed. One set of prints showing this shall be furnished to the Engineer at the completion of the work and shall be available for inspection during the work. A separate marked up print of the site plan shall be provided showing all underground conduits in their actual installed locations with precise dimensions to existing elements.

1.10 GUARANTEE

A. The Contractor shall guarantee his workmanship and the materials and equipment he furnishes for a period of one year after the date of physical completion of the project. Any item which fails during the guarantee period because of defects in material or workmanship shall be promptly and properly replaced by the Contractor after notification from the Owner.

1.11 EXPERIENCE

A. The Contractor performing the work shall have completed a minimum of two similar projects working with athletic field floodlight poles more than 40' long in the past four years.

PART 2 – PRODUCTS

2.1 DESCRIPTION

A. All materials and equipment shall be new, of proven quality and be a standard product of a reputable manufacturer. Storage at the job site shall be in a manner which will prevent any damage or corrosion.

2.2 ELECTRICAL

A. The main panel currently exists at the site. The panel is 120/208-volt, three phase, four wire, bussed for 500 amps. The contractor shall remove one existing 3P60A spare breaker and replace with a new 3P50A circuit breaker.

B. Lighting contactors and relays are required. The lighting contactors shall be Square D Class 8903 of the size as required, electrically held with 120-volt coils, or equal of GE or Square D. Relays shall be IDEC Type RH single thru 4 pole SPDT, 4PDT or equal of Potter & Brumfield and have 120-volt coils. The components shall be installed in a Nema 3R enclosure with a hinged, lockable cover. The cabinet shall be mounted to the side of the existing electrical pedestal.

C. A separate control panel enclosure shall be provided. The controller shall be Musco Control Link and replace the existing Musco controller mounted on the side of the pedestal. Coordinate reconnecting existing field lighting control zones with Musco. The controller shall have a separate locking cover and contain the lighting controller as necessary plus other components as shown on the drawings. A microprocessor based 7-day lighting controller shall be installed in the control panel. The controller shall be wireless with web-based access. It shall be eight channels with each capable of handling a 10 amp, 120-volt

load, be easily programmed and the program override shall not disturb the memory. The unit shall have a battery backup to preserve memory in the event of a power failure.

D. Provide flashing beacon control with two push button stations mounted at poles with flashing beacon notification of light shutoff.

E. Provide engraved phenolic nameplates to label each of the channels of the controller as well as other control components. Separate HOA switches must be provided on the controller enclosure as shown on the drawings.

2.3 LIGHTING

A. Floodlight Luminaires

1. Floodlight luminaires shall be completely weatherproof with heavy gauge Alzak aluminum reflectors, heat and impact resisting shatterproof glass lens and be fully adjustable for aiming. The floodlight reflectors shall be powder-coat painted a dull gray finish at the factory. Acceptable manufacturers are Musco TLC LED or prior approved equal and must also conform to the following paragraphs B through H listed below.

2. Substitution requests for the athletic field lighting system must be submitted at least 7 (seven) days prior to the bid date. Included with the substitution request shall be manufacturer cut sheets along with a list of recent projects.

3. The luminaires shall have LED drivers and a disconnect remote mounted in separate NEMA 3R enclosures mounted on the pole a minimum of 10’ above finish grade. The driver enclosures shall be powder coat painted a dull gray finish at the factory.

4. The Contractor shall provide the expected performance of the illumination. The system must comply with the minimum initial field light level readings as shown on the drawings. The calculations shall be made on a 15' grid based on the IES (Illuminating Engineering Society) guide for measuring sports lighting facilities LM-5. Any deviations to the minimum initial light level readings must be submitted in writing to the Engineer.

5. Spill light calculations shall be provided showing the maximum vertical spill light produced at the property lines. Spill light shall not exceed the maximum allowed per approved City of Seattle permit documents. Refer to drawings for maximum allowable spill light and maximum allowable candela exposure at the ROW line noted.

6. Provide manufacturer warranty for the operation of the floodlighting system. The manufacturer shall provide services to include all labor, equipment and material to repair or replace the poles, floodlights, brackets, and drivers. Equipment that fails shall be replaced for up to 50,000 of use or 25 years.

7. The floodlight manufacturer shall provide the Owner with a signed certificate of insurance or escrow agreement to cover the costs of the warranty. The insurance policy must be fully funded in an actuarially sound basis and underwritten by a top-rated insurance company. The escrow account must be set up with an escrow agent approved by the owner. The manufacturer shall submit a complete listing of manufacturer warranty terms and conditions with their bid as a condition of approval.

8. The floodlight manufacturer shall provide a four-hour training session at the site with Owner personnel. The individual shall be factory trained and cover all aspects of the operation and control of the athletic field lighting system.

B. Area Luminaires

1. Area luminaires shall be rectangular with formed and welded aluminum housing and bracket arm. The lens shall be plain, flat, heat and impact resisting glass in a mitered extruded aluminum neoprene gasketed frame. Reflectors shall be provided such that the luminaire produces an IES-ANSI Type IV Medium distribution with essentially complete light cutoff above 75 deg from Nadir when operated with 400-watt integral LED drivers. Color temperature shall be 4,000 CCT. The luminaires shall be Lithonia DSX2 P7 or equal.

2.4 MISCELLANEOUS ELECTRICAL EQUIPMENT

A. Additional electrical equipment is required including switches, push buttons, flashing beacons, photocell etc. This equipment shall be as shown and specified on the drawings.

PART 3 – EXECUTION

3.1 GROUNDING:

A. Provide a complete grounding system with grounding continuity throughout the system. Ground rods shall be copper clad 3/4" by 10'. Ground wire shall be bare stranded copper.

3.2 DEPTH OF BURIAL:

A. All underground runs for the electrical distribution system shall be a minimum of 24 inches below grade.

B. Whenever the conduit run is shown across the field area or the Contractor chooses to go across the field area, the conduit shall be placed to ensure a minimum of 48 inches of cover. Also, this work should be coordinated with the Owner to verify existing irrigation systems at the site.

3.3 TRENCHING, EXCAVATION AND BACKFILLING:

A. Provide all trenching, excavation and backfilling required for the installation of items included in this Contract. Contractor shall provide drawings showing proposed installation locations of all conduit runs and junction boxes for review by Owner.

B. Provide a plastic Marker Tape the entire length of all underground conduit runs. The Marker Tape shall be 3” minimum width, bright red color installed a minimum of 12” above the top conduit run.

C. Contact the Owner before trenching in any area. In trenching through sodded areas, remove the sod and replace after backfilling and compaction. In trenching through non-sodded earth areas, the Contractor shall compact to 90%, dress with topsoil and reseed with an approved grass seed. Underground runs through asphalt or concrete areas shall be neatly cut, the backfill fully tamped to 95% compaction and the area repaired to match the existing.

D. Underground sprinkler systems, sewers and other systems exist at all the sites. Contact the Owner and call for utility locate to ascertain the location of all underground systems

before trenching or excavating. The Contractor shall make his best effort to locate all underground systems before trenching or excavating. If damage still occurs, the underground systems shall be repaired to original condition at the Contractor's expense and be approved by the Engineer before backfilling.

3.4 FLOODLIGHT STANDARD SETTING:

A. Floodlight standard locations shall be staked out by the Contractor and be approved by the Engineer before auguring. Holes shall be augured to the depth indicated on the drawings plus an additional 4 inches. The Contractor shall refer to the structural and geotechnical notes on the drawings and the geotechnical report to determine the conditions that will affect the excavation of the pole foundations. Standards shall be set plumb and true and the area around the base finished matching the existing grade.

3.5 AIMING OF LUMINAIRES:

A. Provide an aiming diagram to the engineer with the lighting submittals.

B. The Illumination System shall be demonstrated to the Engineer at an agreed time after completion and prior to final approval. Light readings will be taken by the Contractor, and verified by the Engineer, based on IES (Illuminating Engineering Society) guide for measuring sports lighting facilities LM-5. Light readings will be taken after all floodlights are operational. If the actual performance of the illumination system deviates from the expected performance by more than +10% average or by more than ±20% at any reading point the Contractor shall provide equipment and workforce necessary to correct the system to meet the minimum specified requirements.

