



Division of Finance and Business Operations

Wayne State University
University Tower Lightning Protection
WSU Project Number 507-216501
Prevailing Wage Work

FOR:

Board of Governors
Wayne State University
Detroit, Michigan

Owner's Representative:

Thomas J. Edwards, Project Manager
Facilities Planning & Management
Design & Construction Services
5454 Cass
Wayne State University
Detroit, Michigan 48202

Owner's Agent:

Robert Kuhn, Senior Buyer
WSU – Procurement & Strategic Sourcing
5700 Cass, Suite 4200
Detroit, Michigan 48202
313 577 - 3712 Phone / 313-577-3747 fax
Robert Kuhn Ac6243@wayne.edu and copy Valerie
Kreher, ab4889@wayne.edu

Consultant:

Peter Basso and Associates
5145 Livernois, Suite 100
Troy, Michigan 48098-3276

June 7, 2013

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INFORMATION FOR BIDDERS

OWNER: Board of Governors
Wayne State University

PROJECT: University Tower Lightning Protection
Project No. 507-216501

LOCATION: Wayne State University
University Tower, 4500 Cass Avenue
Detroit, Michigan 48202

OWNER'S AGENT: Robert Kuhn , Senior Buyer
WSU – Procurement & Strategic Sourcing
5700 Cass, Suite 4200
Detroit, Michigan 48202
313 577 - 3712 Phone / 313-577-3747 fax
Robert Kuhn Ac6243@wayne.edu & copy Valerie Kreher
ab4889@wayne.edu

OWNER'S REPRESENTATIVE: Thomas J. Edwards, Project Manager
Facilities Planning & Management
Design & Construction Services
Wayne State University
5454 Cass Avenue
Detroit, Michigan 48202

Architect: Peter Basso and Associates
5145 Livernois, Suite 100
Troy, Michigan 48098-3276

SPECIAL NOTE: Right to reject any and all proposals, either in whole or in part, and to waive any irregularities therein is reserved by the Owner.

BIDS ADVERTISED: June 7, 2013

BIDDING: Bidding documents may be obtained by vendors from the University Purchasing Web Site at http://www.forms.purchasing.wayne.edu/Adv_bid/Adv_bid.html beginning **June 7, 2013**. When visiting the Web Site, click on the "**Construction**" link in green. Copies of the RFP will not be available at the pre-proposal meeting.

MANDATORY Pre-Bid Conference: 1:00 p.m., local time, **June 14, 2013** to be held at Wayne State University – 4500 Cass Avenue, First Floor Living Room, Detroit, MI, 48202. Late Arrivals may not be permitted to submit bids.

OPTIONAL Second Walk Through: (if needed) **To be determined at the conclusion of the prebid conference, by those in attendance** .

DUE DATE FOR QUESTIONS: Due Date for questions shall be **June 18, 2013 at 12:00 Noon**. All questions must be reduced to writing and emailed to the attention of Robert Kuhn, Senior Buyer at Robert Kuhn Email@wayne.edu, copy to Valerie Kreher, Senior Buyer at: ab4889@wayne.edu .

Bids Due: Sealed proposals for lump-sum General Contract will be received at the office of the Procurement & Strategic Sourcing located at 5700 Cass Avenue, Suite 4200, Detroit, MI 48202 on **June 21, 2013**, until 2:00 p.m. (local time).

No public bid opening will be held.

Bid Qualification Meeting: Bidders must be available for bid prequalification meeting the day following the bid opening. The lowest qualified bidder will be contacted and requested to meet with Facilities Planning & Management at their office located at 5454 Cass Avenue, Detroit, MI 48202. During the prequalification, the Vendor must provide a Project Schedule and a Schedule of Values, including a list of Contractor's suppliers, subcontractors and other

qualifications.

An unsigned contract will be given to the successful Contractor at the conclusion of the Pre Award meeting, if all aspects of the bid are in order. The Contractor has 5 business days to return the contract to the Project Manager for University counter signature. The contractor must also submit a Performance Bond as outlined above and a Certificate of Insurance in the same 5 business day period. In the event the Contractor fails to return the documents in this 5 day period, the University reserves the right to award the contract to the next most responsive bidder.

All available information pertaining to this project will be posted to the Purchasing web site at

http://www.forms.purchasing.wayne.edu/Adv_bid/Adv_bid.html.

Information that is not posted to the website is not available/not known

INSTRUCTIONS TO BIDDERS

OWNER: Board of Governors
Wayne State University

PROJECT: **University Tower Lightning Protection
Project No. 507-216501**

LOCATION: **Wayne State University
University Tower, 4500 Cass Avenue,
Detroit, Michigan 48202**

OWNER'S AGENT: Robert Kuhn , Senior Buyer
WSU – Procurement & Strategic Sourcing
5700 Cass, Suite 4200
Detroit, Michigan 48202
313 577 - 3712 Phone / 313-577-3747 fax
Robert Kuhn Ac6243@wayne.edu & copy Valerie Kreher
ab4889@wayne.edu

1. PROPOSALS

- A. The Purchasing Agent will receive sealed Proposals for the work as herein set forth at the place and until the time as stated in the "Information for Bidders", a copy of which is bound herewith in these specifications. **No public bid opening will be held.**
- B. Proposals shall be for a **lump-sum General Contract for the entire work of the Project as provided in the Form of Proposal.**
- C. Proposals shall be submitted in duplicate on forms furnished with the Bidding documents. The forms must be fully filled out in ink or typewritten with the signature in longhand, and the completed forms shall be without alterations, interlineations, or erasures. Forms shall contain no recapitulations of the work to be done. Each proposal shall be delivered in an opaque sealed envelope, marked "**PROPOSAL**" AND SHALL BEAR THE NAME OF THE PROJECT AND THE NAME OF THE BIDDER. Proposals submitted by telephone or telegraph will not be accepted. Modifications by telephone or telegraph to previously submitted proposals will not be accepted.
- D. (**revised 5-29-2009**) All base bids must be conforming to the detailed specifications and drawings provided by the University, including any Addenda issued. Voluntary Alternates will only be considered if the Contractor has also submitted a conforming base bid. Any stipulation of voluntary alternates or qualifications contrary to the Contract requirements made by the Bidder in or accompanying his proposal as a condition for the acceptance of the Contract will not be considered in the award of the Contract and will cause the rejection of the entire Proposal.
- E. **The competency and responsibility of Bidders will be considered in making the award. The Owner does not obligate himself to accept the lowest or any other bids. The Owner reserves the right to reject any and all bids and to waive any informalities in the Proposals.**

2. PROPOSAL GUARANTEE (revised 3-22-2012)

- A. A certified check or bank draft payable to the Owner, or satisfactory Bid Bond executed by the Bidder and Surety Company, in an amount equal to not less than five percent (5%) of the maximum proposal amount shall be submitted with each Proposal, which amount may be forfeited to the Board of Governors, Wayne State University, if the successful Bidder refuses to enter into a Contract within ninety (90) days from receipt of Proposals.
- B. Bond must be issued by a Surety Company with an "A rating as denoted in the AM Best Key Rating Guide"

- C. The bid deposit of all bidders except the lowest three will be returned within three (3) days after the bids are opened. After the formal Contract and bonds are approved, the bid deposit will be returned to the lowest three bidders, except when forfeited.
- D. Bid bonds shall be accompanied by a Power of Attorney authorizing the signer of the bond to do so on behalf of the Surety Company.
- E. Withdrawal of Proposals is prohibited for a period of ninety (90) days after the actual date of opening thereof.

3. CONTRACT SECURITY (revised 3-22-2012)

- A. The successful Bidder will be required to furnish a Performance Bond and Labor and Material Payment bond in an amount equal to 100% of the contract award amount, and include such cost in the Proposal, complying with the laws of the State of Michigan. The graduated formula no longer applies.
- B. Performance Bond and Labor and Material Payment Bond shall be from a surety company acceptable to the Owner and made payable as follows:
 - (1) A bond for 100% of the contract award amount to the Board of Governors of Wayne State University, and guaranteeing the payment of all subcontractors and all indebtedness incurred for labor, materials, or any cause whatsoever on account of the Contractor in accordance with the laws of the State of Michigan relating to such bonds.
 - (2) A bond for 100% of the contract award amount to the Board of Governors of Wayne State University to guarantee and insure the completion of work according to the Contract.
- C. The only acceptable Performance Bond shall be the AIA A312 – 2010.
- D. Bond must be issued by a Surety Company with an “A rating as denoted in the AM Best Key Rating Guide”.

4. BOND CLARIFICATION

For bids below \$50,000.00,

- A. Bid bond will not be required.
- B. Performance Bond will not be required.

5. INSPECTION

- A. Before submitting his Proposal, each Bidder shall be held to have visited the site of the proposed work and to have familiarized himself as to all existing conditions affecting the execution of the work in accordance with the Contract Documents. No allowance or extra consideration on behalf of the Contractor will subsequently be made by reason of his failure to observe the Conditions or on behalf of any subcontractor for the same reason.

6. EXPLANATION TO BIDDERS AND ADDENDA

- A. Neither the Owner nor Representative nor Purchasing Agent will give verbal answers to any inquiries regarding the meaning of drawings and specifications, and any verbal statement regarding same by any person, previous to the award, shall be unauthoritative.
- B. Any explanation desired by Bidders must be requested of the Purchasing Agent in writing, and if explanation is necessary, a reply will be made in the form of an Addendum, a copy of which will be forwarded to each Bidder registered on the Bidders' List maintained by Procurement & Strategic Sourcing.

- C. All addenda issued to Bidders prior to date of receipt of Proposals shall become a part of these Specifications, and all proposals are to include the work therein described.

7. INTERPRETATION OF CONTRACT DOCUMENTS

- A. If any person contemplating submitting a bid for the proposed Contract is in doubt as to the true meaning of any part of the drawings, specifications, or other Contract Documents, he may submit to the Purchasing Agent, a written request for an interpretation thereof. The person submitting the request will be responsible for its prompt delivery. Any interpretation of the Contract Documents will be made by an addendum duly issued. A copy of such addendum will be mailed and delivered to each registered Bidder. Each proposal submitted shall list all addenda, by numbers, which have been received prior to the time scheduled for receipt of proposal.

8. SUBSTITUTION OF MATERIALS AND EQUIPMENT*

- A. Whenever a material, article or piece of equipment is identified on the Drawings or in the Specifications by reference to manufacturers' or vendors' names, trade names, catalog numbers, or the like, it is so identified for the purpose of establishing a standard, and any material, article, or piece of equipment of other manufacturers or vendors which will perform adequately the duties imposed by the general design will be considered equally acceptable provided that the material, article, or piece of equipment so proposed is, in the opinion of the Architect, of equal substance, appearance and function. It shall not be purchased or installed by the Contractor without the Architect's written approval.

9. TAXES

- A. The Bidder shall include in his lump sum proposal and make payment of all Federal, State, County and Municipal taxes, including Michigan State Sales and Use Taxes, now in force or which may be enacted during the progress and completion of the work covered.

10. REQUIREMENTS FOR SIGNING PROPOSALS AND CONTRACTS

- A. The following requirements must be observed in the signing of proposals that are submitted:
- (1) Proposals that are not signed by individuals making them shall have attached thereto a Power of Attorney, evidencing the authority to sign the Proposal in the name of the person for whom it is signed.
 - (2) Proposals that are signed for partnership shall be signed by all of the partners or by an Attorney-in-Fact. If signed by an Attorney-in-Fact, there must be attached to the Proposal a Power of Attorney evidencing authority to sign the Proposal, executed by the partners.
 - (3) Proposals that are signed for a corporation shall have the correct corporate name thereof and the signature of the President or other authorized officer of the corporation, manually written in the line of the Form of Proposal following the words "signed by". If such a proposal is signed by an official other than the President of the Corporation, a certified copy of resolution of the Board of Directors, evidencing the authority of such official to sign the bid, shall be attached to it. Such proposal shall also bear the attesting signature of the Secretary of the Corporation and the impression of the corporate seal.

11. QUALIFICATIONS OF BIDDERS

- A. The Owner may request each of the three (3) low bidders to submit information necessary to satisfy the Owner that the Bidder is adequately prepared to fulfill the Contract. Such information may include past performance records, list of available personnel, plant and equipment, description of work that will be done simultaneously with the Owner's Project, financial statement, or any other pertinent information. This information and such other information as may be requested will be used in determining whether a Bidder is qualified to perform the work required and is responsible and reliable.

12. SPECIAL REQUIREMENTS

- A. The attention of all Bidders is called to the General Conditions, Supplementary General Conditions, and Special Conditions, all of which are a part of the Specifications covering all work, including Subcontracts, materials, etc. Special attention is called to those portions dealing with Labor Standards, including wages, fringe benefits, Equal Employment Opportunities, and Liquidated Damages.
- B. Prior to award of the project, the apparent low bidder will be required to produce a schedule of values which will include the proposed subcontractors for each division of work and whether the subcontractor is signatory or non-signatory. A contract will not be issued to the apparent low bidder until this document is provided. A contractor will have one week to produce this document. If the required document is not received within this time, the bidder will be disqualified.

13. NOTICE OF AWARD/ACCEPTANCE OF BID PROPOSAL (revised 12-15-2009)

- A. The Proposal shall be deemed as having been accepted when a copy of the Contract (fully executed by both the vendor and the appropriate signatory authority for the University), with any/all Alternates, Addenda, and Pre-Contract Bulletins, as issued by the office or agent of the Owner has been duly received by the Contractor. After signing the Contracts, the Contractor shall then return all copies, plus any required bonds and certificates of insurance, to the office of the Owner's Representative, at 5454 Cass, Wayne State University, Detroit, MI 48202. Construction will begin when the fully-executed contract has been returned to the Contractor.

14. TIME OF STARTING AND COMPLETION

- A. It is understood that the work is to be carried through to substantial completion with the utmost speed consistent with good workmanship and to meet the established start and completion dates.
- B. The Contractor shall begin work under the Contract without delay, upon receipt of a fully-executed contract from the Owner, and shall substantially complete the project ready for unobstructed occupancy and use of the Owner for the purposes intended within the completion time stated in the Contract.
- C. The Contractor shall, immediately upon receipt of fully-executed contract, schedule his work and expedite deliveries of materials and performance of the subcontractors to maintain the necessary pace for start and completion on the aforementioned dates.