C. Additional luminaire aiming is required after demonstration of the performance of the lighting system. The contractor shall provide equipment and workforce necessary for final aiming and external shield adjustments at night to improve the performance of the lighting on the field and to reduce objectionable spill lighting and glare as directed by the Engineer.

3.6 MARKING OF DEVICES:

A. Permanent labels shall be provided for all Control Devices Panel Schedules and One Line Diagrams. Engraved phenolic nameplates shall be provided for all time clock channels, override switches and similar devices as previously specified. Plastic laminated sheets showing the panel schedules and one-line diagrams shall be placed in each panel. If the panels and other equipment are installed in exact accordance with the Drawings, the Panel Schedules and One Line Diagrams from the Drawings may be duplicated and placed in plastic laminated sheets. If only minor variations are made, those items may be modified and used. Otherwise, new panel schedules and one-line diagrams shall be provided.

3.7 TESTING:

A. Each circuit shall be tested with a megohm meter. A reading more than two (2) meg-ohms shall be deemed satisfactory. The Contractor shall provide a written report of the results of his testing. The written report shall be provided to the Engineer prior to final acceptance of the project. Testing and operation of the entire system shall be performed. The Contractor shall provide workforce and equipment as necessary to correct any defects as may be directed by the Engineer.

END OF SECTION

SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish all labor, materials, equipment and incidentals required and perform all installation, maintenance, removal and area cleanup related to sedimentation control work as shown on the Drawings and as specified herein. The work shall include, but not necessarily be limited to; installation of temporary access ways and staging areas, silt fences, inlet protection devices, sediment removal and disposal, device maintenance, removal of temporary devices, temporary and permanent seeding, mulching and fertilization, and final cleanup. All erosion control devices shall remain in place throughout construction and until approval of final site stabilization is given by local or state authorities.

B. The Contractor is responsible for implementing Best Management Practices (BMP's), as shown on the Contract Drawings and specified herein, to prevent and minimize erosion and resultant sedimentation in all cleared, grubbed, and active work areas during and after construction. This item covers the work necessary for the installation and maintenance of all structures and measures necessary for the prevention and control of soil erosion.

C. Construction on this site is subject to the standards and responsibilities of City Code Chapter 63, regardless of the necessity for a permit.

D. The following items from Rule 1709 promulgated under the authority of Part 91, Soil Erosion and Sedimentation Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, are particularly important:

1. Design, construct, and complete the earth change in a manner that limits the exposed area of disturbed land for the shortest period of time.

2. Remove sediment caused by accelerated soil erosion from runoff water before it leaves the site of the earth change.

3. Temporary or permanent control measures shall be designed and installed to convey water around, through or from the earth change at a non-erosive velocity.

4. Install temporary soil erosion and sedimentation control measures before or upon commencement of the earth change activity and maintain the measures on a daily basis. Remove temporary soil erosion and sedimentation control measures after permanent soil erosion measures are in place and the area is stabilized. ("Stabilized" means the establishment of vegetation or the proper placement, grading, or covering of soil to ensure its resistance to soil erosion, sliding, or other earth movement.)

5. Complete permanent soil erosion control measures for the earth change within five (5) calendar days after final grading or upon completion of the final earth change. If it is not possible to permanently stabilize the earth change, then maintain temporary soil erosion and sedimentation control measures until permanent soil erosion control measures are in place and the area is stabilized.

E. Due to the nature of the work required by this Contract, it is anticipated that the location and nature of the erosion and sedimentation control devices will be adjusted on several occasions to reflect the current phase of construction. The construction schedule adopted by the Contractor will impact the placement and need for specific devices required for the control of erosion. The Contractor shall develop and implement such additional techniques as may be required to minimize erosion and off-site sedimentation. The location and extent of erosion and sedimentation control devices shall be revised at each phase of construction that results in a change in either the quantity or direction of surface runoff from constructed areas. All deviations from the erosion and sedimentation control provisions shown on the Drawings shall have the prior acceptance of the Engineer.

1.2 RELATED SECTIONS

A. City of Ann Arbor Standard Specifications Division IV

B. Section 32 92 00 – Turf and Grasses

1.3 SUBMITTALS

A. Submit to the Engineer, in accordance with Section 01 33 00 – Submittal Procedures, technical product literature for all commercial products to be used for sedimentation and erosion control.

1.4 QUALITY ASSURANCE

A. The Contractor shall be responsible for the timely installation and maintenance of all sedimentation control devices necessary to prevent the movement of sediment from the construction site to offsite areas or into the stream system via surface runoff or underground drainage systems. Measures in addition to those shown on the Drawings necessary to prevent the movement of sediment off site shall be installed, maintained, removed, and cleaned up at the expense of the Contractor. No additional charges to the Owner will be considered.

1.5 REFERENCES

A. Chapter 63 – Stormwater Management and Soil Erosion and Sedimentation Control, of the City of Ann Arbor City Ordinance.

B. City of Ann Arbor Public Services Department Standard Specifications Manual, latest edition.

C. Michigan Department of Environmental Quality Water Division Soil Erosion and Sedimentation Control Program, Soil Erosion and Sedimentation Control (SESC) Training Manual, 2010 Edition, or latest.

D. Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction.

1.6 EROSION AND SEDIMENTATION CONTROL DEVICES

A. The following erosion and sedimentation control devices shall be incorporated into the work as indicated on the Plans. Other devices, as necessary and acceptable to the Engineer shall be installed as required.

1. Temporary Sediment Traps shall be constructed at the locations shown on the Drawings, at the termination of all Temporary Diversions diverting sediment laden runoff, and at other locations indicated by the Engineer. Temporary Sediment Traps shall be constructed by excavating the appropriate size rectangular basin and constructing a rock-fill dam on the discharge end to form a sediment trap. Temporary Sediment Traps shall be designed, installed and maintained in accordance with the requirements of Unit 4 of the SESC Training Manual.

2. Temporary Diversions shall be constructed at the locations shown on the Drawings, and at other locations indicated by the Engineer. Dimensions shall be as shown on the Drawings. All Diversions transporting sediment-laden runoff shall terminate in Temporary Sediment Basins. Temporary Diversions shall be designed, installed and maintained in accordance with the requirements of Unit 2 of the SESC Training Manual.

3. Silt Fence shall be constructed at the locations shown on the Drawings, and at other locations indicated by the Engineer. Silt Fence shall not be installed across streams, ditches, or waterways. Silt Fence shall be designed, installed and maintained in accordance with the requirements of Unit 4 of the SESC Training Manual.

4. Check Dams shall be constructed at the locations shown on the Drawings, and at other locations indicated by the Engineer. Check Dams shall be designed, installed and maintained in accordance with the requirements of Unit 2 of the SESC Training Manual.

5. Storm Drain Inlet Protection shall be constructed at the locations shown on the Drawings, and at other locations indicated by the Engineer. Storm Drain Inlet Protection measures shall be designed, installed and maintained in accordance with the requirements of Unit 4 of the SESC Training Manual.

6. Temporary and Permanent Channels shall be installed at the locations shown on the Drawings, and at other locations indicated by the Engineer. Channels, and Channel Linings, shall be designed, installed and maintained in accordance with the requirements of Unit 2 of the SESC Training Manual.

7. Rock Construction Exits shall be located at points where vehicles enter and leave a construction site, or at other locations indicated by the Engineer. Rock Construction Exits shall be designed, installed and maintained in accordance with the requirements of Unit 4 of the SESC Training Manual.

PART 2 -- PRODUCTS

2.1 MATERIALS

A. Materials for use in erosion and sedimentation control devices shall be in accordance with the City of Ann Arbor Public Services Department Standard Specifications Manual, latest edition, and the Michigan Department of Environmental Quality Soil Erosion and Sedimentation Control (SESC) Training Manual, 2010 Edition, or latest edition.

2.2 TEMPORARY DIVERSIONS

A. Temporary Diversions shall be constructed as shown on the Contract Drawings and as specified herein. Temporary Diversions shall be installed and maintained in accordance

with Part 3 of this Section. The cost of Temporary Diversions shall include the excavation and all maintenance and restoration activities required.

2.3 SILT FENCE

A. Silt Fence shall be a woven geotextile filter fabric made specifically for sediment control. Filter fabric shall not rot when buried and shall resist attack from soil chemicals, alkalides and acids in the pH range from 2 to 13, and shall resist damage due to prolonged ultraviolet exposure. Filter fabric shall be Type FX-11, as manufactured by Carthage Mills, Geotex 910SC as manufactured by Synthetic Industries, Inc., Amoco 2130 as manufactured by Amoco Fabrics & Fibers Co., or equal.

B. Filter fabric for the silt fence shall have the following minimum properties:

	Value	Test Method
Grab Tensile Strength	100 lbs.	ASTM D 4632
Grab Elongation	15%	ASTM D 4632
Trapezoid Tear Strength	50 lbs.	ASTM D 4533
Mullen Burst Strength	265 lbs.	ASTM D 3786
Puncture Strength	58 lbs.	ASTM D 4833
Retained Strength (500 hrs. accelerated UV exposure)	80%	ASTM D 4355
Filtration Efficiency	75%	VTM-51
Flow Rate	10 gal/min/ft^2	ASTM-D4491
Height	36 inches	

C. Posts for silt fence shall be steel and shall have the following properties:

ASTM Designation:	ASTM A702
Length:	5-Feet Long (T-Type)
Weight:	1.25#/Foot (min.)
Area of Anchor Plate:	14 Sq. In.

Note: Five (T) Fasteners shall be furnished with each post.

D. Wire Fabric for the silt fence shall have the following properties:

Wire Fabric Designation:	832-12-10-12.5 Class 1
Designation:	ASTM A116
Width:	32"
Number of Line Wires:	8
Stay Wire Spacing:	12"
Line and Stay Wires:	12.5 Ga.
Top and Bottom Wires:	10 Ga.
Wire Coating:	ASTM Class 1 Zinc Coating

E. Silt Fence shall be installed and maintained in accordance with Part 3 of this Section, and Unit 4 of the SESC Manual, to the satisfaction of the Engineer until the site has been

stabilized. The cost of Silt Fence shall include the fabric, posts, wire fabric, excavation and all maintenance and restoration activities required.

2.4 STONE FOR EROSION CONTROL AND RIP RAP

A. Crushed stone for sediment filtration devices, access ways and staging areas shall conform to MDOT Sections 208 and 307.

B. Riprap shall meet the requirements of MDOT Section 916 for plain riprap.

2.5 STRAW WITH NET TEMPORARY ROLLED EROSION CONTROL MAT (RECM)

A. The Contractor shall place straw with net temporary RECM on all disturbed areas. The mat shall consist of clean wheat straw from agricultural crops made into a knitted straw mat that is machine assembled. The straw shall be evenly distributed throughout the mat. The mat shall be covered with a photodegradable synthetic mesh attached to the straw with degradable thread.

B. The Contractor shall place the straw with net temporary channel and slope RECM where directed immediately after the channel or slope has been properly graded and prepared, fertilized, and seeded. If the mat is of single net construction, the netting shall be on top with the straw in contact with the soil.

C. The Contractor will immediately repair or replaced any section of straw with net temporary channel and slope RECM which is not functioning properly or has been damaged in any way until a stable growth of grass has been established.

D. Straw with net RECM shall be North American Green S150, American Excelsior Co. Curlex I, Contech SFB1, or equal with a minimum bare soil shear stress value of 1.5 lb/ft^2.

2.6 CURLED WOOD OR COCONUT FIBER ROLLED EROSION CONTROL MAT (RECM)

A. The Contractor shall place curled wood or coconut fiber RECM on all disturbed areas with slopes greater than 1 on 3. The mat shall consist of machine-produced mat of curled wood excelsior or coconut fiber with a majority of the fibers 6 inches or longer with consistent thickness and the fibers evenly distributed over the entire area of the mat. The top of the mat shall be covered with a biodegradable synthetic mesh. The mesh shall be attached to the curled wood excelsior or coconut fiber with photodegradable synthetic yarn.

B. The Contractor shall place the curled wood or coconut fiber channel and slope RECM where directed immediately after the channel or slope has been properly graded and prepared, fertilized, and seeded. If the mat is of single net construction, the mesh shall be on top with the fibers in contact with the soil.

C. The Contractor will immediately repair or replace any section of curled wood or coconut fiber RECM which is not functioning properly or has been damaged in any way until a stable growth of grass has been established.

D. Curled wood or coconut fiber RECM shall be American Excelsior Curlex II, North American Green C125, Contech EFB4 or equal matting with a minimum bare soil shear stress value of 2.0 lb/ft^2.

2.7 ROCK CONSTRUCTION EXITS

A. Rock construction exits shall be constructed as shown on the Drawings and as specified herein. Rock construction exit shall be maintained in accordance with Part 3 of this Section to the satisfaction of the Engineer until the site has been stabilized. The cost of temporary gravel construction entrances shall include the gravel and all maintenance activities required.

2.8 TEMPORARY SOIL STABILIZER

A. The temporary agent for soil erosion control shall consist of an especially prepared highly concentrated powder which, when mixed with water, forms a thick liquid such as "Enviroseal 2001" by Enviroseal Corporation, "Terra Control" by Quattro Environmental, Inc., or "CHEM-CRETE ECO-110" by International CHEM-CRETE Corporation, and having no growth or germination inhibiting factors. The agent shall be used for hydroseeding grass seed in combination with other approved amendments resulting in a highly viscous slurry which, when sprayed directly on the soil, forms a gelatinous crust.

2.9 STRAW MULCH

A. Straw mulch shall be utilized on all newly graded areas to protect areas against washouts and erosion. Straw mulch shall be comprised of threshed straw of oats, wheat, barley, or rye that is free from noxious weeds, mold or other objectionable material. The straw mulch shall contain at least 50 percent by weight of material to be 10-in or longer. Straw shall be in an air-dry condition and suitable for placement with blower equipment.

B. Latex acrylic copolymer, such as Soil Sealant with coalescing agent by Soil Stabilization Co., Merced, CA or equivalent shall be used as straw mulch tackifier.

C. An asphalt tackifier shall only be used when temperatures are too low to allow the use of a latex acrylic copolymer and only with prior written approval from the Engineer.

PART 3 – EXECUTION

3.1 INSTALLATION AND MAINTENANCE

A. Erosion and sedimentation control devices shall be established prior to or concurrent with the clearing operations in a given area. Where such practice is not feasible, the erosion and sedimentation control device(s) shall be established immediately following completion of the clearing operation.

B. The Contractor shall furnish the labor, materials and equipment required for routine maintenance of all erosion and sedimentation control devices. Maintenance shall be scheduled as required for a particular device to maintain the removal efficiency and intent of the device. Maintenance shall include but not be limited to 1) the removal and satisfactory disposal of accumulated sediment from traps or silt barriers and 2) replacement of filter fabrics used for silt fences and stone used in temporary sediment traps, stone filters, gravel construction entrances, etc. Sediment removed from erosion and sedimentation control devices shall be disposed of in locations that will not result in offsite sedimentation as acceptable to the Engineer, at no additional cost to the Owner.

C. The Contractor shall provide temporary sedimentation traps at all locations shown on the Contract Drawings and as per the approved SESC Plan for the settling of water pumped from the excavations or intercepted by drainage ditches for keeping water out of the excavations or to protect existing structures. The Contractor shall remove accumulated sediment from the traps as necessary to maintain their effectiveness or as indicated by the Engineer. Sediment material removed from the traps shall be disposed by the Contractor in locations that will not result in off-site sedimentation as acceptable to the Engineer, at no additional cost to the Owner.