15. BIDDING DOCUMENTS

- A. Bid specifications are not available at the University, but are available beginning **June 7, 2013** through Wayne State University Procurement & Strategic Sourcing's Website for Advertised Bids: **http://www.forms.purchasing.wayne.edu/Adv_bid/Adv_bid.html**. The plans for this project can be viewed in advance and/or printed from the above website. Copies of the RFP will not be available at the pre-proposal meeting.

B. DOCUMENTS ON FILE (revised 12-2007)

- (1) *Wayne State University Procurement & Strategic Sourcing's Website.*
All available information pertaining to this project will be posted to the Purchasing web site at **http://www.forms.purchasing.wayne.edu/Adv_bid/Adv_bid.html**.
Information that is not posted to the website is not available/not known.
- (2) Notification of this Bid Opportunity has been sent to *DUNN BLUE (for purchase of Bid Documents only), DODGE REPORTS, REED CONSTRUCTION, CONSTRUCTION NEWS and the CONSTRUCTION ASSOCIATION OF MICHIGAN (CAM).*
- (3) Please note: Effective December 1, 2007, bid notices will be sent only to those Vendors registered to receive them via our Bid Opportunities list serve. To register, to **http://www.forms.purchasing.wayne.edu/Adv_bid/Adv_bid.html**, and click on the "Join our Listserve" link at the top of the page.

NOTICE OF MANDATORY PRE-BID CONFERENCE

PROJECT: **University Tower Lightning Protection,**

PROJECT NOS.: **WSU PROJECT NO. 507-216501**

It is **MANDATORY** that each Contractor proposing to bid on this work attend a pre-bid conference at the following location:

**Wayne State University
4500 Cass Avenue, First Floor Living Room
Detroit MI 48202**

1:00 p.m., local time, June 14, 2013

The purpose of this conference is to clarify the procedures, scope of work, and to identify any omissions and/or inconsistencies that may impede preparation and submission of representative competitive bids.

An attendance list shall be prepared and minutes of the conference shall be furnished to all those attending.

Any clarifications or corrections that cannot be made at the conference will be by Addendum.

For your convenience a map of the University and appropriate parking lots can be downloaded and printed from: **<http://campusmap.wayne.edu/>** . Guest parking in any of the University student and guest lots is **\$6.00**. A detailed list of Cash & Coin operated lots can be viewed at

http://purchasing.wayne.edu/cash_and_credit_card_lots.php . Cash lots dispense change in quarters. Due to time constraints, Vendors are encouraged to avoid parking at meters on the street (especially blue "handicapped" meters).

All available information pertaining to this project will be posted to the Purchasing web site at

http://www.forms.purchasing.wayne.edu/Adv_bid/Adv_bid.html.

Information that is not posted to the website is not available/not known.

AGENDA

- I. Welcome and Introductions
 - A. Wayne State University Representatives
 - B. Vendor Representatives
 - C. Sign in Sheet- be sure to include your fax number and email address (LEGIBLY) on the sign in sheet.
- II. Brief Overview of Wayne State University
 - A. Purpose and Intent of RFP.
 - B. Detailed review of the RFP and the requirements for a qualified response.
 - C. Review of all pertinent dates and forms that are REQUIRED for a qualified response.
- III. Vendor Questions/Concerns/Issues
 - A. Questions that can be answered directly by the appropriate person in this meeting will be answered and both question and answer will be recorded in the minutes of the meeting.
 - B. Questions that need to be researched will be answered and a nature of clarification will be emailed to the appropriate ListServ. See
http://www.forms.purchasing.wayne.edu/Adv_bid/Adv_Bid_Listserve.html for a list of ListServ Bid Lists.
 - C. Minutes will be emailed to all participants of the meeting within a reasonable amount of time. (be sure to include your email address/addresses on the sign in sheet)
 - D. Questions and concerns that come up after this meeting are to be addressed to Robert Kuhn , Procurement & Strategic Sourcing. Discussion with other University members is seriously discouraged and could lead to disqualification from further consideration. All questions and answers will be recorded and emailed to all participants of the RFP.
 - E. Due date for questions is **June 18, 2013, 12:00 noon.**
- IV. Proposal Due Date- **June 21, 2013, 2:00 p.m.**
- V. Final Comments
- VI. Adjourn

VENDOR NAME _____

GENERAL CONTRACT - PROPOSAL FORM (revised 1 - 2011)

Please Note – Vendors must Prequalify themselves when responding to this bid opportunity. Our Prequalification questions can be found on page 4 of this section.

OWNER: Board of Governors
Wayne State University

PROJECT: University Tower Lightning Protection

PROJECT NO.: WSU PROJECT NO. 507-216501

PROJECT TYPE: Electrical Work

PURCHASING AGENT: Robert Kuhn , Senior Buyer
WSU – Procurement & Strategic Sourcing
5700 Cass, Suite 4200
Detroit, Michigan 48202
313 577 - 3712 **Phone/** 313-577-3747 fax
Robert Kuhn Ac6243@wayne.edu & copy Valerie Kreher
ab4889@wayne.edu

OWNER'S REPRESENTATIVE: Thomas J. Edwards, Project Manager
Design & Construction Services
Facilities Planning & Management
Wayne State University
5454 Cass Avenue
Detroit, Michigan 48202

TO: Board of Governors
Wayne State University
Detroit, Michigan

BASE PROPOSAL:

The undersigned agrees to enter into an Agreement to complete the entire work of the **University Tower Lightning Protection** project (WSU Project No. **507-216501**) in accordance with the Bidding Documents for the following amounts:

_____ \$ _____ Dollars

ALTERNATES: The following alternates to the base proposal(s) are required to be offered by the respective bidder. The undersigned agrees that the following amounts will be added to or deducted from the base bid as indicated, for each alternate which is accepted.

ALTERNATE NO. 1:

The undersigned agrees to enter into an agreement to complete the Alternate # 1 work of the **University Tower Lightning Protection** project (WSU Project No. **507-216501**) **Provide Surge Protective Devices at the panelboards indicated for the Child Care area electrical distribution** and to provide all labor and material associated with the work in accordance with the Bidding Documents for the following amounts:

(select one) ADD _____ \$ _____ Dollars

or
DEDUCT _____ \$ _____ Dollars**LAWN REPLACEMENT:**

The undersigned agrees that, in the event of existing lawn or landscaping damage, due to the Contractor's work, that has not been properly addressed and repaired to the satisfaction of the University, the University may repair/replace the lawn and/or landscaping, and that the expense will be at a **unit cost of \$10.00 per square yard for lawn, and landscaping at a rate of 1.5 times the cost of said repairs**, the full cost of which shall be reimbursed by the contractor.

CONTRACT CHANGE**ORDERS: (revised 4-01-2011)**

The undersigned agrees to the following pricing formula and rates for changes in the contract work:

1. For subcontract work, Contractor's markup for handling, overhead, profit and bonding on subcontractor's sell price, shall not exceed **5%**.
 - 1.1. **For subcontract work that is provided on a time and material basis, the subcontractor shall be permitted a single markup for handling, overhead, profit and bonding of 5%. When a markup is identified in the subcontractor's hourly labor rate, additional markup on labor is not permitted.**
 - 1.1.1 **For changes that are based upon a lump sum value, subcontractor shall provide all labor and material back-ups to ensure that duplicative charges are avoided and authorized mark-ups for OH&P can be confirmed**
2. For work by his own organization, Contractor's markup for job* and general overhead, profit and bonding shall not exceed **5%** of the net labor** and material costs.

Within 14 days of the project's contract execution Contractor shall provide to the Owner; Subcontractor's hourly labor rate breakdown details. This requirement shall extend to the lowest level of subcontractor participation.

* Job and general overhead includes supervision and executive expenses; use charges on small tools, scaffolding, blocking, shores, appliances, etc., and other miscellaneous job expenses.

** Net labor cost is the sum of the base wages, fringe benefits established by governing trade organizations, applicable payroll taxes, and increased expense for contractor's liability insurance (Workman's Compensation, P.L. and P.D.).

TIME OF COMPLETION:**(revised 4-01-2011)**

The Contract is expected to be fully executed on or about 25 calendar days after successful bidder qualification and recommendation of award. The undersigned agrees to start construction **immediately after** receipt of a fully executed contract, and to complete the work as follows:

Substantial Completion will be completed no later than **December 18, 2013**.

LIQUIDATED DAMAGES:

It is understood and agreed that, if project is not completed within the time specified in the contract plus any extension of time allowed pursuant thereto, the actual damages sustained by the Owner because of any such delay, will be uncertain and difficult to ascertain, and it is agreed that the reasonable foreseeable value of the use of said project by Owner would be the sum of **\$100.00, One Hundred Dollars per day**, and therefore

the contractor shall pay as liquidated damages to the Owner the sum of **\$100.00, One Hundred Dollars per day** for each day's delay in substantially completing said project beyond the time specified in the Contract and any extensions of time allowed thereunder.

TAXES:

The undersigned acknowledges that prices stated above include all applicable taxes of whatever character or description. Michigan State Sales Tax is applicable to the work. Bidder understands that the Owner reserves the right to reject any or all bids and to waive informalities or irregularities therein.

ADDENDA:

The undersigned affirms that the cost of all work covered by the following Addenda are included in the lump sum price of this proposal.

Addendum No. _____ Date _____ Addendum No. _____ Date _____

Addendum No. _____ Date _____ Addendum No. _____ Date _____

Addendum No. _____ Date _____ Addendum No. _____ Date _____

Addendum No. _____ Date _____ Addendum No. _____ Date _____

Addendum No. _____ Date _____ Addendum No. _____ Date _____

CONTRACTOR'S PREQUALIFICATION STATEMENT & QUESTIONNAIRE:**Our Minimum Requirements for Construction Bids are:**

WSU considers this project: Electrical Work.

Criteria	Small Project bid less than \$50,000	Medium Project bid between \$50,001 and \$250,000	Large Project bid between \$250,001 and \$2 million	Very Large Project bid greater than \$2 million
EMR Rating (Experience Modification Rating)	1.0 or Less	1.0 or Less	1.0 or Less	1.0 or Less
Bondable Vendor	N.A.	Required	Required	Required
Length of Time in Construction Business	2 Years	3 Years	5 Years	5 Years
Demonstrated Experience in Projects Similar in Scope and Price in the last 3 years	1 or more	1 or more	2 or more	3 or more
Unsuccessful Projects on Campus in last 3 years	None Allowed	None Allowed	None Allowed	None Allowed
Failure to comply with Prevailing Wage and/or Project Labor requirements	None Allowed	None Allowed	None Allowed	None Allowed
Withdrawn University Bid (with or without Bond forfeiture) within the last 3 years **	2 or less	2 or less	1 or less	1 or less
Company currently not in Chapter 11 of the US Bankruptcy Code	1 Year	2 Years	3 Years	3 Years

** Withdrawal of a bid is subject to the University suspension policy, for a period up to one year.

Contractors must complete the following information to determine their eligibility to participate in this bid. This information is required with your Bid to the University

Failure to complete this form in its entirety will result in your bid being disqualified.

Check one of the following on the makeup of your company:

_____ Corporation

_____ Individual

_____ Partnership

_____ Joint Venture

_____ Other (Explain)

1. How many years has your organization been in business as a contractor? _____

2. How many years has your organization been in business under its present business name? _____

3. List states in which your organization is legally qualified to do business. _____

4. Provide the Name and Address of your Liability Insurance Carrier. _____

5. What is your current EMR Rating? _____

The minimum requirement is an EMR Rating of 1.0 or less for all projects. Bidders with a rating higher than 1.0 understand that their bid may be disqualified, at the sole discretion of the University.

6. What percentage of the work do you normally perform with your own work force/employees? _____

7. Have you ever failed to complete any work awarded to you? If so, attach a separate sheet of explanation. Include the name of the Project, the customer, the dates of the work, and the amount of the contract ?

8. Have you withdrawn a bid after a University bid opening and/or refused to enter into a contract with the University upon notification of award within the last 3 years? If so, state the Project Name and Number, and the date of bid submission below.

9. Has any officer or partner of your organization ever been an officer or partner of another organization that failed to complete a construction contract? If so, attach a separate sheet of explanation.

10. List the construction experience of the principals and superintendents of your company.

Name: _____ Title: _____

Name: _____ Title: _____

Name: _____ Title: _____

11. List the construction Projects, and approximate dates, when you performed work similar in Scope to this project.

Project: _____ Owner: _____

Contract Amount: _____ Date Completed: _____

Project: _____ Owner: _____

Contract Amount: _____ Date Completed: _____

Project: _____ Owner: _____

Contract Amount: _____ Date Completed: _____

12. List the construction Projects, and approximate dates, when you performed work similar in Dollar Amount to this project.

Project: _____ Owner: _____

Contract Amount: _____ Date Completed: _____

Project: _____ Owner: _____

Contract Amount: _____ Date Completed: _____

Project: _____ Owner: _____

Contract Amount: _____ Date Completed: _____

13. Is your Company "bondable"? Yes _____ No _____

14. What is your present bonding capacity? \$ _____

15. Who is your bonding agent?

NAME: _____

ADDRESS: _____

PHONE: (_____) _____

CONTACT: _____

16. Does your company agree to provide financial reports to the University upon request? Failure to agree may result in disqualification of your bid. Yes _____ No _____

17. Does your company agree that all of the Terms and Conditions of this RFP and Vendor's Response Proposal become part of any ensuing agreement? Yes _____ No _____

18. Does your company agree to execute a contract containing the clauses shown in Section 00500 "Agreement Between Contractor and Owner for Construction"? Yes _____ No _____

If "No", clearly note any exceptions to any information contained in the contract documents and include with your proposal.

19. Did your company quote based upon the Prevailing Wage Schedule Provided? Yes _____ No _____

Note: Contractors submitting proposals for this project may, at the discretion of the University, be required to submit references including contact information to be used to assist in the post bid evaluation process for the subject project

**ACKNOWLEDGEMENT OF
MINIMUM QUALIFICATIONS:**

The undersigned has read and understands the minimum qualifications for University construction projects, and has completed the Prequalification section completely and accurately. The undersigned understands that a contractor, who fails to meet the minimum qualifications **in the category identified for this project, will be disqualified from consideration for the project.**

ACCEPTANCE OF PROPOSAL:

The undersigned agrees to execute a Contract, being the Wayne State University standard form titled "Agreement Between Contractor and Owner for Construction" (see section 00500 of the bid documents), provided that we are notified of the acceptance of our Proposal within sixty (60) days of the date set for the opening thereof.