1. Inspect temporary sediment traps after each period of significant rainfall. Remove sediment and restore the trap to its original dimensions when the sediment has accumulated to one-half the design depth of the trap. Place the sediment that is removed in a designated disposal area and replace the contaminated part of the gravel facing.

2. Check the structure for damage from erosion or piping. Periodically check the depth of the spillway to ensure it is a minimum of 1.5 ft. below the low point of the embankment. Immediately fill any settlement of the embankment to slightly above design grade. Any riprap displaced from the spillway must be replaced immediately.

3. After all sediment-producing areas have been permanently stabilized, remove the structure and all unstable sediment. Smooth the area to blend with the adjoining areas and stabilize properly.

D. The Contractor shall provide temporary diversions at all locations noted on the Contract Drawings and as per the approved SESC Plan. All temporary diversions shall outlet at a temporary sediment trap or other appropriate structure.

1. Inspect temporary diversions once a week and after every rainfall. Immediately remove sediment from the flow area and repair the diversion ridge. Carefully check outlets and make timely repairs as needed. When the area protected is permanently stabilized, remove the ridge and the channel to blend with the natural ground level and appropriately stabilize it.

E. Silt fence shall be erected as shown on the Drawings, as per the approved SESC Plan and specified herein. Silt fence shall be erected and maintained to the satisfaction of the Engineer until a vegetative ground cover has been established. Replacement of the filter fabric, if required by the Engineer, will be at the Contractor's expense.

1. Silt fence shall be erected around all catch basins which are located downstream from any construction work. Should any catch basins be indicated to be relocated or modified, silt fence shall be utilized until work is completed on the catch basins. Upon completion of the modification, the area shall be rough graded, as shown on the Drawings, until the end of the project, at which time final grading shall occur.

2. Inspect silt fence at least once a week and after each rainfall. Make any required repairs immediately.

3. Should the fabric of a silt fence collapse, tear, decompose or become in-effective, replace it promptly.

4. Remove sediment deposits as necessary to provide adequate storage volume for the next rain and to reduce pressure on the fence. Take care to avoid undermining the fence during cleanout.

5. Remove all fencing materials and unstable sediment deposits and bring the area to grade and stabilize it after the contributing drainage area has been properly stabilized. Removal of any silt fence shall be permitted only with the prior approval of the Engineer, or the local governing agency.

F. Riprap shall be graded so that the smaller stones are uniformly distributed through the mass. The Contractor may place the stone by mechanical methods, augmented by hand placing where necessary or ordered by the Engineer. The placed riprap shall form a properly graded, dense, neat layer of stone. The placed riprap shall have a minimum depth of 24 inches. Type II Separator Geotextile, shall be used under all riprap unless otherwise noted.

G. Riprap and stone for erosion control shall be dumped and placed in such manner that the larger rock fragments are uniformly distributed throughout the rock mass and the smaller fragments fill the voids between the larger fragments. Rearranging of individual stones by equipment or by hand shall only be required to the extent necessary to secure the results specified above, to protect structures from damage when rock material is placed against the structures, or to protect the underlying Separator Geotextile from damage during installation.

H. The Contractor shall provide gravel and riprap filter berm basins at all locations noted on the Contract Drawings and as per the approved SESC Plan.

1. Inspect gravel and riprap filter berm basins after each period of significant rainfall. Remove sediment and restore the basin to its original dimensions when the sediment has accumulated to one-half the design depth of the trap. Place the sediment that is removed in a designated disposal area and replace the contaminated part of the gravel facing.

2. Check the structure for damage from erosion or piping. Any stone or riprap displaced from the berm must be replaced immediately.

3. After all sediment-producing areas have been permanently stabilized, remove the structure and all unstable sediment. Smooth the area to blend with the adjoining areas and stabilize properly.

I. Engineer may direct the Contractor to place Straw with Net, Curled Wood or Coconut Fiber RECM’s and Synthetic TRM’s in permanent channels or on slopes at other locations not shown on Drawings.

1. All temporary and permanent channel and slope lining RECM’s and TRM’s shall be unrolled in the ditch in the direction of the flow of water. Temporary linings shall overlap the buried end of the downstream blanket by a minimum of 6 inches. Permanent linings shall overlap a minimum of 3 feet. All anchor and transverse trenches shall be a minimum of 12 inches deep. All mats shall be stapled as per manufacturer's specifications.

2. During the establishment period, check grass, RECM and TRM-lined channels after every rainfall event. For grass-lined channel once grass is established, check periodically and after every heavy rainfall event. Immediately make repairs. It is particularly important to check the channel outlet and all road crossings for bank stability and evidence of piping and scour holes. Give special attention to the outlet and inlet sections and other points where concentrated flow enters. Remove all significant sediment accumulations to maintain the designed carrying capacity. Keep the grass in a healthy, vigorous condition at all times.

J. The Contractor shall provide temporary slope drains at all location noted on the Contract Drawings, and as per the approved SESC Plan, and at other locations as may be directed by the Engineer.

1. Inspect the temporary slope drain and supporting diversion after every rainfall event and promptly make any necessary repairs. When the protected area has been permanently stabilized, temporary measures may be removed, materials disposed of properly, and all disturbed areas stabilized appropriately.

K. The Contractor shall provide temporary gravel construction entrances at all locations noted on the Contract Drawings, and as per the approved SESC Plan, and at all other locations as may be directed by the Engineer.

1. Maintain the gravel pad in a condition to prevent mud or sediment from leaving the construction site. This may require periodic topdressing with 2-inch stone. After each rainfall, inspect each construction entrance and clean out as necessary. Immediately remove all objectionable materials spilled, washed, or tracked onto public roadways.

L. The Contractor shall provide temporary or permanent ground cover adequate to restrain erosion on all disturbed areas that will be left unworked for periods exceeding 30 calendar days.

1. Reseed and mulch temporary seeding areas where seedling emergence is poor, or where erosion occurs, as soon as possible. Do not mow. Protect from traffic as much as possible.

2. Generally, a stand of vegetation cannot be determined to be fully established until soil cover has been maintained for one full year from planting. Inspect seeded areas for failure and make necessary repairs and reseedings within the same season, if possible.

3. Reseeding – If a stand has inadequate cover, re-evaluate choice of plant materials and quantities of lime and fertilizer. Re-establish the stand after seedbed preparation or over-seed the stand. Consider seeding temporary, annual species if the time of year is not appropriate for permanent seeding.

4. If vegetation fails to grow, soil must be tested to determine if acidity or nutrient imbalance is responsible.

5. Fertilization – Contractor shall refertilize in the second growing season.

M. Additional Requirements

1. All storm sewer piping shall be blocked at the end of every working day until the inlet is constructed above grade.

2. All streets around the construction area shall be swept as necessary at the end of each day's work and after each rainfall event of ½-inch or greater to prevent accumulation of dirt and debris. Inlet protection shall be maintained on all stormwater inlets on site, in streets, or downstream of site until construction is complete.

3. The Contractor shall provide adequate means to prevent any sediment from entering any storm drains, curb inlets (curb inlet filter box), ditches, streams, or bodies of water downstream of any area disturbed by construction. Excavation materials shall be placed upstream of any trench or other excavation to prevent sedimentation of offsite areas. In areas where a natural buffer area exists between the work area and the closest stream or water course, this area shall not be disturbed.

4. Contractor shall provide adequate means to control dust on the site and prevent it from entering the process tanks on site.

5. The Owner or Engineer may direct the Contractor to place any additional sediment and erosion control devices at other locations not shown on the Drawings.

3.2 INSPECTIONS AND MAINTENANCE

A. The Contractor shall designate a Certified Operator to perform inspections required by this Section. The following areas are to be inspected and maintenance performed, if needed, at least once every 7 calendar days and within 24 hours of a rainfall event that has a precipitation of 1/2 inch or greater.

1. Disturbed areas of the construction site that have not undergone final stabilization

2. Erosion and sediment control structures, dust control measures

3. All locations where vehicles enter or exit the site

4. Material storage and construction laydown areas that are exposed to precipitation and have not been finally stabilized

C. Immediate action will be taken to correct deficiencies to BMP's. The State or Local Authorities reserves the right to stop all construction activities not related to maintaining BMP's until such deficiencies are repaired.

D. In areas that have been finally stabilized, inspections and, if necessary, maintenance by Contractor will occur at least once per month for the duration of the contract or project, whichever is longer.

E. During inspections the following will be observed, and appropriate maintenance procedures taken:

1. The conformance to specifications and current condition of all erosion and sediment control structures

2. The effectiveness and operational success of all erosion and sediment control measures

3. The presence of sediments or other pollutants in storm water runoff at all runoff

discharge points

4. If reasonably accessible, the presence of sediments or other pollutants in receiving waters

5. Evidence of dust being transported to any process tank on site

6. Evidence of off-site tracking at all locations where vehicles enter or exit the site

3.3 TEMPORARY MULCHING

A. Apply temporary mulch to areas where rough grading has been completed but final grading is not anticipated to begin within 30 days of the completion of rough grading.

B. Straw mulch shall be applied at rate of 100 lbs/1000 sq ft and tackified with latex acrylic copolymer at a rate of 1 gal/1000 sq ft diluted in a ratio of 30 parts water to 1 part latex acrylic copolymer mix.

3.4 REMOVAL OF TEMPORARY SEDIMENT CONTROL STRUCTURES

A. At such time that temporary erosion and control structures are no longer required under this item, the Contractor shall notify the Engineer of its intent and schedule for the removal of the temporary structures, and obtain the Engineer's approval in writing prior to removal. Once the Contractor has received such written approval from the Engineer, the Contractor shall remove, as approved, the temporary structures and all sediments accumulated at the removed structure shall be returned upgrade. In areas where temporary control structures are removed, the site shall be left in a condition that will restore original drainage. Such areas shall be evenly graded and seeded as specified in Section 32 92 00 – Turf and Grasses.

3.5 FINAL CLEANUP

A. Once the site has been fully stabilized against erosion and all sediment control measures have been removed, dispose of accumulated silt and waste materials in proper manner. Re-grade all areas disturbed during this process and stabilize against erosion with surfacing materials as indicated on the Drawings.

END OF SECTION

SECTION 32 92 00

TURF AND GRASSES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Fine Grading

B. Topsoil

C. Fertilizers

D. Seeding

1.2 RELATED SECTIONS

A. City of Ann Arbor Standard Specification Division IV

B. Section 31 25 00 – Erosion and Sedimentation Controls

1.3 SUBMITTALS

A. Certification of grass seed from seed vendor for each grass-seed mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

B. Certification of all fertilizers.

C. Certified analysis of the topsoil from each source.

1.4 REFERENCES

A. Michigan Department of Transportation 2020 Standard Specifications for Construction (MDOT).

B. ASTM D5268 - Topsoil Used for Landscaping Purposes

1.5 DESCRIPTION

A. The CONTRACTOR shall permanently prepare, fertilize, and seed or riprap the areas designated on the Plans or disturbed by the CONTRACTOR. Grass seed shall be placed on areas having a slope flatter than 3:1. Sod may be placed in other areas at the CONTRACTOR's own option and expense. Riprap shall be placed where shown on the Plans or required by the ENGINEER. A bioswale/rain garden seed mix must be used within the areas designated on the Plans as rain garden restoration areas or required by the ENGINEER.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Seed: Deliver seed in original sealed, labeled, and undamaged containers, bearing seed analysis and the date of the seed testing. The testing shall be within a period of six months prior to commencement of planting operations.

B. Fertilizer: Delivered in bags or other convenient containers, each fully labeled, conforming to applicable state fertilizer laws, bearing the grade and the trade name of the producer.

C. The CONTRACTOR is responsible for proper storage & security of all seeding materials.

1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with planting only when existing and forecast weather conditions are suitable for work. At option and under full responsibility of CONTRACTOR, planting operations may be conducted under unseasonable conditions, but without additional compensation.

1.8 SCHEDULING

A. Planting Season: Sow seed during normal planting seasons and per project schedule. Optimal time for seed is between April 1 and June 1, and between September 1 and October 15.

1.9 MAINTENANCE

A. It is the responsibility of the CONTRACTOR to establish a dense lawn of permanent grasses, free from mound and depressions and a full restoration of all rain garden areas. Any portion of a seeded area that fails to show a uniform germination, shall be re-seeded. Such re-seeding shall be at the CONTRACTOR's expense and shall continue until a dense lawn is established.

B. The CONTRACTOR shall maintain all lawn and rain garden areas until they have been accepted by the OWNER. Lawn and rain garden maintenance shall begin immediately after the seed is in place and continue until provisional acceptance.

1. Lawns shall be protected and maintained by watering, mowing, and re-seeding as necessary for one year to establish a uniform weed-free stand of grasses and until specific lawn acceptance has been made. CONTRACTOR shall review lawn establishment on a minimum bi-weekly basis. Maintenance includes deposition of additional topsoil and re-seeding as may be required to correct all settlement and erosion until the date of final acceptance.

2. Rain garden areas shall be protected and maintained by watering, re-seeding, and weeding as necessary to re-establish the rain garden.

3. At the time of the first cutting the lawn shall be 2-1/2 to 3-1/2 inches high, and the mower blades shall be set at 2-1/2 inches high. All lawns shall receive at least six (6) mowings, with a minimum of 1 week between mowing, before acceptance.

4. Damage to seeded areas resulting from erosion shall be repaired by the CONTRACTOR at the CONTRACTOR's expense. Scattered bare spots in seeded areas will not be allowed over three (3) percent of the area nor greater than 3" x3" in size.

5. OWNER will withhold $4,000 from final payment and will release up to $1,000 per quarter upon satisfactory completion of lawn and landscaping maintenance work.

C. When the above requirements have been fulfilled, the OWNER will accept the lawn.

PART 2 - PRODUCTS

2.1 TOPSOIL

A. Topsoil shall meet the requirements of ASTM D5268 Topsoil shall not be contaminated or excessively acidic or alkaline, and shall be free of stones 1 inch or larger in any dimension. Topsoil shall consist of natural loam, sandy loam, silty loam, or clay loam humus-bearing soils adapted to sustain plant life.

B. Topsoil Source: Reuse surface soil stockpiled on the site. Verify suitability of surface soil to produce topsoil meeting requirements and amend when necessary. Supplement with imported topsoil when quantities are insufficient. Clean topsoil of roots, plants, stones, clay lumps, and other extraneous materials harmful to plant growth.

2.2 FERTILIZER

A. Fertilizer shall meet the requirements of the MDOT Section 917.

2.3 SEED

A. Permanent seed for lawn areas shall meet the requirements of the MDOT Section 917 for seed mixture THM, as follows:

1. 65% Kentucky Bluegrass, 98% pure with an 85% germination factor.

2. 25% Creeping Red Fescue, 97% pure with an 85% germination factor.

3. 10% Perennial Ryegrass, 96% pure with an 85% germination factor.

B. Temporary seeds for lawn areas, and their spreading rates and dates of application shall be as follows:

1. April 1 to August 15:
   Spring oats or barley, at 2 lbs/1000 sq ft, or 3 bu/acre;
   Domestic rye grass, at .5 lb/1000 sq ft, or 20-25 bu/acre.

2. June - July:
   Sudangrass, at 1 lb/1000 sq ft, or 30-40 lbs/acre.

3. August 1 to October 15:
   Rye, at 1lbs/1000 sq ft, or 2-3 bu/acre; Perennial Ryegrass, at .5 lb/1000, or 20-25 lbs/acre.