The undersigned below understands that the bid will be disqualified if the Prequalification information above is not completed in its entirety.

NAME OF COMPANY:

OFFICE ADDRESS:

PHONE NUMBER:

_____ DATE _____

FAX NUMBER:

SIGNED BY:

Signature

(Please print or type name here)

TITLE

eMAIL

_____ @ _____

PREVAILING WAGE RATE SCHEDULE (revised 4-05-2010)

- A. See also Page 00100-4 Section 12.B
- B. Wayne State University requires all project contractors, including subcontractors, who provide labor on University projects to compensate at a rate no less than prevailing wage rates.
- C. The rates of wages and fringe benefits to be paid to each class of laborers and mechanics by each VENDOR and subcontractor(s) (if any) shall be not less than the wage and fringe benefit rates prevailing in Wayne County, Michigan, as determined by the United States Secretary of Labor. Individually contracted labor commonly referred to as "1099 Workers" and subcontractors using 1099 workers are not acceptable for work related to this project.
- D. To maintain compliance with State of Michigan Ordinances, Certified Payroll must be provided for each of the contractor's or subcontractor's payroll periods for work performed on this project. Certified Payroll should accompany all Pay Applications. Failure to provide certified payroll will constitute breach of contract, and pay applications will be returned unpaid and remain so until satisfactory supporting documents are provided.

A Prevailing Wage Rate Schedule has been issued from the State of Michigan that is enclosed in this section

Additional information can be found on the University Procurement & Strategic Sourcing's web site at the following URL address:

<http://purchasing.wayne.edu/vendors/wage-rates.php>

If you have any questions, or require rates for additional classifications, please contact:

Michigan Department of Consumer & Industry Services,
Bureau of Safety and Regulation, Wage and Hour Division,
7150 Harris Drive,
P.O. Box 30476,
Lansing, Michigan 48909-7976

http://www.michigan.gov/dleg/0,1607,7-154-27673_27706---,00.html

F. Wayne State University's Prevailing Wage Requirements:

When compensation will be paid under prevailing wage requirements, the University shall require the following:

- A. The contractor shall obtain and keep posted on the work site, in a conspicuous place, a copy of all current prevailing wage and fringe benefit rates.
- B. The contractor shall obtain and keep an accurate record showing the name and occupation of and the actual wages and benefits paid to each laborer and mechanic employed in connection with this contract.
- C. The contractor shall submit a completed certified payroll document [U.S. Department of Labor Form WH 347] verifying and confirming the prevailing wage and benefits rates for all employees and subcontractors for each payroll period for work performed on this project. The contractor shall include copies of pay stubs for all employee or contract labor payments related to Wayne State University work. The certified payroll form can be downloaded from the Department of Labor website at <http://www.dol.gov/whd/forms/wh347.pdf>.
- D. A properly executed sworn statement is required from all tiers of contractors, sub-contractors and suppliers which provide services or product of \$1,000.00 or greater. Sworn statements must accompany applications for payment. All listed parties on a sworn statement and as a subcontractor must submit Partial or Full Conditional Waivers for the amounts invoiced on the payment application. A copy of the acceptable WSU Sworn Statement and Waiver will be provided to the awarded contractor.

- E. Apprentices for a skilled trade must provide proof of participation in a Certified Apprenticeship Program and the level of hours completed in the program.
- F. Daily project sign-in sheets and field reports for the project must be turned in weekly.

Note: Contractor invoices WILL NOT be processed until all listed certified payroll documents are received.

- G. If the VENDOR or subcontractor fails to pay the prevailing rates of wages and fringe benefits and does not cure such failure within 10 days after notice to do so by the UNIVERSITY, the UNIVERSITY shall have the right, at its option, to do any or all of the following:
 - 1. Withhold all or any portion of payments due the VENDOR as may be considered necessary by the UNIVERSITY to pay laborers and mechanics the difference between the rates of wages and fringe benefits required by this contract and the actual wages and fringe benefits paid;
 - 2. Terminate this contract and proceed to complete the contract by separate agreement with another vendor or otherwise, in which case the VENDOR and its sureties shall be liable to the UNIVERSITY for any excess costs incurred by the UNIVERSITY.
 - 3. Propose to the Director of Purchasing that the Vendor be considered for Debarment in accordance with the University's Debarment Policy, found on our website at <http://purchasing.wayne.edu/docs/appm28.pdf>

Terms identical or substantially similar to this section of this RFP shall be included in any contract or subcontract pertaining to this project.
- H. The current applicable prevailing wage rates as identified by the State of Michigan Department of Consumer & Industry Services, Bureau of Safety and Regulation, Wage and Hour Division are attached. Refer to item C above if additional information is required.
- I. Prior to award of the project, the apparent low bidder will be required to produce a schedule of values which will include the proposed subcontractors for each division of work and whether the subcontractor is signatory or non-signatory. A letter of intent or **contract will not** be issued to the apparent low bidder until this document is provided. The apparent low bidder will have one week to produce this document. If the required document is not received within this time, the bidder will be disqualified, and the next low bidder will be required to provide this schedule of values.

SEE ATTACHED STATE PREVAILING WAGE INFORMATION

Note: Project Number Corrected to 507- 216501

State of Michigan

WHPWRequest@michigan.gov

Official Request #: 730**Requestor:** Wayne State University**Project Description:** University Tower Lightning Protection**Project Number:** 193-216501**Wayne County****Official 2013 Prevailing Wage Rates for State Funded Projects****Issue Date:** 6/6/2013**Contract must be awarded by:** 9/4/2013**Page 1 of 30**

<u>Classification</u>		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description					
=====						
Asbestos & Lead Abatement Laborer						
Asbestos & Lead Abatement Laborer	MLDC	10/23/2012	\$38.85	\$51.87	\$64.89	H H H X X X D Y
4 ten hour days @ straight time allowed Monday-Saturday, must be consecutive calendar days						
Asbestos & Lead Abatement, Hazardous Material Handler						
Asbestos and Lead Abatement, Hazardous Material Handler	AS207	10/23/2012	\$38.85	\$52.00	\$65.15	H H H X X X D Y
4 ten hour days @ straight time allowed Monday-Saturday,						
Boilermaker						
Boilermaker	BO169	8/14/2009	\$54.70	\$81.08	\$107.45	H H H H H H D Y
Apprentice Rates:						
1st 6 months			\$40.31	\$59.49	\$78.67	
2nd 6 months			\$41.45	\$61.21	\$80.95	
3rd 6 months			\$42.57	\$62.88	\$83.19	
4th 6 months			\$43.69	\$64.57	\$85.43	
5th 6 months			\$44.81	\$66.24	\$87.67	
6th 6 months			\$49.53	\$73.40	\$97.26	
7th 6 months			\$49.32	\$73.01	\$96.69	
8th 6 months			\$51.58	\$76.40	\$101.21	

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Project Number: 193-216501

County: Wayne

Official Rate Schedule

Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing wage and fringe benefit rates prescribed in a contract.

Official 2013 Prevailing Wage Rates for State Funded Projects

Issue Date: 6/6/2013

Contract must be awarded by: 9/4/2013

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Classification		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description					

Bricklayer

Bricklayer, stone mason, pointer, cleaner, caulker	BR1	11/1/2012	\$51.43	\$77.15	\$102.86	H H D H D D D D N
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Between October 1 and April 30, if lost time occurs due to inclement weather, Saturday may be worked as a make-up day @ straight time until forty hours are worked.

Apprentice Rates:

First 6 months	\$31.21	\$46.84	\$62.42
2nd 6 months	\$33.06	\$49.61	\$66.12
3rd 6 months	\$34.91	\$52.39	\$69.82
4th 6 months	\$36.76	\$55.16	\$73.52
5th 6 months	\$38.61	\$57.93	\$77.22
6th 6 months	\$40.46	\$60.71	\$80.92
7th 6 months	\$42.31	\$63.49	\$84.62
8th 6 months	\$44.16	\$66.26	\$88.32

Carpenter

Carpet and Resilient Floor Layer, (does not include installation of prefabricated formica & parquet flooring which is to be paid carpenter rate)	CA1045	9/15/2011	\$46.04	\$65.56	\$85.07	X X H X X X X D Y
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Apprentice Rates:

1st 6 months	\$22.62	\$30.43	\$38.23
2nd 6 months	\$26.52	\$36.27	\$46.03
3rd 6 months	\$28.48	\$39.21	\$49.95
4th 6 months	\$30.43	\$42.14	\$53.85
5th 6 months	\$32.39	\$45.08	\$57.77
6th 6 months	\$34.33	\$48.00	\$61.65
7th 6 months	\$36.29	\$50.94	\$65.57
8th 6 months	\$38.23	\$53.84	\$69.45

Carpenter-four 10s allowed Mon-Sat; double time due when over 12 hours worked per day	CA687Z1	10/31/2012	\$52.54	\$75.17	\$97.79	X X H X X H H D Y
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Apprentice Rates:

1st year	\$32.18	\$44.63	\$57.07
3rd 6 months	\$34.45	\$48.04	\$61.61
4th 6 months	\$36.71	\$51.42	\$66.13
5th 6 months	\$38.97	\$54.81	\$70.65
6th 6 months	\$41.23	\$58.20	\$75.17
7th 6 months	\$43.49	\$61.60	\$79.69
8th 6 months	\$45.76	\$65.00	\$84.23

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Project Number: 193-216501

County: Wayne

Official Rate Schedule

Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing wage and fringe benefit rates prescribed in a contract.

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Official 2013 Prevailing Wage Rates for State Funded Projects

Issue Date: 6/6/2013

Contract must be awarded by: 9/4/2013

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Classification		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description					
Piledriver	CA687Z1P		\$52.54	\$75.17	\$97.79	X X H X X H H D Y
	Four 10s allowed Monday-Saturday; double time due when over 12 hours worked per day	10/31/2012				

Apprentice Rates:

1st 6 months	\$32.18	\$44.63	\$57.07
2nd 6 months	\$36.71	\$51.42	\$66.13
3rd 6 months	\$41.23	\$58.20	\$75.17
4th 6 months	\$45.76	\$65.00	\$84.23

Cement Mason

Cement Mason	br1cm		\$48.30	\$67.47	\$86.63	X X H H H H H D N
		11/1/2012				

Apprentice Rates:

1st 6 months	\$28.32	\$37.91	\$47.49
2nd 6 months	\$30.29	\$40.83	\$51.37
3rd 6 months	\$34.23	\$46.68	\$59.14
4th 6 months	\$38.18	\$52.56	\$66.93
5th 6 months	\$40.15	\$55.48	\$70.81
6th 6 months	\$44.10	\$61.35	\$78.60

Cement Mason

Cement Mason	CE514		\$46.30	\$64.89	\$83.48	H H D H H H H D N
		11/10/2011				

Apprentice Rates:

1st 6 months	\$26.77	\$36.07	\$45.36
2nd 6 months	\$28.68	\$38.91	\$49.13
3rd 6 months	\$32.50	\$44.59	\$56.66
4th 6 months	\$36.32	\$50.26	\$64.19
5th 6 months	\$38.24	\$53.11	\$67.98
6th 6 months	\$42.06	\$58.79	\$75.51

Drywall

Drywall Taper	PT-22-D		\$43.16	\$56.14	\$69.11	H H D H D D D D Y
Four 10s allowed Monday-Thursday		7/3/2012				

Apprentice Rates:

First 3 months	\$30.19	\$36.68	\$43.17
Second 3 months	\$32.78	\$40.57	\$48.35
Second 6 months	\$35.37	\$44.45	\$53.53
Third 6 months	\$37.97	\$48.35	\$58.73
4th 6 months	\$39.27	\$50.30	\$61.33

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Project Number: 193-216501

County: Wayne

Official Rate Schedule

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Official 2013 Prevailing Wage Rates for State Funded Projects

Issue Date: 6/6/2013

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Classification		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description					

Electrician

Road Way Electrical Work EC-17 \$49.55 \$71.93 \$94.30 H H H H H H D Y
 Double time due after 16 hours on any calendar day and all hours Sunday. 5/31/2012

Apprentice Rates:

1st 6 months	\$31.65	\$45.07	\$58.49
2nd 6 months	\$33.88	\$48.42	\$62.96
3rd 6 months	\$36.13	\$51.79	\$67.46
4th 6 months	\$38.35	\$55.13	\$71.90
5th 6 months	\$40.58	\$58.47	\$76.36
6th 6 months	\$45.06	\$65.19	\$85.32

Inside Wireman EC-58-IW \$56.50 \$73.94 \$91.39 H H H H H H D N
 5/3/2013

Apprentice Rates:

0-1000 hours	\$35.56	\$42.54	\$49.52
1000-2000 hours	\$37.31	\$45.17	\$53.02
2000-3500 hours	\$39.05	\$47.78	\$56.50
3500-5000 hours	\$40.79	\$50.38	\$59.98
5000-6500 hours	\$44.28	\$55.62	\$66.96
6500-8000 hours	\$47.77	\$60.86	\$73.94

Sound and Communication Installer/Technician EC-58-SC \$36.12 \$48.24 \$60.36 H H H H H H D Y
 4 consecutive 10s allowed M-TH 4/16/2013

Apprentice Rates:

Period 1	\$23.99	\$30.06	\$36.11
Period 2	\$25.21	\$31.88	\$38.55
Period 3	\$26.41	\$33.68	\$40.95
Period 4	\$27.63	\$35.51	\$43.39
Period 5	\$28.84	\$37.33	\$45.81
Period 6	\$30.06	\$39.16	\$48.25

Elevator Constructor

Elevator Constructor EL 36 \$56.46 \$94.99 D D D D D D D Y
 Elevator Constructor 8/7/2007

Apprentice Rates:

1st Year Apprentice	\$37.74	\$58.93
2nd Year Apprentice	\$41.90	\$66.94
3rd Year Apprentice	\$43.98	\$70.95
4th Year Apprentice	\$48.14	\$78.96

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Official 2013 Prevailing Wage Rates for State Funded Projects

Issue Date: 6/6/2013

Contract must be awarded by: 9/4/2013

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Classification	Name	Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
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Glazier

Glazier	GL-357		7/3/2012	\$46.21	\$64.51	\$82.80	H H H H H H D Y
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If a four 10 hour day workweek is scheduled, four 10s must be consecutive, M-F.