4. September 20 to October 15:
   Wheat, at 3 lbs/1000 sq ft, or 2-3 bu/acre

C. Seed mix for rain garden restoration areas shall be submitted to the OWNER for approval per Section 01 33 00 – Submittal Procedures. The seed mix shall be a bioswale/rain garden native seed mix containing primarily wildflowers and grasses. The seed mix should contain a mixture of:

1. Grasses, Sedges, & Rushes: Bebb's oval sedge, Fox Sedge, Canada Wild Rye, Virginia Wild Rye, Fowl Manna Grass, Soft Rush, Path Rush, Prairie Cordgrass.

2. Forbs: Nodding Wild Onion, Swamp Milkweed, New England Aster, Wild Senna, Showy Tick Trefoil, Purple Coneflower, Sweet Joe Pye Weed, False sunflower,

Great St John's Wort, Great Blue Lobelia, Wild Bergamot, Mountain mint, Yellow Coneflower, Black-eyed Susan, Riddell's Goldenrod, Blue Vervain, Golden Alexander

3. Temporary Grass Cover: Annual Ryegrass, Seed Oats

4. Application rates shall be per manufacturer.

2.4 MULCH

A. Mulch shall meet the requirements of the MDOT Section 917 for straw mulch blankets.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to seeding, OWNER must approve condition of the seedbed. Inadequate seedbed preparation shall result in the reworking of the area to the complete satisfaction of the OWNER.

B. Do not proceed until unsatisfactory conditions have been corrected.

C. The CONTRACTOR is solely responsible to determine the quantity of cut and fill required to complete the work and to locate a suitable source and amount of topsoil.

3.2 TOPSOIL PLACEMENT

A. The application of topsoil shall occur only when conditions are favorable so as to minimize damage to the subgrade.

B. Where undesirable soils exist within the subgrade, it will be the responsibility of the CONTRACTOR not to contaminate the topsoil during the replacement or finishing process. All undesirable soils or objects will be removed from the topsoil seedbed at the cost of the CONTRACTOR.

C. Topsoil shall be placed and spread over the areas graded as shown on the plans in such a manner so that after compaction and natural settling the topsoil will conform to finished grades as shown.

D. Provide a smooth transition between adjacent existing grades and new grades.

E. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

3.3 FINE GRADING

A. Areas to be planted shall be finish graded to provide surface drainage.

B. Undulations and unsightly variations in grade which will not permit the use of normal mowing equipment without scalping shall be removed so that proper use of such equipment may be accomplished.

C. Limit preparation to areas that will be planted in the immediate future.

D. Loosen existing topsoil to a minimum depth of 4 inches. Remove stones, sticks, roots,

rubbish, and other extraneous matter larger than 1 inch in any dimension.

E. Mix soil amendments and fertilizers with new topsoil per recommendations from soil report. Delay mixing fertilizer if planting does not follow placing of topsoil within a few days. Either mix soil before spreading or apply soil amendments and fertilizers on surface of spread topsoil and mix thoroughly into top 4 inches of topsoil before planting

3.4 TEMPORARY SEEDING AND MULCHING

A. The seedbed immediately before seeding shall be firm but not so compact as to prohibit covering seed, securing adequate germination, or root penetration. Tillage implements shall be used as necessary to provide at least a 3-inch depth of firm but friable soil, free of large clods and stones.

B. Seed may be broadcast by hand, by cyclone-type mechanical seeders or applied with a drill, cultipacker-seeder, or other suitable equipment. Seed should be covered approximately 2-inches deep either during seeding operation or by following broadcast application with cultipacker or similar tool.

C. Mulching shall be used with all seedings on disturbed soil areas and for temporary use without seeding during months unfavorable to seeding.

D. Immediately after seeding, mulch with unweathered small grain straw (preferably wheat) or hay spread uniformly at the rate of 1-1/2 ton per acre, or 100 lbs (2-3 bales) per 1,000 sq ft.

3.5 PERMANENT SEEDING

A. Topsoil shall be spread to a depth of 4 inches unless otherwise shown on the Plans. Placement of topsoil shall conform to MDOT Section 816.

B. All areas to be seeded shall be fertilized in accordance with MDOT Section 816. CONTRACTOR shall provide all necessary soil tests to determine fertilizer needs.

C. Permanent seeding shall conform to MDOT Section 816. Seeding rate shall be 300 lb/acre or per rain garden/bioswale seed mix manufacturer.

D. Fertilizing shall conform to all local restrictions.

3.6 MULCHING

A. Straw mulch blankets shall be applied to all seeded areas. Blankets shall be attached with biodegradable wooden pegs per the manufacturer’s recommendations.

3.7 PROTECTION

A. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period until lawn is established.

END OF SECTION

Native Connections

3815 N Westnedge Ave, Kalamazoo, MI 49004
(P) 269.459.6900
info@nativeconnections.net
www.nativeconnections.net

BioSwale / Raingarden Seed Mix

This mix is similar to our Wet-Mesic Prairie, except more specifically designed for swales, detention basins, and raingardens. It has less emphasis on the tallest grasses and more emphasis on the showier, more common wildflowers. For a shorter stature, we can easily customize it by eliminating the tall grasses and increasing the shorter sedges and rushes.

Total Seeding Rate: 31 lbs per acre
3.75 lbs grasses • 2.25 lbs forbs • 25 lbs nurse crop

63 native seeds per sq ft

Call, email or visit our website for pricing.

Grasses, Sedges & Rushes		PLS Oz/acre	Seeds/sq ft
~~Andropogon gerardii~~	~~Big Bluestem~~	~~6.00~~	~~1.38~~
Carex bebbii	Bebb's oval sedge	3.00	2.34
Carex vulpinoidea	Fox Sedge	4.00	9.18
Elymus canadensis	Canada Wild Rye	16.00	1.91
Elymus virginicus	Virginia Wild Rye	16.00	1.54
Glyceria striata	Fowl Manna Grass	0.50	1.84
Juncus effusus	Soft Rush	0.25	5.74
Juncus tenuis	Path Rush	0.25	5.74
~~Panicum virgatum~~	~~Switchgrass~~	~~4.00~~	~~1.29~~
~~Sorghastrum nutans~~	~~Indian Grass~~	~~6.00~~	~~1.65~~
Spartina pectinata	Prairie Cordgrass	4.00	0.61
	Total Grasses	**60.00**	**33.21**

Forbs		PLS Oz/acre	Seeds/sq ft
Allium cernuum	Nodding Wild Onion	2.00	0.35
Asclepias incarnata	Swamp Milkweed	1.00	0.11
Aster novae-angliae	New England Aster	0.25	0.38
Cassia hebecarpa	Wild Senna	4.00	0.13
Desmodium canadense	Showy Tick Trefoil	0.50	0.06
Echinacea purpurea	Purple Coneflower	8.00	1.21
Eupatorium purpureum	Sweet Joe Pye Weed	0.25	0.24
Heliopsis helianthoides	False sunflower	8.00	1.16
Hypericum pyramidatum	Great St John's Wort	0.50	2.18
Lobelia siphilitica	Great Blue Lobelia	0.50	5.74
Monarda fistulosa	Wild Bergamot	0.50	0.80
Pycnanthemum virginianum	Mountain mint	0.25	1.26
Ratibida pinnata	Yellow Coneflower	1.50	1.03
Rudbeckia hirta	Black-eyed Susan	5.00	10.56
Solidago riddellii	Riddell's Goldenrod	0.50	1.07
Verbena hastata	Blue Vervain	1.50	3.20
Zizia aurea	Golden Alexander	1.75	0.44
	Total Forbs	**36.00**	**29.93**

Temporary Grass Cover		Oz/acre	Seeds/sq ft
Lolium multiflorum	Annual Ryegrass	80.00	24.79
Avena sativa	Seed Oats	320.00	7.35
	Total Temp Grasses	**400.00**	**32.14**

ATTACHMENTS

CITY OF ANN ARBOR
PREVAILING WAGE DECLARATION OF COMPLIANCE

The "wage and employment requirements" of Section 1:320 of Chapter 14 of Title I of the Ann Arbor City Code mandates that the city not enter any contract, understanding or other arrangement for a public improvement for or on behalf of the city unless the contract provides that all craftsmen, mechanics and laborers employed directly on the site in connection with said improvements, including said employees of subcontractors, shall receive the prevailing wage for the corresponding classes of craftsmen, mechanics and laborers, as determined by statistics for the Ann Arbor area compiled by the United States Department of Labor. Where the contract and the Ann Arbor City Code are silent as to definitions of terms required in determining contract compliance with regard to prevailing wages, the definitions provided in the Davis-Bacon Act as amended (40 U.S.C. 278-a to 276-a-7) for the terms shall be used. Further, to the extent that any employees of the contractor providing services under this contract are not part of the class of craftsmen, mechanics and laborers who receive a prevailing wage in conformance with section 1:320 of Chapter 14 of Title I of the Code of the City of Ann Arbor, employees shall be paid a prescribed minimum level of compensation (i.e. Living Wage) for the time those employees perform work on the contract in conformance with section 1:815 of Chapter 23 of Title I of the Code of the City of Ann Arbor.

At the request of the city, any contractor or subcontractor shall provide satisfactory proof of compliance with this provision.

The Contractor agrees:

(a) To pay each of its employees whose wage level is required to comply with federal, state or local prevailing wage law, for work covered or funded by this contract with the City,

(b) To require each subcontractor performing work covered or funded by this contract with the City to pay each of its employees the applicable prescribed wage level under the conditions stated in subsection (a) or (b) above.

(c) To provide to the City payroll records or other documentation within ten (10) business days from the receipt of a request by the City.

(d) To permit access to work sites to City representatives for the purposes of monitoring compliance, and investigating complaints or non-compliance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services in accordance with the terms of the wage and employment provisions of the Chapter 14 of the Ann Arbor City Code. The undersigned certifies that he/she has read and is familiar with the terms of Section 1:320 of Chapter 14 of the Ann Arbor City Code and by executing this Declaration of Compliance obligates his/her employer and any subcontractor employed by it to perform work on the contract to the wage and employment requirements stated herein. The undersigned further acknowledges and agrees that if it is found to be in violation of the wage and employment requirements of Section 1:320 of the Chapter 14 of the Ann Arbor City Code it shall has be deemed a material breach of the terms of the contract and grounds for termination of same by the City.

Rawhorn Electric, Inc.
Company Name

Signature of Authorized Representative — Date: 1/24/22

Scott Finkbeiner, Vice President
Print Name and Title

14140 33 Mile Rd. Bruce Twp, MI 48065
Address, City, State, Zip

sfinkbeiner@rawhornelec.com
Phone/Email address

Questions about this form? Contact Procurement Office City of Ann Arbor Phone: 734/794-6500

CITY OF ANN ARBOR
LIVING WAGE ORDINANCE DECLARATION OF COMPLIANCE

The Ann Arbor Living Wage Ordinance (Section 1:811-1:821 of Chapter 23 of Title I of the Code) requires that an employer who is (a) a contractor providing services to or for the City for a value greater than $10,000 for any twelve-month contract term, or (b) a recipient of federal, state, or local grant funding administered by the City for a value greater than $10,000, or (c) a recipient of financial assistance awarded by the City for a value greater than $10,000, shall pay its employees a prescribed minimum level of compensation (i.e., Living Wage) for the time those employees perform work on the contract or in connection with the grant or financial assistance. The Living Wage must be paid to these employees for the length of the contract/program.

Companies employing fewer than 5 persons and non-profits employing fewer than 10 persons are exempt from compliance with the Living Wage Ordinance. If this exemption applies to your company/non-profit agency please check here [ ] *No. of employees*__

The Contractor or Grantee agrees:

(a) To pay each of its employees whose wage level is not required to comply with federal, state or local prevailing wage law, for work covered or funded by a contract with or grant from the City, no less than the Living Wage. The current Living Wage is defined as $14.05/hour for those employers that provide employee health care (as defined in the Ordinance at Section 1:815 Sec. 1 (a)), or no less than $15.66/hour for those employers that do not provide health care. The Contractor or Grantor understands that the Living Wage is adjusted and established annually on April 30 in accordance with the Ordinance and covered employers shall be required to pay the adjusted amount thereafter to be in compliance with Section 1:815(3).

Check the applicable box below which applies to your workforce

[ ] Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage without health benefits

[x] Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage with health benefits

(b) To post a notice approved by the City regarding the applicability of the Living Wage Ordinance in every work place or other location in which employees or other persons contracting for employment are working.

(c) To provide to the City payroll records or other documentation within ten (10) business days from the receipt of a request by the City.

(d) To permit access to work sites to City representatives for the purposes of monitoring compliance, and investigating complaints or non-compliance.

(e) To take no action that would reduce the compensation, wages, fringe benefits, or leave available to any employee covered by the Living Wage Ordinance or any person contracted for employment and covered by the Living Wage Ordinance in order to pay the living wage required by the Living Wage Ordinance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services or agrees to accept financial assistance in accordance with the terms of the Living Wage Ordinance. The undersigned certifies that he/she has read and is familiar with the terms of the Living Wage Ordinance, obligates the Employer/Grantee to those terms and acknowledges that if his/her employer is found to be in violation of Ordinance it may be subject to civil penalties and termination of the awarded contract or grant of financial assistance.

Rayhorn Electric, Inc.
Company Name

14140 33 mile rd.
Street Address

[signature] 1/24/22
Signature of Authorized Representative — Date

Bruce Twp. MI 48065
City, State, Zip

Scott Finkbeiner – vice President
Print Name and Title

586-997-0400
sfinkbeiner@rayhornelec.com
Phone/Email address

CITY OF ANN ARBOR
LIVING WAGE ORDINANCE

RATE EFFECTIVE APRIL 30, 2021 - ENDING APRIL 29, 2022

$14.05 per hour
If the employer provides health care benefits*

$15.66 per hour
If the employer does **NOT** provide health care benefits*

Employers providing services to or for the City of Ann Arbor or recipients of grants or financial assistance from the City of Ann Arbor for a value of more than $10,000 in a twelve-month period of time must pay those employees performing work on a City of Ann Arbor contract or grant, the above living wage.

ENFORCEMENT

The City of Ann Arbor may recover back wages either administratively or through court action for the employees that have been underpaid in violation of the law. Persons denied payment of the living wage have the right to bring a civil action for damages in addition to any action taken by the City.

Violation of this Ordinance is punishable by fines of not more than $500/violation plus costs, with each day being considered a separate violation. Additionally, the City of Ann Arbor has the right to modify, terminate, cancel or suspend a contract in the event of a violation of the Ordinance.

* Health Care benefits include those paid for by the employer or making an employer contribution toward the purchase of health care. The employee contribution must not exceed $.50 an hour for an average work week; and the employer cost or contribution must equal no less than $1/hr for the average work week.

The Law Requires Employers to Display This Poster Where Employees Can Readily See It.

For Additional Information or to File a Complaint contact
Colin Spencer at 734/794-6500 or cspencer@a2gov.org

Revised 2/4/2021

Vendor Conflict of Interest Disclosure Form

All vendors interested in conducting business with the City of Ann Arbor must complete and return the Vendor Conflict of Interest Disclosure Form in order to be eligible to be awarded a contract. Please note that all vendors are subject to comply with the City of Ann Arbor's conflict of interest policies as stated within the certification section below.

If a vendor has a relationship with a City of Ann Arbor official or employee, an immediate family member of a City of Ann Arbor official or employee, the vendor shall disclose the information required below.