Apprentice Rates:

1st 6 months	\$31.63	\$42.64	\$53.64
2nd 6 months	\$33.09	\$44.83	\$56.56
3rd 6 months	\$36.00	\$49.19	\$62.38
4th 6 months	\$37.46	\$51.39	\$65.30
5th 6 months	\$38.92	\$53.57	\$68.22
6th 6 months	\$40.38	\$55.77	\$71.14
7th 6 months	\$41.84	\$57.95	\$74.06
8th 6 months	\$44.75	\$62.32	\$79.88

Heat and Frost Insulator

Spray Insulation	AS25S		3/5/2007	\$20.14	\$29.14		H H H H H H H N
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Heat and Frost Insulator and Asbestos Worker

Heat and Frost Insulators and Asbestos Workers	AS25		8/14/2009	\$53.15	\$68.54	\$83.92	H H H H H H D Y
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Four 10s must be worked for a minimum of 2 weeks consecutively, Monday thru Thursday. All hours worked in excess of 10 will be paid at double time. All hours worked on the fifth day, Monday thru Friday will be paid at time and one-half.

Apprentice Rates:

1st Year	\$39.30	\$47.76	\$56.22
2nd Year	\$42.38	\$52.38	\$62.38
3rd Year	\$43.92	\$54.69	\$65.46
4th Year	\$47.00	\$59.31	\$71.62

Ironworker

Fence, Sound Barrier & Guardrail erection/installation and Exterior Signage work	IR-25-F1		4/2/2013	\$33.15	\$45.15	\$57.15	X X H X X X H D Y
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Four ten hour work days may be worked during Monday-Saturday.

Apprentice Rates:

60% Level	\$22.75	\$29.95	\$37.15
65% Level	\$24.05	\$31.85	\$39.65
70% Level	\$25.36	\$33.76	\$42.16
75% Level	\$26.65	\$35.65	\$44.65
80% Level	\$27.95	\$37.55	\$47.15
85% Level	\$29.25	\$39.45	\$49.65

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Project Number: 193-216501

County: Wayne

Official Rate Schedule

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Official 2013 Prevailing Wage Rates for State Funded Projects

Issue Date: 6/6/2013

Contract must be awarded by: 9/4/2013

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Classification	Name	Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
=====							

Siding, Glazing, Curtain Wall	IR-25-GZ2			\$44.11	\$55.52	\$66.93	X X H H H H D D Y
4 tens may be worked Monday thru Thursday @ straight time.		4/11/2013					

Apprentice Rates:

Level 1	\$27.18	\$33.53	\$39.88
Level 2	\$29.29	\$36.27	\$43.25
Level 3	\$31.41	\$39.03	\$46.64
Level 4	\$33.53	\$41.78	\$50.02
Level 5	\$35.64	\$44.53	\$53.40
Level 6	\$37.76	\$47.28	\$56.78

Pre-engineered Metal Work	IR-25-PE-Z1			\$44.59	\$54.71	\$64.83	X X H X X X X D Y
		6/3/2013					

Apprentice Rates:

1st Year	\$25.46	\$30.77	\$36.08
3rd 6 month period	\$27.58	\$33.64	\$39.70
4th 6 month period	\$29.71	\$36.53	\$43.35
5th 6 month period	\$31.83	\$39.40	\$46.97
6th 6 month period	\$33.96	\$42.29	\$50.61

Reinforced Iron Work	IR-25-RF			\$53.11	\$75.98	\$98.84	H H D H D D D D N
		6/3/2013					

Apprentice Rates:

Level 1	\$33.76	\$46.66	\$59.54
Level 2	\$36.13	\$50.20	\$64.28
Level 3	\$38.49	\$53.75	\$69.00
Level 4	\$41.03	\$57.55	\$74.08
Level 5	\$43.56	\$61.36	\$79.14
Level 6	\$46.10	\$65.16	\$84.22

Rigging Work	IR-25-RIG			\$58.73	\$87.92	\$117.11	H H H H H H H D N
		6/4/2013					

Apprentice Rates:

Level 1 & 2	\$33.81	\$50.72	\$67.62
Level 3	\$36.64	\$54.96	\$73.28
Level 4	\$39.46	\$59.19	\$78.92
Level 5	\$42.29	\$63.44	\$84.58
Level 6	\$45.12	\$67.68	\$90.24

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Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Project Number: 193-216501

County: Wayne

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Page 6 of 30

Official 2013 Prevailing Wage Rates for State Funded Projects

Issue Date: 6/6/2013

Contract must be awarded by: 9/4/2013

Page 7 of 30

Classification Name Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Decking 4 tens may be worked Monday thru Thursday @ straight time. If bad weather, Friday may be a make up day. If holiday celebrated on a Monday, 4 10s may be worked Tuesday thru Friday. Work in excess of 12 hours per day must be paid @ double time.	IR-25-SD 10/10/2011	\$49.44	\$73.91	\$98.37	H H H H H D D Y
Structural, ornamental, conveyor, welder and pre-cast 4 tens may be worked Monday thru Thursday @ straight time. If bad weather, Friday may be a make up day. If holiday celebrated on a Monday, 4 10s may be worked Tuesday thru Friday. Work in excess of 12 hours per day must be paid @ double time.	IR-25-STR 6/4/2013	\$58.86	\$88.04	\$117.21	H H H H H D D Y
Apprentice Rates:					
Levels 1 & 2		\$33.56	\$50.69	\$67.58	
Level 3		\$36.39	\$54.57	\$72.74	
Level 4		\$39.21	\$58.79	\$78.38	
Level 5		\$42.04	\$63.42	\$84.54	
Level 6		\$44.87	\$67.29	\$89.70	
Level 7		\$47.69	\$71.52	\$95.34	
Level 8		\$50.52	\$75.76	\$101.00	
Industrial Door erection & construction	IR-25-STR-D 10/10/2011	\$58.17	\$72.60	\$87.02	H H D H H H D D Y
Laborer Construction Laborer, Demolition Laborer, Mason Tender, Carpenter Tender, Drywall Handler, Concrete Laborer, Cement Finisher Tender, Concrete Chute, and Concrete Bucket Handler	L33401-A-CC 6/11/2012	\$42.31	\$60.11	\$77.90	H H H H H H H D Y

If conditions beyond the employer/employee's control prevent one or more hours of working during Mon-Fri, the employer may choose to work up to 10 hour straight time weekdays. Work may be scheduled up to 10 hours per Mon-Fri for the purpose of reaching 40 hours @ straight time. Make up days may also include 8 hours of work on Saturdays @ straight time.

Apprentice Rates:

0-1,000 work hours	\$36.43	\$51.29	\$66.14
1,001 - 2,000 work hours	\$37.60	\$53.04	\$68.48
2,001 - 3,000 work hours	\$38.78	\$54.82	\$70.84
3,001 - 4,000 work hours	\$41.13	\$58.34	\$75.54

Official Request #: 730

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Project Description: University Tower Lightning Protection

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Official 2013 Prevailing Wage Rates for State Funded Projects

Issue Date: 6/6/2013

Contract must be awarded by: 9/4/2013

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Classification		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description					
Signal Man (on sewer & caisson work), Air, Electric or Gasoline Tool Operator, Concrete Vibrator Operator, Acetylene Torch & Air Hammer Operator; Scaffold Builder, Caisson Worker	L33401-B-SB	6/11/2012	\$42.57	\$60.50	\$78.42	H H H H H H D Y

If conditions beyond the employer/employee's control prevent one or more hours of working during Mon-Fri, the employer may choose to work up to 10 hour straight time weekdays. Work may be scheduled up to 10 hours per Mon-Fri for the purpose of reaching 40 hours @ straight time. Make up days may also include 8 hours of work on Saturdays @ straight time.

Furnace Battery Heater Tender, Burning Bar & Oxy-Acetylene Gun	L33401-D-HH	6/11/2012	\$42.81	\$60.86	\$78.90	H H H H H H D Y
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If conditions beyond the employer/employee's control prevent one or more hours of working during Mon-Fri, the employer may choose to work up to 10 hour straight time weekdays. Work may be scheduled up to 10 hours per Mon-Fri for the purpose of reaching 40 hours @ straight time. Make up days may also include 8 hours of work on Saturdays @ straight time.

Expediter Man, Top Man and/or Bottom Man (Blast Furnace Work or Battery Work)	L33401-E-EX	6/11/2012	\$43.56	\$61.98	\$80.40	H H H H H H D Y
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If conditions beyond the employer/employee's control prevent one or more hours of working during Mon-Fri, the employer may choose to work up to 10 hour straight time weekdays. Work may be scheduled up to 10 hours per Mon-Fri for the purpose of reaching 40 hours @ straight time. Make up days may also include 8 hours of work on Saturdays @ straight time.

Cleaner/Sweeper Laborer; Furniture Laborer	L33401-F-CL	6/11/2012	\$36.86	\$51.93	\$67.00	H H H H H H D Y
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If conditions beyond the employer/employee's control prevent one or more hours of working during Mon-Fri, the employer may choose to work up to 10 hour straight time weekdays. Work may be scheduled up to 10 hours per Mon-Fri for the purpose of reaching 40 hours @ straight time. Make up days may also include 8 hours of work on Saturdays @ straight time.

Lansing Burner, Blaster & Powder Man; Air, Electric or Gasoline Tool Operator (Blast Furnace Work or Battery Work)	L334C	6/11/2012	\$43.06	\$61.23	\$79.40	X X H X H H D Y
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Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Official Rate Schedule

Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing wage and fringe benefit rates

Project Number: 193-216501
County: Wayne

prescribed in a contract.

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Official 2013 Prevailing Wage Rates for State Funded Projects

Issue Date: 6/6/2013

Contract must be awarded by: 9/4/2013

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Classification		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description					

Plasterer Tender, Plastering Machine Operator	LPT-1	6/8/2012	\$42.31	\$60.11	\$77.90	H H H H H H D N
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If conditions beyond the employer/employee's control prevent one or more hours of working during Mon-Fri, the employer may choose to work up to 10 hour straight time weekdays. Work may be scheduled up to 10 hours per Mon-Fri for the purpose of reaching 40 hours @ straight time. Make up days may also include 8 hours of work on Saturdays @ straight time.

Apprentice Rates:

0 - 1,000 hours	\$36.43	\$51.29	\$66.14
1,001 - 2,000 hours	\$37.60	\$53.04	\$68.48
2,001 - 3,000 hours	\$38.78	\$54.82	\$70.84
3,001 - 4,000 hours	\$41.13	\$58.34	\$75.54

Laborer - Hazardous

Class A performing work in conjunction with site preparation and other preliminary work prior to actual removal, handling, or containment of hazardous waste substances not requiring use of personal protective equipment required by state or federal regulations; or a laborer performing work in conjunction with the removal, handling, or containment of hazardous waste substances when use of personal protective equipment level "D" is required.	LHAZ-Z1-A	3/6/2013	\$42.31	\$60.11	\$77.90	H H H H H H D Y
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Apprentice Rates:

0-1,000 work hours	\$36.43	\$51.29	\$66.14
1,001-2,000 work hours	\$37.60	\$53.04	\$68.48
2,001-3,000 work hours	\$38.78	\$54.82	\$70.84
3,001-4,000 work hours	\$41.13	\$58.34	\$75.54

Class B performing work in conjunction with the removal, handling, or containment of hazardous waste substances when the use of personal protective equipment levels "A", "B" or "C" is required.	LHAZ-Z1-B	3/6/2013	\$43.31	\$61.61	\$79.90	H H H H H H D Y
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Apprentice Rates:

0-1,000 work hours	\$37.17	\$52.40	\$67.62
1,001-2,000 work hours	\$38.40	\$54.24	\$70.08
2,001-3,000 work hours	\$39.63	\$56.09	\$72.54
3,001-4,000 work hours	\$42.08	\$59.76	\$77.44

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Project Number: 193-216501

County: Wayne

Official Rate Schedule

Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing wage and fringe benefit rates prescribed in a contract.

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Official 2013 Prevailing Wage Rates for State Funded Projects

Issue Date: 6/6/2013

Contract must be awarded by: 9/4/2013

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Classification	Name	Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
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Laborer Underground - Tunnel, Shaft & Caisson

Class I - Tunnel, shaft and caisson laborer, dump man, shanty man, hog house tender, testing man (on gas), and watchman.	LAUCT-Z1-1	1/16/2013	\$36.92	\$47.61	\$58.29	H H H H H H H D Y
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Apprentice Rates:

0-1,000 work hours	\$32.10	\$40.38	\$48.65
1,001-2,000 work hours	\$33.07	\$41.83	\$50.59
2,001-3,000 work hours	\$34.03	\$43.27	\$52.51
3,001-4,000 work hours	\$35.96	\$46.16	\$56.37

Class II - Manhole, headwall, catch basin builder, bricklayer tender, mortar man, material mixer, fence erector, and guard rail builder.	LAUCT-Z1-2	1/16/2013	\$37.03	\$47.77	\$58.51	H H H H H H H D Y
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Apprentice Rates:

0-1,000 work hours	\$32.19	\$40.51	\$48.83
1,001-2,000 work hours	\$33.15	\$41.95	\$50.75
2,001-3,000 work hours	\$34.12	\$43.40	\$52.69
3,001-4,000 work hours	\$36.06	\$46.32	\$56.57

Class III - Air tool operator (jack hammer man, bush hammer man and grinding man), first bottom man, second bottom man, cage tender, car pusher, carrier man, concrete man, concrete form man, concrete repair man, cement invert laborer, cement finisher, concrete shoveler, conveyor man, floor man, gasoline and electric tool operator, gunnite man, grout operator, welder, heading dinky man, inside lock tender, pea gravel operator, pump man, outside lock tender, scaffold man, top signal man, switch man, track man, tugger man, utility man, vibrator man, winch operator, pipe jacking man, wagon drill and air track operator and concrete saw operator (under 40 h.p.).	LAUCT-Z1-3	1/16/2013	\$37.09	\$47.86	\$58.63	H H H H H H H D Y
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Apprentice Rates:

0-1,000 work hours	\$32.23	\$40.57	\$48.91
1,001-2,000 work hours	\$33.20	\$42.02	\$50.85
2,001-3,000 work hours	\$34.17	\$43.48	\$52.79
3,001-4,000 work hours	\$36.12	\$46.40	\$56.69

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Project Number: 193-216501

County: Wayne

Official Rate Schedule

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Official 2013 Prevailing Wage Rates for State Funded Projects

Issue Date: 6/6/2013

Contract must be awarded by: 9/4/2013

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<u>Classification</u>		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description					
=====						
Class IV - Tunnel, shaft and caisson mucker, bracer man, liner plate man, long haul dinky driver and well point man.	LAUCT-Z1-4	1/16/2013	\$37.27	\$48.13	\$58.99	H H H H H H D Y
Apprentice Rates:						
0-1,000 work hours			\$32.37	\$40.78	\$49.19	
1,001-2,000 work hours			\$33.35	\$42.25	\$51.15	
2,001-3,000 work hours			\$34.33	\$43.72	\$53.11	
3,001-4,000 work hours			\$36.29	\$46.66	\$57.03	
Class V - Tunnel, shaft and caisson miner, drill runner, keyboard operator, power knife operator, reinforced steel or mesh man (e.g. wire mesh, steel mats, dowel bars)	LAUCT-Z1-5	1/16/2013	\$37.52	\$48.51	\$59.49	H H H H H H D Y
Apprentice Rates:						
0-1,000 work hours			\$32.55	\$41.05	\$49.55	
1,001-2,000 work hours			\$33.55	\$42.55	\$51.55	
2,001-3,000 work hours			\$34.54	\$44.04	\$53.53	
3,001-4,000 work hours			\$36.53	\$47.02	\$57.51	
Class VI - Dynamite man and powder man.	LAUCT-Z1-6	1/16/2013	\$37.85	\$49.00	\$60.15	H H H H H H D Y
Apprentice Rates:						
0-1,000 work hours			\$32.80	\$41.42	\$50.05	
1,001-2,000 work hours			\$33.81	\$42.94	\$52.07	
2,001-3,000 work hours			\$34.82	\$44.46	\$54.09	
3,001-4,000 work hours			\$36.84	\$47.48	\$58.13	
Class VII - Restoration laborer, seeding, sodding, planting, cutting, mulching and topsoil grading and the restoration of property such as replacing mail boxes, wood chips, planter boxes and flagstones.	LAUCT-Z1-7	1/16/2013	\$31.13	\$38.92	\$46.71	H H H H H H D Y
Apprentice Rates:						
0-1,000 work hours			\$27.76	\$33.86	\$39.97	
1,001-2,000 work hours			\$28.43	\$34.87	\$41.31	
2,001-3,000 work hours			\$29.11	\$35.89	\$42.67	
3,001-4,000 work hours			\$30.46	\$37.92	\$45.37	

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Project Number: 193-216501

County: Wayne

Official Rate Schedule

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Official 2013 Prevailing Wage Rates for State Funded Projects

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Contract must be awarded by: 9/4/2013

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Classification			Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description						
=====							
Landscape Laborer							
Landscape Specialist includes air, gas, and diesel equipment operator, skidsteer (or equivalent), lawn sprinkler installer on landscaping work where seeding, sodding, planting, cutting, trimming, backfilling, rough grading or maintenance of landscape projects occurs.	LLAN-Z1-A		10/23/2012	\$27.48	\$37.96	\$48.44	X X H X X X H D Y
Sundays paid at time & one half. Holidays paid at double time.							
Skilled Landscape Laborer: small power tool operator, lawn sprinkler installers' tender, material mover, truck driver when seeding, sodding, planting, cutting, trimming, backfilling, rough grading or maintaining of landscape projects occurs	LLAN-Z1-B		10/23/2012	\$23.26	\$31.63	\$40.00	X X H X X X H D Y
Sundays paid at time & one half. Holidays paid at double time.							
Marble Finisher							
Marble Finisher	BR1-MF		11/16/2012	\$42.41	\$53.10	\$63.79	H H D H D D D D Y
A 4 ten workweek may be worked Monday thru Thursday or Tuesday thru Friday.							

Apprentice Rates:

Level 1	\$18.57	\$24.54	\$30.52
Level 2	\$19.74	\$26.30	\$32.86
Level 3	\$26.34	\$33.11	\$39.87
Level 4	\$27.77	\$35.25	\$42.73
Level 5	\$29.25	\$36.95	\$44.65
Level 6	\$30.83	\$38.92	\$47.02
Level 7	\$32.48	\$40.65	\$48.82
Level 8	\$33.93	\$42.50	\$51.08

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

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County: Wayne

Official Rate Schedule

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Official 2013 Prevailing Wage Rates for State Funded Projects

Issue Date: 6/6/2013

Contract must be awarded by: 9/4/2013

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Classification		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description					
=====						
Marble Mason						
Marble Mason	BR1-MM		\$49.05	\$63.06	\$77.07	H H D H D D D D Y
A 4 ten workweek may be worked Monday thru Thursday or Tuesday thru Friday.		11/16/2012				

Apprentice Rates:

Level 1	\$24.52	\$31.83	\$39.13
Level 2	\$27.50	\$35.59	\$43.67
Level 3	\$32.59	\$40.95	\$49.31
Level 4	\$35.26	\$44.56	\$53.86
Level 5	\$37.47	\$47.04	\$56.61
Level 6	\$41.04	\$52.32	\$63.60
Level 7	\$41.69	\$53.15	\$64.61
Level 8	\$42.60	\$54.51	\$66.43

Operating Engineer

Crane with boom & jib or leads 120' or longer	EN-324-A120	6/18/2012	\$54.91	\$72.15	\$89.38	H H D H D D D D Y
Four ten hour days may be scheduled Monday-Thursday. Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.						

Crane with boom & jib or leads 140' or longer	EN-324-A140	6/18/2012	\$55.73	\$73.38	\$91.02	H H D H D D D D Y
Four ten hour days may be scheduled Monday-Thursday. Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.						

Crane with boom & jib or leads 220' or longer	EN-324-A220	6/18/2012	\$56.03	\$73.83	\$91.62	H H D H D D D D Y
Four ten hour days may be scheduled Monday-Thursday. Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.						

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Project Number: 193-216501

County: Wayne

Official Rate Schedule

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Official 2013 Prevailing Wage Rates for State Funded Projects

Issue Date: 6/6/2013

Contract must be awarded by: 9/4/2013

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<u>Classification</u>		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description					
Crane with boom & jib or leads 300' or longer	EN-324-A300	6/18/2012	\$57.53	\$76.08	\$94.62	H H D H D D D Y
Four ten hour days may be scheduled Monday-Thursday. Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.						
Crane with boom & jib or leads 400' or longer	EN-324-A400	6/18/2012	\$59.03	\$78.33	\$97.62	H H D H D D D Y
Four ten hour days may be scheduled Monday-Thursday. Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.						
Compressor or welding machine	EN-324-CW	6/18/2012	\$44.06	\$55.87	\$67.68	H H D H D D D Y
Four ten hour days may be scheduled Monday-Thursday. Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.						
Forklift, lull, extend-a-boom forklift	EN-324-FL	6/18/2012	\$51.37	\$66.84	\$82.30	H H D H D D D Y
Four ten hour days may be scheduled Monday-Thursday. Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.						
Fireman or oiler	EN-324-FO	6/18/2012	\$43.03	\$54.33	\$65.62	H H D H D D D Y
Four ten hour days may be scheduled Monday-Thursday. Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.						

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Project Number: 193-216501

Official Rate Schedule

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County: Wayne

Official 2013 Prevailing Wage Rates for State Funded Projects

Issue Date: 6/6/2013

Contract must be awarded by: 9/4/2013

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<u>Classification</u>		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description					
Regular crane, job mechanic, concrete pump with boom	EN-324-RC	6/18/2012	\$54.05	\$70.86	\$87.66	H H D H D D D Y

Four ten hour days may be scheduled Monday-Thursday.
Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.

Regular engineer, hydro-excavator, remote controlled concrete breaker	EN-324-RE	6/18/2012	\$53.08	\$69.40	\$85.72	H H D H D D D Y
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Four ten hour days may be scheduled Monday-Thursday.
Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.

Apprentice Rates:

0-999 hours	\$42.69	\$54.11	\$65.54
1,000-1,999 hours	\$44.31	\$56.55	\$68.78
2,000-2,999 hours	\$45.95	\$59.01	\$72.06
3,000-3,999 hours	\$47.58	\$61.45	\$75.32
4,000-4,999 hours	\$49.21	\$63.90	\$78.58
5,000-5,999 hours	\$50.84	\$66.34	\$81.84

Operating Engineer - Marine Construction

Diver/Wet Tender, Engineer (hydraulic dredge)	GLF-1	3/1/2013	\$63.00	\$82.35	\$101.70	X X H H H H H D Y
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Holiday pay= \$121.05 per hour, wages & fringes

Subdivision of county all Great Lakes, islands therein, & connecting & tributary waters

Crane/Backhoe Operator, 70 ton or over Tug Operator, Mechanic/Welder, Assistant Engineer (hydraulic dredge), Leverman (hydraulic dredge), Diver Tender	GLF-2	3/1/2013	\$61.50	\$80.10	\$98.70	X X H H H H H D Y
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Holiday pay = \$117.30 per hour, wages & fringes

Subdivision of county All Great Lakes, islands therein, & connecting & tributary waters

Friction, Lattice Boom or Crane License Certification	GLF-2B	3/1/2013	\$62.50	\$81.60	\$100.70	X X H H H H H D Y
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Holiday pay = \$119.80

Subdivision of county All Great Lakes, islands, therein, & connecting & tributary waters

Official Request #: 730

Requestor: Wayne State University
Project Description: University Tower Lightning Protection

Project Number: 193-216501
County: Statewide

Official Rate Schedule

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Official 2013 Prevailing Wage Rates for State Funded Projects

Issue Date: 6/6/2013

Contract must be awarded by: 9/4/2013

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Classification		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description					
Deck Equipment Operator, Machineryman, Maintenance of Crane (over 50 ton capacity) or Backhoe (115,000 lbs or more), Tug/Launch Operator, Loader, Dozer on Barge, Deck Machinery	GLF-3	3/1/2013	\$57.40	\$73.95	\$90.50	X X H H H H D Y

Holiday pay = \$107.05 per hour, wages & fringes

Subdivision of county All Great Lakes, islands therein, & connecting & tributary waters

Deck Equipment Operator, (Machineryman/Fireman), (4 equipment units or more), Off Road Trucks, Deck Hand, Tug Engineer, & Crane Maintenance 50 ton capacity and under or Backhoe 115,000 lbs or less, Assistant Tug Operator	GLF-4	3/1/2013	\$51.85	\$65.63	\$79.40	X X H H H H D Y
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Holiday pay = \$93.17 per hour, wages & fringes

Subdivision of county All Great Lakes, islands therein, & connecting & tributary waters**Operating Engineer Hazardous Waste Class I**

Level A - Fully encapsulating chemical resistant suit w/ pressure demand, full face piece SCBA or pressure demand supplied air respirator w/ escape SCBA. The highest available level of respiratory, skin and eye protection.	EN-324-HWCI-Z1A	1/20/2012	\$51.84	\$67.86	\$83.87	H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Apprentice Rates:

1st 6 months	\$41.63	\$52.85	\$64.05
2nd 6 months	\$43.23	\$55.25	\$67.25
3rd 6 months	\$44.83	\$57.64	\$70.45
4th 6 months	\$46.43	\$60.04	\$73.65
5th 6 months	\$48.03	\$62.44	\$76.85
6th 6 months	\$49.64	\$64.86	\$80.07

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

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County: Wayne

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Official 2013 Prevailing Wage Rates for State Funded Projects

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Classification	Name	Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Level B & C protection. B - Pressure demand, full face SCBA EN-324-HWCI-Z1B or pressure demand supplied air respirator w/ escape SCBA w/chemical resistant clothing. C - Full face piece, air purifying canister-equipped respirator w/chemical resistant clothing.			1/20/2012	\$50.89	\$66.43	\$81.97	H H H H H H D Y

Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Apprentice Rates:

1st 6 months	\$40.97	\$51.85	\$62.73
2nd 6 months	\$42.52	\$54.17	\$65.83
3rd 6 months	\$44.07	\$56.50	\$68.93
4th 6 months	\$45.64	\$58.86	\$72.07
5th 6 months	\$47.19	\$61.19	\$75.17
6th 6 months	\$48.74	\$63.51	\$78.27

Level D - Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HWCI-Z1D	1/20/2012	\$49.59	\$64.48	\$79.37	H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Apprentice Rates:

1st 6 months	\$40.06	\$50.49	\$60.91
2nd 6 months	\$41.54	\$52.71	\$63.87
3rd 6 months	\$43.04	\$54.96	\$66.87
4th 6 months	\$44.53	\$57.19	\$69.85
5th 6 months	\$46.02	\$59.42	\$72.83
6th 6 months	\$47.50	\$61.65	\$75.79

Level D When Capping Landfill Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HWCI-Z1DCL	1/20/2012	\$49.34	\$64.11	\$78.87	H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Apprentice Rates:

1st 6 months	\$39.89	\$50.23	\$60.57
2nd 6 months	\$41.36	\$52.44	\$63.51
3rd 6 months	\$42.83	\$54.64	\$66.45
4th 6 months	\$44.31	\$56.86	\$69.41
5th 6 months	\$45.79	\$59.08	\$72.37
6th 6 months	\$47.27	\$61.30	\$75.33

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Project Number: 193-216501

County: Wayne

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Official 2013 Prevailing Wage Rates for State Funded Projects

Issue Date: 6/6/2013

Contract must be awarded by: 9/4/2013

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Classification	Name	Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
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Operating Engineer Hazardous Waste Class II

Level A - Fully encapsulating chemical resistant suit w/ pressure demand, full face piece SCBA or pressure demand supplied air respirator w/ escape SCBA. The highest available level of respiratory, skin and eye protection.	EN-324-HWCII-Z1A	1/20/2012	\$47.61	\$61.51	\$75.41	H H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Level B & C protection. B - Pressure demand, full face SCBA or pressure demand supplied air respirator w/ escape SCBA w/chemical resistant clothing. C - Full face piece, air purifying canister-equipped respirator w/chemical resistant clothing.	EN-324-HWCII-Z1B	1/20/2012	\$46.66	\$60.09	\$73.51	H H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Level D - Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HWCII-Z1D	1/20/2012	\$45.36	\$58.14	\$70.91	H H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Level D When Capping Landfill Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HWCII-Z1DCL	1/20/2012	\$45.11	\$57.76	\$70.41	H H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Operating Engineer Hazardous Waste Crane w/ Boom & Jib leads 140' or longer

Level A - Fully encapsulating chemical resistant suit w/ pressure demand, full face piece SCBA or pressure demand supplied air respirator w/ escape SCBA. The highest available level of respiratory, skin and eye protection.	EN-324-HW140-Z1A	1/20/2012	\$54.49	\$71.83	\$89.17	H H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Official Rate Schedule

Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing wage and fringe benefit rates

Project Number: 193-216501
County: Wayne

prescribed in a contract.

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Official 2013 Prevailing Wage Rates for State Funded Projects

Issue Date: 6/6/2013

Contract must be awarded by: 9/4/2013

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Classification		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description					
=====						
Level B & C protection.	B - Pressure demand, full face SCBA EN-324-HW140-Z1B		\$53.54	\$70.41	\$87.27	H H H H H H D Y
	or pressure demand supplied air respirator w/ escape	1/20/2012				
	SCBA w/chemical resistant clothing. C - Full face piece, air					
	purifying canister-equipped respirator w/chemical resistant					
	clothing.					
Four 10 hour days may be worked Monday-Thursday with						
Friday as a straight-time make up day.						
Level D Coveralls, safety boots, glasses or chemical splash	EN-324-HW140-Z1D		\$52.24	\$68.46	\$84.67	H H H H H H D Y
	goggles and hard hats.	1/20/2012				
Four 10 hour days may be worked Monday-Thursday with						
Friday as a straight-time make up day.						
Level D When Capping Landfill Coveralls, safety boots,	EN-324-HW140-Z1DCL		\$51.99	\$68.08	\$84.17	H H H H H H D Y
	glasses or chemical splash goggles and hard hats.	1/20/2012				
	Four 10 hour days may be worked Monday-Thursday with					
	Friday as a straight-time make up day.					
Operating Engineer Hazardous Waste Crane w/ Boom & Jib leads						
220' or longer						
Level A - Fully encapsulating chemical resistant suit w/	EN-324-HW220-Z1A		\$54.79	\$72.28	\$89.77	H H H H H H D Y
	pressure demand, full face piece SCBA or pressure demand	1/20/2012				
	supplied air respirator w/ escape SCBA. The highest					
	available level of respiratory, skin and eye protection.					
Four 10 hour days may be worked Monday-Thursday with						
Friday as a straight-time make up day.						
Level B & C protection. B - Pressure demand, full face SCBA	EN-324-HW220-Z1B		\$53.84	\$70.86	\$87.87	H H H H H H D Y
	or pressure demand supplied air respirator w/ escape	1/20/2012				
	SCBA w/chemical resistant clothing. C - Full face piece, air					
	purifying canister-equipped respirator w/chemical resistant					
	clothing.					
Four 10 hour days may be worked Monday-Thursday with						
Friday as a straight-time make up day.						
Level D Coveralls, safety boots, glasses or chemical splash	EN-324-HW220-Z1D		\$52.54	\$68.91	\$85.27	H H H H H H D Y
	goggles and hard hats.	1/20/2012				
Four 10 hour days may be worked Monday-Thursday with						
Friday as a straight-time make up day.						

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Official Rate Schedule

Every contractor and subcontractor shall keep posted
on the construction site, in a conspicuous place, a copy
of all prevailing wage and fringe benefit rates

Project Number: 193-216501
County: Wayne

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Official 2013 Prevailing Wage Rates for State Funded Projects

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Classification		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description					
Level D When Capping Landfill Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HW220-Z1DCL	1/20/2012	\$52.29	\$68.53	\$84.77	H H H H H H D Y

Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Operating Engineer Hazardous Waste Regular Crane, Job Mechanic, Dragline Operator, Boom Truck Operator, Power Shovel Operator and Concrete Pump with boom

Level D When Capping Landfill Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HWRC-Z1DCL	1/20/2012	\$49.69	\$64.63	\$79.57	H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Operating Engineer Hazardous Waste Regular Crane, Job Mechanic, Dragline Operator, Boom Truck Operator, Power Shovel Operator and Concrete Pump with Boom Operator

Level D - Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HWRC-Z1D	1/20/2012	\$50.56	\$65.94	\$81.31	H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Operating Engineer Hazardous Waste Regular Crane, Job Mechanic, Dragline Operator, Boom Truck Operator, Power Shovel Operator and Concrete Pump with booms

Level B & C protection. B - Pressure demand, full face SCBA or pressure demand supplied air respirator w/ escape SCBA w/chemical resistant clothing. C - Full face piece, air purifying canister-equipped respirator w/chemical resistant clothing.	EN-324-HWRC-Z1B	1/20/2012	\$51.86	\$67.89	\$83.91	H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Operating Engineer Hazardous Waste Regular Crane, Job Mechanic, Dragline Operator, Boom Truck Operator, Power Shovel Operators and Concrete Pump with booms

Level A - Fully encapsulating chemical resistant suit w/ pressure demand, full face piece SCBA or pressure demand supplied air respirator w/ escape SCBA. The highest available level of respiratory, skin and eye protection.	EN-324-HWRC-Z1A	1/20/2012	\$52.81	\$69.31	\$85.81	H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Official Rate Schedule

Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy

Project Number: 193-216501
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**of all prevailing wage and fringe benefit rates
prescribed in a contract.**

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Official 2013 Prevailing Wage Rates for State Funded Projects

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Classification		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description					
=====						
Operating Engineer Steel Work						
Forklift, 1 Drum Hoist	EN-324-ef	6/4/2012	\$55.56	\$73.30	\$91.03	H H D H H H D D Y
Crane w/ 120' boom or longer	EN-324-SW120	6/4/2012	\$58.26	\$77.35	\$96.43	H H D H H H D D Y
Crane w/ 120' boom or longer w/ Oiler	EN-324-SW120-O	10/12/2011	\$59.26	\$78.85	\$98.43	H H D H H H D D Y
Crane w/ 140' boom or longer	EN-324-SW140	6/5/2012	\$59.44	\$79.12	\$98.79	H H D H H H D D Y
Crane w/ 140' boom or longer W/ Oiler	EN-324-SW140-O	6/5/2012	\$60.44	\$80.62	\$100.79	H H D H H H D D Y
Boom & Jib 220' or longer	EN-324-SW220	6/5/2012	\$59.71	\$79.52	\$99.33	H H D H H H D D Y
Crane w/ 220' boom or longer w/ Oiler	EN-324-SW220-O	6/5/2012	\$60.71	\$81.02	\$101.33	H H D H H H D D Y
Boom & Jib 300' or longer	EN-324-SW300	6/5/2012	\$61.21	\$81.77	\$102.33	H H D H H H D D Y
Crane w/ 300' boom or longer w/ Oiler	EN-324-SW300-O	6/5/2012	\$62.21	\$83.27	\$104.33	H H D H H H D D Y
Boom & Jib 400' or longer	EN-324-SW400	6/5/2012	\$62.71	\$84.02	\$105.33	H H D H H H D D Y
Crane w/ 400' boom or longer w/ Oiler	EN-324-SW400-O	6/5/2012	\$63.71	\$85.52	\$107.33	H H D H H H D D Y
Crane Operator, Job Mechanic, 3 Drum Hoist & Excavator	EN-324-SWCO	1/11/2013	\$57.90	\$76.81	\$95.71	H H D H H H D D Y

Apprentice Rates:

0-999 hours	\$45.96	\$59.20	\$72.44
1,000-1,999 hours	\$47.85	\$62.03	\$76.21
2,000-2,999 hours	\$49.74	\$64.86	\$79.98
3,000-3,999 hours	\$51.63	\$67.70	\$83.78
4,000-4,999 hours	\$53.52	\$70.53	\$87.55
5,000 hours	\$55.42	\$73.39	\$91.35

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Project Number: 193-216501

County: Wayne

Official Rate Schedule

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Official 2013 Prevailing Wage Rates for State Funded Projects

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Classification Name Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Crane w/ Oiler	EN-324-SWCO-O 6/4/2012	\$58.90	\$78.31	\$97.71	H H D H H H D D Y
Compressor or Welder Operator	EN-324-SWCW 6/4/2012	\$50.45	\$65.63	\$80.81	H H D H H H D D Y
Hoisting Operator, 2 Drum Hoist, & Rubber Tire Backhoe	EN-324-SWHO 6/4/2012	\$57.26	\$75.85	\$94.43	H H D H H H D D Y
Oiler	EN-324-SWO 6/4/2012	\$49.04	\$63.52	\$77.99	H H D H H H D D Y
Tower Crane & Derrick where work is 50' or more above first level	EN-324-SWTD50 10/12/2011	\$58.99	\$78.44	\$97.89	H H D H H H D D Y
Tower Crane & Derrick 50' or more w/ Oiler where work station is 50' or more above first level	EN-324-SWTD50-O 10/12/2011	\$59.99	\$79.94	\$99.89	H H D H H H D D Y
Operating Engineer Underground					
Class I Equipment	EN-324A1-UC1 1/16/2013	\$50.34	\$65.33	\$80.32	H H H H H H H D Y
Apprentice Rates:					
0-999 hours		\$40.75	\$51.25	\$61.74	
1,000-1,999 hours		\$42.24	\$53.48	\$64.72	
2,000-2,999 hours		\$43.75	\$55.75	\$67.74	
3,000-3,999 hours		\$45.24	\$57.98	\$70.72	
4,000-4,999 hours		\$46.74	\$60.23	\$73.72	
5,000-5,999 hours		\$48.25	\$62.50	\$76.74	
Class II Equipment	EN-324A1-UC2 1/16/2013	\$45.61	\$58.24	\$70.86	H H H H H H H D Y
Class III Equipment	EN-324A1-UC3 1/16/2013	\$44.88	\$57.14	\$69.40	H H H H H H H D Y
Class IV Equipment	EN-324A1-UC4 1/16/2013	\$44.31	\$56.29	\$68.26	H H H H H H H D Y
Master Mechanic	EN-324A1-UMM 1/16/2013	\$50.59	\$65.71	\$80.82	H H H H H H H D Y

Official Request #: 730
Requestor: Wayne State University
Project Description: University Tower Lightning Protection

Project Number: 193-216501
County: Wayne

Official Rate Schedule

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Classification	Name	Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
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Painter

Painter (8 hours of repaint work performed on Sunday shall be paid time & one half rate)	PT-22-P	6/18/2012	\$41.32	\$53.78	\$66.23	H H D H D D D D Y
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Four 10s allowed Monday-Thursday with Friday makeup day if job down due to weather, holiday or other conditions beyond the control of the employer.

Apprentice Rates:

First 6 months	\$28.87	\$35.10	\$41.33
Second 6 months	\$32.60	\$40.69	\$48.79
Third 6 months	\$33.85	\$42.57	\$51.29
Fourth 6 months	\$35.09	\$44.43	\$53.77
Fifth 6 months	\$36.34	\$46.31	\$56.27
Final 6 months	\$37.58	\$48.17	\$58.75

Pipe and Manhole Rehab

General Laborer for rehab work or normal cleaning and cctv work-top man, scaffold man, CCTV assistant, jetter-vac assistant	TM247	10/15/2012	\$27.20	\$36.70		H H H H H H H H N
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Tap cutter/CCTV Tech/Grout Equipment Operator: unit driver and operator of CCTV; grouting equipment and tap cutting equipment	TM247-2	10/15/2012	\$31.70	\$43.45		H H H H H H H H N
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CCTV Technician/Combo Unit Operator: unit driver and operator of cctv unit or combo unit in connection with normal cleaning and televising work	TM247-3	10/15/2012	\$30.45	\$41.57		H H H H H H H H N
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Boiler Operator: unit driver and operator of steam/water heater units and all ancillary equipment associated	TM247-4	10/15/2012	\$32.20	\$44.20		H H H H H H H H N
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Combo Unit driver & Jetter-Vac Operator	TM247-5	10/15/2012	\$32.20	\$44.20		H H H H H H H H N
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Pipe Bursting & Slip-lining Equipment Operator	TM247-6	10/15/2012	\$33.20	\$45.70		H H H H H H H H N
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Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Project Number: 193-216501

County: Statewide

Official Rate Schedule

Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing wage and fringe benefit rates prescribed in a contract.

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Classification		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description					
=====						
Pipefitter						
Pipefitter	PF-636	3/11/2013	\$64.13	\$84.96	\$101.78	H H D H D D D Y
	Apprentice Rates:					
	1st & 2nd periods		\$26.88	\$35.23	\$42.23	
	3rd period		\$28.88	\$38.23	\$46.23	
	4th period		\$30.13	\$40.11	\$48.73	
	5th period		\$31.38	\$41.98	\$51.23	
	6th period		\$32.63	\$43.85	\$53.73	
	7th period		\$33.88	\$45.73	\$56.23	
	8th period		\$34.88	\$47.23	\$58.23	
	9th period		\$35.88	\$48.73	\$60.23	
	10th period		\$37.31	\$50.87	\$63.09	
Plasterer						
Plasterer	BR1P	11/1/2012	\$45.04	\$67.56	\$90.08	H H H H H H D N
	Apprentice Rates:					
	1st 6 months		\$32.11	\$48.17	\$64.22	
	2nd 6 months		\$33.40	\$50.10	\$66.80	
	3rd 6 months		\$34.69	\$52.04	\$69.38	
	4th 6 months		\$37.28	\$55.92	\$74.56	
	5th 6 months		\$39.87	\$59.81	\$79.74	
	6th 6 months		\$42.45	\$63.68	\$84.90	
Plasterer	PL67	9/8/2010	\$44.72	\$60.11	\$75.50	H H H X D D D N
	Apprentice Rates:					
	1st 6 months		\$29.33	\$37.02	\$44.72	
	2nd 6 months		\$30.87	\$39.34	\$47.80	
	3rd 6 months		\$32.41	\$41.64	\$50.88	
	4th 6 months		\$35.49	\$46.26	\$57.04	
	5th 6 months		\$38.56	\$51.16	\$63.76	
	6th 6 months		\$41.64	\$55.49	\$69.34	

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

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County: Wayne

Official Rate Schedule

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Official 2013 Prevailing Wage Rates for State Funded Projects

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Classification		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description					
=====						
Plumber						
Plumber	PL-98	8/18/2009	\$57.58	\$74.45	\$89.31	H H D H D D D N
Apprentice Rates:						
	Period 1		\$17.76	\$24.31	\$30.86	
	Period 2		\$17.76	\$24.31	\$30.86	
	Period 3		\$30.79	\$39.88	\$48.96	
	Period 4		\$31.42	\$40.82	\$50.22	
	Period 5		\$32.58	\$42.56	\$52.54	
	Period 6		\$33.73	\$44.28	\$54.84	
	Period 7		\$34.88	\$43.61	\$54.74	
	Period 8		\$36.05	\$47.76	\$59.48	
	Period 9		\$37.20	\$49.49	\$61.78	
	Period 10		\$38.35	\$51.22	\$64.08	
Roofer						
Commercial Roofer	RO-149-WOM	8/18/2008	\$48.46	\$62.29	\$76.62	H H D H H H D N
Straight time is not to exceed ten (10) hours per day or forty (40) hours per week.						
Apprentice Rates:						
	Apprentice 1		\$32.62	\$39.86	\$48.04	
	Apprentice 2		\$36.80	\$44.80	\$53.30	
	Apprentice 3		\$38.22	\$46.93	\$56.14	
	Apprentice 4		\$39.25	\$48.48	\$58.20	
	Apprentice 5		\$40.47	\$50.30	\$60.64	
	Apprentice 6		\$41.87	\$52.40	\$63.44	
Sewer Relining						
Class I-Operator of audio visual CCTV system including remote in-ground cutter and other equipment used in conjunction with CCTV system.	SR-I	3/27/2013	\$42.07	\$56.90	\$71.72	H H H H H H D N
Class II-Operator of hot water heaters and circulation system; water jetters; and vacuum and mechanical debris removal systems and those assisting.	SR-II	3/27/2013	\$40.54	\$54.60	\$68.66	H H H H H H D N

Official Request #: 730

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Project Description: University Tower Lightning Protection

Project Number: 193-216501

County: Statewide

Official Rate Schedule

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Classification		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description					
=====						
Sheet Metal Worker						
Sheet Metal Worker	SHM-80		\$58.32	\$74.80	\$91.28	H H D H D D D Y
A 4 10 schedule may be worked, 4 consecutive days Monday thru Friday.		1/19/2012				

Apprentice Rates:

1st & 2nd Periods Indentured before 6-1-11	\$40.96	\$49.32	\$57.69
3rd & 4th Periods Indentured before 6-1-11	\$42.21	\$51.20	\$60.19
5th & 6th Periods Indentured before 6-1-11	\$43.51	\$53.16	\$62.79
7th & 8th Periods Indentured before 6-1-11	\$46.05	\$56.96	\$67.87
9th & 10th Periods Indentured before 6-1-11	\$48.63	\$60.83	\$73.03
1st & 2nd Periods Indentured AFTER 6-1-11	\$36.14	\$43.56	\$50.97
3rd & 4th Periods Indentured AFTER 6-1-11	\$37.79	\$46.04	\$54.27
5th & 6th Periods Indentured AFTER 6-1-11	\$39.44	\$48.51	\$57.57
7th & 8th Periods Indentured AFTER 6-1-11	\$41.08	\$50.97	\$60.85

Architectural Sheet Metal Worker	SHM-80-SD		\$40.85	\$53.00	\$65.15	H H H H H H D Y
		2/15/2012				

Sprinkler Fitter

Sprinkler Fitter	SP 704		\$61.92	\$82.38	\$102.83	H H D H D D D Y
4 ten hour days allowed Monday-Friday only in those weeks containing a holiday and the preceding or succeeding holiday week		3/11/2013				

Apprentice Rates:

1st Period	\$27.37	\$35.55	\$43.73
2nd Period	\$39.42	\$48.63	\$57.83
3rd Period	\$41.46	\$51.69	\$61.91
4th Period	\$43.51	\$54.76	\$66.01
5th Period	\$45.56	\$57.83	\$70.11
6th Period	\$47.60	\$60.89	\$74.19
7th Period	\$49.65	\$63.97	\$78.29
8th Period	\$51.69	\$67.03	\$82.37
9th Period	\$53.74	\$70.11	\$86.47
10th Period	\$55.78	\$73.17	\$90.55

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Project Number: 193-216501

County: Wayne

Official Rate Schedule

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Official 2013 Prevailing Wage Rates for State Funded Projects

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Classification		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description					

Terrazzo

Terrazzo Finisher	BR1-TRF	11/26/2012	\$42.89	\$53.82	\$64.75	H H D H D D D D Y
A 4 ten workweek may be worked Monday thru Thursday or Tuesday thru Friday.						

Apprentice Rates:

Level 1	\$18.57	\$24.54	\$30.52
Level 2	\$19.74	\$26.30	\$32.86
Level 3	\$26.34	\$33.11	\$39.87
Level 4	\$27.77	\$35.25	\$42.73
Level 5	\$29.25	\$36.95	\$44.65
Level 6	\$30.83	\$38.92	\$47.02
Level 7	\$32.48	\$40.65	\$48.82
Level 8	\$33.93	\$42.50	\$51.08

Terrazzo Worker	BR1-TRW	11/26/2012	\$48.50	\$62.24	\$75.97	H H D H D D D D Y
A 4 ten workweek may be worked Monday thru Thursday or Tuesday thru Friday.						

Apprentice Rates:

Level 1	\$24.52	\$31.83	\$39.13
Level 2	\$27.50	\$35.59	\$43.67
Level 3	\$32.59	\$40.95	\$49.31
Level 4	\$35.26	\$44.56	\$53.86
Level 5	\$37.47	\$47.04	\$56.61
Level 6	\$41.04	\$52.32	\$63.60
Level 7	\$41.69	\$53.15	\$64.61
Level 8	\$42.60	\$54.51	\$66.43

Tile

Tile Finisher	BR1-TF	11/26/2012	\$42.43	\$53.13	\$63.83	H H D H D D D D Y
A 4 ten workweek may be worked Monday thru Thursday or Tuesday thru Friday.						

Apprentice Rates:

Level 1	\$18.57	\$24.54	\$30.52
Level 2	\$19.74	\$26.30	\$32.86
Level 3	\$26.34	\$33.11	\$39.87
Level 4	\$27.77	\$35.25	\$42.73
Level 5	\$29.25	\$36.95	\$44.65
Level 6	\$30.83	\$38.92	\$47.02
Level 7	\$32.48	\$40.65	\$48.82
Level 8	\$33.93	\$42.50	\$51.08

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Requestor: Wayne State University

Project Description: University Tower Lightning Protection

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County: Wayne

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Official 2013 Prevailing Wage Rates for State Funded Projects

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Classification		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description					
Tile Layer	BR1-TL	11/26/2012	\$48.45	\$62.16	\$75.87	H H D H D D D Y
A 4 ten workweek may be worked Monday thru Thursday or Tuesday thru Friday.						

Apprentice Rates:

Level 1	\$24.52	\$31.83	\$39.13
Level 2	\$27.50	\$35.59	\$43.67
Level 3	\$32.59	\$40.95	\$49.31
Level 4	\$35.26	\$44.56	\$53.86
Level 5	\$37.47	\$47.04	\$56.61
Level 6	\$41.04	\$52.32	\$63.60
Level 7	\$41.69	\$53.15	\$64.61
Level 8	\$42.60	\$54.51	\$66.43

Truck Driver

on all trucks of 8 cubic yard capacity or less TM-RB1 10/9/2012 \$40.40 \$37.84 H H H H H H H Y

of all trucks of 8 cubic yard capacity or over TM-RB1A 10/9/2012 \$40.50 \$37.99 H H H H H H H Y

on euclid type equipment TM-RB1B 10/9/2012 \$40.65 \$38.21 H H H H H H H Y

Underground Laborer Open Cut, Class I

Construction Laborer LAUC-Z1-1 1/16/2013 \$36.77 \$47.38 \$57.99 H H H H H H H D Y

Apprentice Rates:

0-1,000 work hours	\$31.99	\$40.21	\$48.43
1,001-2,000 work hours	\$32.95	\$41.65	\$50.35
2,001-3,000 work hours	\$33.90	\$43.08	\$52.25
3,001-4,000 work hours	\$35.81	\$45.94	\$56.07

Underground Laborer Open Cut, Class II

Mortar and material mixer, concrete form man, signal man, well point man, manhole, headwall and catch basin LAUC-Z1-2 1/16/2013 \$36.88 \$47.55 \$58.21 H H H H H H H D Y
builder, guard rail builders, headwall, seawall, breakwall, dock builder and fence erector.

Apprentice Rates:

0-1,000 work hours	\$32.07	\$40.33	\$48.59
1,001-2,000 work hours	\$33.03	\$41.77	\$50.51
2,001-3,000 work hours	\$34.00	\$43.22	\$52.45
3,001-4,000 work hours	\$35.92	\$46.10	\$56.29

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Project Number: 193-216501

County: Wayne

Official Rate Schedule

Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing wage and fringe benefit rates prescribed in a contract.

Page 28 of 30

Official 2013 Prevailing Wage Rates for State Funded Projects

Issue Date: 6/6/2013

Contract must be awarded by: 9/4/2013

Page 29 of 30

Classification	Name	Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
=====							
Underground Laborer Open Cut, Class III							
	Air, gasoline and electric tool operator, vibrator operator, drillers, pump man, tar kettle operator, bracers, rodger, reinforced steel or mesh man (e.g. wire mesh, steel mats, dowel bars, etc.), cement finisher, welder, pipe jacking and boring man, wagon drill and air track operator and concrete saw operator (under 40 h.p.), windlass and tugger man, and directional boring man.	LAUC-Z1-3	1/16/2013	\$36.93	\$47.62	\$58.31	H H H H H H D Y
Apprentice Rates:							
0-1,000 work hours				\$32.11	\$40.39	\$48.67	
1,001-2,000 work hours				\$33.07	\$41.83	\$50.59	
2,001-3,000 work hours				\$34.04	\$43.28	\$52.53	
3,001-4,000 work hours				\$35.97	\$46.18	\$56.39	
Underground Laborer Open Cut, Class IV							
	Trench or excavating grade man.	LAUC-Z1-4	1/16/2013	\$37.01	\$47.74	\$58.47	H H H H H H D Y
Apprentice Rates:							
0-1,000 work hours				\$32.17	\$40.48	\$48.79	
1,001-2,000 work hours				\$33.14	\$41.94	\$50.73	
2,001-3,000 work hours				\$34.11	\$43.39	\$52.67	
3,001-4,000 work hours				\$36.04	\$46.28	\$56.53	
Underground Laborer Open Cut, Class V							
	Pipe Layer	LAUC-Z1-5	1/16/2013	\$37.07	\$47.83	\$58.59	H H H H H H D Y
Apprentice Rates:							
0-1,000 work hours				\$32.21	\$40.54	\$48.87	
1,001-2,000 work hours				\$33.19	\$42.01	\$50.83	
2,001-3,000 work hours				\$34.16	\$43.46	\$52.77	
3,001-4,000 work hours				\$36.10	\$46.38	\$56.65	
Underground Laborer Open Cut, Class VI							
	Grouting man, top man assistant, audio visual television operations and all other operations in connection with closed circuit television inspection, pipe cleaning and pipe relining work and the installation and repair of water service pipe and appurtenances.	LAUC-Z1-6	1/16/2013	\$34.52	\$44.01	\$53.49	H H H H H H D Y
Apprentice Rates:							
0-1,000 work hours				\$30.30	\$37.68	\$45.05	
1,001-2,000 work hours				\$31.15	\$38.95	\$46.75	
2,001-3,000 work hours				\$31.99	\$40.21	\$48.43	
3,001-4,000 work hours				\$33.68	\$42.74	\$51.81	

Official Request #: 730

Requestor: Wayne State University

Project Description: University Tower Lightning Protection

Project Number: 193-216501

County: Wayne

Official Rate Schedule

Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing wage and fringe benefit rates prescribed in a contract.

Page 29 of 30

Official 2013 Prevailing Wage Rates for State Funded Projects

Issue Date: 6/6/2013

Contract must be awarded by: 9/4/2013

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<u>Classification</u>		Last	Straight	Time and	Double	Overtime
Name	Description	Updated	Hourly	a Half	Time	Provision
=====						

Underground Laborer Open Cut, Class VII

Restoration laborer, seeding, sodding, planting, cutting, LAUC-Z1-7
mulching and topsoil grading and the restoration of
property such as replacing mail boxes, wood chips, planter
boxes, flagstones etc.

1/16/2013

\$31.14 \$38.94 \$46.73 H H H H H H D Y

Apprentice Rates:

0-1,000 work hours	\$27.77	\$33.88	\$39.99
1,001-2,000 work hours	\$28.44	\$34.88	\$41.33
2,001-3,000 work hours	\$29.12	\$35.90	\$42.69
3,001-4,000 work hours	\$30.47	\$37.93	\$45.39

Official Request #: 730
Requestor: Wayne State University
Project Description: University Tower Lightning Protection
Project Number: 193-216501

Official Rate Schedule

Every contractor and subcontractor shall keep posted
on the construction site, in a conspicuous place, a copy
of all prevailing wage and fringe benefit rates
prescribed in a contract.

County: Wayne

**WAYNE STATE UNIVERSITY
PAYMENT PACKAGE DOCUMENT REQUIREMENTS (Revised 5-20-2011):**

Review and comply with Section 410 of Bid Front End Documents.
Review and comply with Article 15 of the Supplemental General Conditions.

AIA DOCUMENT G702 & G703 – (or facsimile thereof) Payment Application Checklist:

- Correct Project Name – Found on your contract.
- Correct Project Number – Found on your contract.
- Purchase Order Number – Required prior to beginning work.
- Correct Application Number. (i.e. 1, 2, 3, etc.)
- Correct Period Reporting Dates – Applications support docs must be sequential and within application range.
- Approved & Executed Change Orders must be listed. (Cannot invoice for unapproved changes.)
- Schedule of values percentages and amounts match the approved Pencil Copy Review – Signed by the Architect, Contractor, and University Project Manager.
- Correct Dates – Back dating not accepted.
- Signed and Notarized.

SWORN STATEMENT – Checklist:

- List all contractors, sub-contractors, suppliers... ≥ \$1000.00
- Contractor's Sworn Statement amounts must coincide with Column „C“ of the schedule of values document. Any unassigned or uncommitted value of contract shall be shown on an entry „Contractor – Unassigned“ followed by the amount necessary to cause the „contracted to date“ column of the sworn statement to equate with the schedule of value column totals.
- Current Date – Back dating not accepted.
- Signed and Notarized.
- A Sworn Statement is required from every Sub Contractor on the job with a material purchase or sub-subcontract of \$1,000 or more. (all the way down to the bottom tier)

**DEPT. of LABOR FORM WH-347 – Certified Payroll Checklist:
(Union and Non-Union)**

- For every contractor & sub-contractors work, for each week within the application for payment reporting period. (For every „boot“ on the floor representing the weeks within the application period)
- Wayne State University Project Number – Found on your contract.
- List ALL workers who have worked on the project site.
- Make sure workers addresses are listed.
- NO Social Security Numbers, if present they MUST be blackened out or listed in XXX-XX-1234 format.
- Work classifications based on the job specific Prevailing Wage Schedule descriptions. If you require rates for additional classifications, contact the Michigan Department of Consumer & Industry Services. (Refer to Section 410 of Bid Front End Documents.)
http://www.cis.state.mi.us/bwuc/bsr/wh/revised_rates/whc_tbl.htm
- Apprenticeship program status – proof of enrolled program and current completion required for any workers paid at Apprenticeship rates.
- Rate of Pay verified against the Prevailing Wage Schedule with an hourly costs breakdown of fringes paid. (Refer to attachment for State of Michigan instructions and example)
- Authorized signatures on affidavit.

The Project Manager may provide additional requirements as may apply to individual jobs

WAYNE STATE UNIVERSITY

AGREEMENT BETWEEN THE UNIVERSITY AND CONTRACTOR FOR CONSTRUCTION SERVICES

Executed as of the _____ day of _____, 2012 by and between:

The Board of Governors, Wayne State University
Detroit, Michigan 48202
(The University)

and

Contractor
address
city/state/zip

regarding

University Tower Lightning Protection

WSU Project No. 507-216501

In consideration of the mutual covenants and conditions contained herein, the Parties agree as follows:

Article 1 - Scope of Work

- 1.1 This Agreement provides for Project includes installation and wiring of a lightning protection system at the University Towers (Residence Hall) and the University's Radio Station, (WDET- FM)., located at **University Tower, 4500 Cass Avenue**. All work is performed on Wayne State's main campus in Detroit Michigan. The documents listed in Article 4 fully define the scope of work.
- 1.2 The Contractor shall furnish all the labor, materials, equipment, services, and supervision to perform all the work shown on the drawings and specifications listed in Article 17, including any addenda issued during the bid phase, and approved change orders issued during the construction phase.
- 1.3 The Contractor shall notify the University in writing within five (5) calendar days when the Contractor discovers any condition that will affect the contract amount or the completion date.

Article 2 - Time of Completion *(revised 10-15-2009)*

- 2.1 The work to be performed under this Agreement shall commence upon the Contractor's receipt of a fully-executed Agreement. The Contract is expected to be fully executed on or about 25 calendar days after successful bidder qualification and recommendation of award. The undersigned agrees to start construction **immediately after** receipt of a fully executed contract and to complete the work as follows:

Substantial Completion no later than **December 18, 2013**.

Article 3 - The Contract Sum

- 3.1 The University shall pay the Contractor a lump sum amount of \$ indicate amt. in no. (indicate amt. in words and xx/100 Dollars) for the performance of all work associated with the Contractor's Base Bid.
- 3.2 The University may, at its sole discretion, during the life of the contract, award the following alternates, at the amounts indicated (If section 3.2 is not used, delete all text and enter "Deleted").

Description	Amount
Alternate #1	
Alternate #2	
Alternate #3	

- 3.3 In the event additional work becomes necessary, the following unit prices will apply (If section 3.3 is not used, delete all text and enter "Deleted"):

Work Item	Unit Price
1.	
2.	
3.	

Article 4 - The Contract Documents

- 4.1 The Contract Documents shall consist of this Agreement, the drawings and specifications as listed in Article 17, the General Conditions of the Contract for Construction as defined by AIA Document A201 1970 Edition, except as otherwise provided herein, and Wayne State University's Supplementary General Conditions 1997 Edition.
- 4.2 For any inconsistencies found among or between these Contract Documents, the language contained in this Agreement shall prevail over all other documents and the Supplementary General Conditions shall prevail over the General Conditions. In the event of a conflict between the Drawings and Specifications, the

requirement for the higher quantity and/or higher quality shall prevail.

Article 5 – Examination of Premises

- 5.1 The Contractor acknowledges that the University provided the opportunity for a thorough examination of the project site and its surroundings and that the Contractor knows of no conditions preventing accomplishment of the full scope of work within the time and for the amount specified in this Agreement.
- 5.2 The University will deny all claims for additional time and/or cost for conditions that could have been reasonably discovered during such an examination.

Article 6 - The Architect/Engineer

- 6.1 The Architect/Engineer for this project is:

**Peter Basso and Associates
5145 Livernois, Suite 100
Troy, Michigan 48098-3276**

- 6.2 The University will appoint a Project Manager who will be the University's point of contact for all matters of contract administration including, but not limited to, interpretation of documents, defining the scope of work, approving work schedules, and approving contract payments.

Article 7 - Additional Work

- 7.1 The University reserves the right to let other Agreements in connection with this work. The Contractor will afford other Contractors or the University's own workforce reasonable opportunity for the delivery and storage of their material and for the performance of their work and shall properly connect and coordinate its work with theirs.
- 7.2 If any part of the Contractor's work depends for proper execution or results upon the work of another Contractor or the University's own workforce, the Contractor shall inspect and promptly report to the University's Project Manager any defects in such work that render it unsuitable for such proper execution and results. The Contractor's failure to so inspect and report shall constitute an acceptance of the work of others as fit and proper for reception of the Contractor's work and as a waiver of any claim or defense against the University or other contractor which relies in whole or in part upon the contention that such work was unsuitable for proper execution and resolution.

Article 8 – Dispute Resolution

- 8.1 Jurisdiction over all claims, disputes, and other matters in question arising out of or relating to this contract or the breach thereof, shall rest in the Court of Claims of the State of Michigan. No provision of this agreement may be construed as Wayne State University's consent to submit any claim, dispute or other matter in question for dispute resolution pursuant to any arbitration or mediation process, whether or not provisions for dispute resolution are included in a document which has been incorporated by reference into this agreement. Specifically, all references to Arbitration contained in the General Conditions are superceded by this Article.
- 8.1 In any claim or dispute by the Contractor against the University, which cannot be resolved by negotiation, the Contractor shall submit the dispute in writing for an administrative decision by the University's Vice President for Finance and Administration, within 30 days of the end of negotiations. Any decision of the Vice President shall be made within 45 days of receipt from the Contractor and is final unless it is challenged by the Contractor by filing a lawsuit in the Court of Claims of the State of Michigan within one year of the issuance of the decision. The Contractor agrees that appeal to the Vice President is a condition precedent to filing suit in the Michigan Court of Claims.
- 8.2 For purposes of this section, the "end of negotiations" shall be deemed to have occurred when:
- 8.2.1 Either party informs the other that pursuant to this section, negotiations are at an impasse; or
- 8.3.2 The Contractor submits the dispute in writing to the Vice President.

- 8.4 Unless otherwise agreed by the University in writing, and notwithstanding any other rights or obligations of either of the parties under any Contract Documents or Agreement, the Contractor shall continue with the performance of its services and duties during the pendency of any negotiations or proceedings to resolve any claim or dispute, and the University shall continue to make payments in accordance with the Contract Documents; however, the University shall not be required or obligated to make payments on or against any such claims or disputes during the pendency of any proceeding to resolve such claims or disputes.

Article 9 - Termination for Convenience

- 9.1 Upon thirty days written notice to the Contractor, the University may, without cause and without prejudice to any other right or remedy of the University, elect to terminate the contract. In such case, the Contractor shall only be paid (without duplication of any items), using a Close Out Change Order, for the following:
- 9.1.1 For completed and acceptable work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
- 9.1.2 For expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted work, including fair and reasonable sums for overhead and profit on such expenses.
- 9.2 The Contractor shall not be paid on account of loss of anticipated profits or revenue, delay or disruption, or other economic loss arising out of or resulting from such termination. For purposes of this section, "fair and reasonable sums for overhead and profit" shall be determined by reference to Michigan law, without reference to principles used for such determinations in arbitration.

Article 10 - Progress Payments

- 10.1 On or before the 20th day of each month, the Contractor shall submit a written application for payment, using form AIA G702, to the Architect/Engineer and the University's Project Manager for review. The Architect/Engineer shall have ten (10) calendar days to accept or reject the Contractor's application for payment. Acceptable applications for payment shall then be submitted to the University for payment of authorized amount(s) within thirty (30) calendar days of receipt by the University's Project Manager.
- 10.2 The application for payment shall contain a full schedule of values organized and sorted by subcontractor, by Construction Specifications Institute standard work categories, or in another format acceptable to the University.
- 10.3 Monthly progress payments shall show the percentage of work installed as of the date of the application, less amount previously installed and the amount due for the application period. The Contractor shall deduct a 10% retainage from the balance due for each progress payment and indicate the net amount due on each application.
- 10.4 When 50% of the work associated with this Agreement is installed, the Contractor shall not deduct additional retainage from the balance due from the University. When substantial completion is achieved and acknowledged by the Architect/Engineer, the Contractor and the University in writing, the University shall remit to the Contractor all but 2% of the retainage. The remaining 2% shall be retained by the University until the final payment is authorized and remitted to the Contractor.

Article 11 - Acceptance and Final Payments

- 11.1 Final payment shall be due thirty (30) days after the completion of the work, including all punch list items, provided the work is fully completed and the Agreement fully performed.
- 11.2 Upon receipt of written notice that the work is ready for final inspection and acceptance, the Architect/Engineer shall promptly inspect the work. When the Architect/Engineer concludes that the work is acceptable and the Agreement to be fully performed, the Architect/Engineer shall promptly issue a final

certificate with an original signature, stating that the work provided is complete and acceptable and that the entire remaining balance found to be due the Contractor shall be remitted by the University once the final application for payment is received.

- 11.3 If, after the work has been substantially completed, full completion thereof is materially delayed through no fault of the Contractor, and the Architect/Engineer so certifies, the University shall, upon certificate of the Architect/Engineer, and without terminating the Contract, make payments of the balance due for that portion of the work fully completed and accepted. Such payments shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

Article 12 - Non-Discrimination

- 12.1 The Contractor agrees that it will not discriminate against any employee or applicant for employment, to be employed in the performance of this Agreement, with respect to hire, tenure, terms, conditions or privileges of employment or any matter directly or indirectly related to employment, because of race, color, religion, sex, age, national origin, or ancestry. Breach of this covenant may be regarded as material breach of this Agreement.
- 12.2 The Contractor further agrees that it will, in all subcontracts relating to the performance of the work under this Agreement, provide in its subcontracts that the subcontractor will not discriminate against any employee or applicant for employment, to be employed in the performance of such contract, with respect to hire, tenure, terms, conditions or privileges of employment, or any matter directly or indirectly related to employment because of race, sex, age, color, religion, national origin or ancestry. Breach of this covenant may also be regarded as a material breach of this Agreement.

Article 13 - Prevailing Wages

- 13.1 The Contractor and each subcontractor shall pay to each class of mechanics and laborers not less than the wage and fringe benefit rates prevailing in the Detroit Metropolitan Area, as determined by the United States Department of Labor. The Contractor shall post on site, in a conspicuous place, a copy of all applicable wage and benefit rates, and shall provide the University with a copy of the applicable wage and benefit rates.
- 13.2 The Contractor and each subcontractor shall keep an accurate record showing the name and occupation of and the actual benefits and wages paid to each laborer and mechanic employed in connection with this contract. The Contractor and each subcontractor shall make certified payroll records available to the University's representatives upon request.
- 13.3 If a Contractor or subcontractor fails to pay the prevailing rates of wages and fringe benefits and does not cure such failure within ten (10) days after notice to do so by the University, the University shall have the right, at its option, to do any or all of the following:
- 13.3.1 Withhold all or any portion of payments due the Contractor as may be considered necessary by the University to pay laborers and mechanics the difference between the rates of wages and fringe benefits required by this Agreement and the actual wage and fringe benefits paid.
- 13.3.2 Terminate part or all of this Agreement or any subagreement and proceed to complete the Agreement or subagreement by separate agreement with another Contractor or otherwise, in which case the Contractor and its sureties shall be liable to the University for any excess costs incurred by the University.
- 13.4 The Contractor shall include terms identical or substantially similar to this section in any Agreement or subagreement pertaining to the project.

Article 14 - Save Harmless

- 14.1 The Contractor shall indemnify, defend and hold harmless the University, its agents and employees from any and all loss, damage, claims, and causes of action whatsoever, including all costs, expenses and attorneys' fees arising out of Contractor's performance of obligations under the terms and conditions of this agreement. Such responsibility shall not be construed as liability for damage caused by or resulting from the negligence

of the University, its agents other than the Contractor, or its employees.

Article 15 - Liquidated Damages

- 15.1 It is understood and agreed that, if the project is not completed within the time specified in the Agreement plus any extension of time allowed pursuant thereto, the actual damages sustained by the University because of any such delay will be uncertain and difficult to ascertain, and it is agreed that the reasonable foreseeable value of the use of said project by the University would be the sum of **\$100.00, One Hundred Dollars per day**. Therefore, the Contractor shall pay as liquidated damages to the University the sum of **\$100.00, One Hundred Dollars per day** for each day's delay in substantially completing said project beyond the time specified in this Agreement and any extensions of time allowed there under.

Article 16- Interpretation

- 16.1 This Agreement shall be interpreted and construed according to the laws of the State of Michigan.
- 16.2 If one part of this Agreement is found to be void by legal or legislative action, the remainder of the contract remains in full effect.

Article 17 - Drawings and Specifications

- 17.1 The Technical Specifications dated **June 7, 2013**, and the following List of Drawings represent the scope of work as defined in the Contract Documents from Article 4.

DRAWINGS

Drawing No.	Description
-------------	-------------

E0.1	ELECTRICAL STANDARDS AND DRAWING INDEX
E0.2	ELECTRICAL STANDARD SCHEDULES AND DETAILS
E3.0	ELECTRICAL COMPOSITE PLAN
E3.1	FIRST FLOOR POWER PLAN
E3.2	ELECTRICAL ROOF PLAN
E5