1. No City official or employee or City employee's immediate family member has an ownership interest in vendor's company or is deriving personal financial gain from this contract.
2. No retired or separated City official or employee who has been retired or separated from the City for less than one (1) year has an ownership interest in vendor's Company.
3. No City employee is contemporaneously employed or prospectively to be employed with the vendor.
4. Vendor hereby declares it has not and will not provide gifts or hospitality of any dollar value or any other gratuities to any City employee or elected official to obtain or maintain a contract.
5. Please note any exceptions below:

Conflict of Interest Disclosure*	
Name of City of Ann Arbor employees, elected officials or immediate family members with whom there may be a potential conflict of interest.	( ) Relationship to employee NONE ( ) Interest in vendor's company NONE ( ) Other (please describe in box below)
NONE	

*Disclosing a potential conflict of interest does not disqualify vendors. In the event vendors do not disclose potential conflicts of interest and they are detected by the City, vendor will be exempt from doing business with the City.

I certify that this Conflict of Interest Disclosure has been examined by me and that its contents are true and correct to my knowledge and belief and I have the authority to so certify on behalf of the Vendor by my signature below:

Rauhorn Electric, Inc.		586-992-0400
Vendor Name		**Vendor Phone Number**
[signature]	1/24/22	Scott Finkbeiner
Signature of Vendor Authorized Representative	**Date**	**Printed Name of Vendor Authorized Representative**

Questions about this form? Contact Procurement Office City of Ann Arbor Phone: 734/794-6500, procurement@a2gov.org

CITY OF ANN ARBOR
DECLARATION OF COMPLIANCE

Non-Discrimination Ordinance

The "non discrimination by city contractors" provision of the City of Ann Arbor Non-Discrimination Ordinance (Ann Arbor City Code Chapter 112, Section 9:158) requires all contractors proposing to do business with the City to treat employees in a manner which provides equal employment opportunity and does not discriminate against any of their employees, any City employee working with them, or any applicant for employment on the basis of actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight. It also requires that the contractors include a similar provision in all subcontracts that they execute for City work or programs.

In addition the City Non-Discrimination Ordinance requires that all contractors proposing to do business with the City of Ann Arbor must satisfy the contract compliance administrative policy adopted by the City Administrator. A copy of that policy may be obtained from the Purchasing Manager

The Contractor agrees:

(a) To comply with the terms of the City of Ann Arbor's Non-Discrimination Ordinance and contract compliance administrative policy, including but not limited to an acceptable affirmative action program if applicable.

(b) To post the City of Ann Arbor's Non-Discrimination Ordinance Notice in every work place or other location in which employees or other persons are contracted to provide services under a contract with the City.

(c) To provide documentation within the specified time frame in connection with any workforce verification, compliance review or complaint investigation.

(d) To permit access to employees and work sites to City representatives for the purposes of monitoring compliance, or investigating complaints of non-compliance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services in accordance with the terms of the Ann Arbor Non-Discrimination Ordinance. The undersigned certifies that he/she has read and is familiar with the terms of the Non-Discrimination Ordinance, obligates the Contractor to those terms and acknowledges that if his/her employer is found to be in violation of Ordinance it may be subject to civil penalties and termination of the awarded contract.

Rauhorn Electric, Inc
Company Name

Signature of Authorized Representative — 1/24/22 Date

Scott Finkbeiner - Vice President
Print Name and Title

14140 33 mile rd. Bruce Twp. MI 48065.
Address, City, State, Zip

586-992-0400 sfinkbeiner@rauhornelec.com
Phone/Email Address

Questions about the Notice or the City Administrative Policy, Please contact:
Procurement Office of the City of Ann Arbor
(734) 794-6500

CITY OF ANN ARBOR NON-DISCRIMINATION ORDINANCE

Relevant provisions of Chapter 112, Nondiscrimination, of the Ann Arbor City Code are included below. You can review the entire ordinance at www.a2gov.org/humanrights.

Intent: It is the intent of the city that no individual be denied equal protection of the laws; nor shall any individual be denied the enjoyment of his or her civil or political rights or be discriminated against because of actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight.

Discriminatory Employment Practices: No person shall discriminate in the hire, employment, compensation, work classifications, conditions or terms, promotion or demotion, or termination of employment of any individual. No person shall discriminate in limiting membership, conditions of membership or termination of membership in any labor union or apprenticeship program.

Discriminatory Effects: No person shall adopt, enforce or employ any policy or requirement which has the effect of creating unequal opportunities according to actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight for an individual to obtain housing, employment or public accommodation, except for a bona fide business necessity. Such a necessity does not arise due to a mere inconvenience or because of suspected objection to such a person by neighbors, customers or other persons.

Nondiscrimination by City Contractors: All contractors proposing to do business with the City of Ann Arbor shall satisfy the contract compliance administrative policy adopted by the City Administrator in accordance with the guidelines of this section. All city contractors shall ensure that applicants are employed and that employees are treated during employment in a manner which provides equal employment opportunity and tends to eliminate inequality based upon any classification protected by this chapter. All contractors shall agree not to discriminate against an employee or applicant for employment with respect to hire, tenure, terms, conditions, or privileges of employment, or a matter directly or indirectly related to employment, because of any applicable protected classification. All contractors shall be required to post a copy of Ann Arbor's Non-Discrimination Ordinance at all work locations where its employees provide services under a contract with the city.

Complaint Procedure: If any individual believes there has been a violation of this chapter, he/she may file a complaint with the City's Human Rights Commission. The complaint must be filed within 180 calendar days from the date of the individual's knowledge of the allegedly discriminatory action or 180 calendar days from the date when the individual should have known of the allegedly discriminatory action. A complaint that is not filed within this timeframe cannot be considered by the Human Rights Commission. To file a complaint, first complete the complaint form, which is available at www.a2gov.org/humanrights. Then submit it to the Human Rights Commission by e-mail (hrc@a2gov.org), by mail (Ann Arbor Human Rights Commission, PO Box 8647, Ann Arbor, MI 48107), or in person (City Clerk's Office). For further information, please call the commission at 734-794-6141 or e-mail the commission at hrc@a2gov.org.

Private Actions For Damages or Injunctive Relief: To the extent allowed by law, an individual who is the victim of discriminatory action in violation of this chapter may bring a civil action for appropriate injunctive relief or damages or both against the person(s) who acted in violation of this chapter.

THIS IS AN OFFICIAL GOVERNMENT NOTICE AND
MUST BE DISPLAYED WHERE EMPLOYEES CAN READILY SEE IT.

Michigan Department
Of Transportation
CP-347 (04/10)

MICHIGAN DEPARTMENT OF TRANSPORTATION

CERTIFIED PAYROLL

COMPLETION OF CERTIFIED PAYROLL FORM FULFILLS THE MINIMUM MDOT PREVAILING WAGE REQUIREMENTS

(1) NAME OF CONTRACTOR / SUBCONTRACTOR (CIRCLE ONE) | (2) ADDRESS

(3) PAYROLL NO. | (4) FOR WEEK ENDING | (5) PROJECT AND LOCATION | (6) CONTRACT ID

(a) EMPLOYEE INFORMATION	(b) WORK CLASSIFICATION	(c) Hour Type	(d) DAY AND DATE / HOURS WORKED ON PROJECT							(e) TOTAL HOURS ON PROJECT	(f) PROJECT RATE OF PAY	(g) PROJECT RATE OF FRINGE PAY	(h) GROSS PROJECT EARNED / GROSS WEEKLY EARNED	(i) TOTAL WEEKLY HOURS WORKED ALL JOBS	(j) DEDUCTIONS FICA	FEDERAL	STATE		OTHER	TOTAL DEDUCT	(k) TOTAL WEEKLY WAGES PAID FOR ALL JOBS
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											

Date _____

I, _____ _____
(Name of Signatory Party) (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by

_____ on the
(Contractor or Subcontractor)

_____; that during the payroll period commencing on the
(Building or Work)

_____ day of _____, _____, and ending the _____ day of _____, _____,

all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said

_____ from the full
(Contractor or Subcontractor)

weekly wages earned by any person and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part 3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Start. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

_____

_____

_____

_____

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

☐ – in addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

☐ – Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

REMARKS:

NAME AND TITLE	SIGNATURE

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE.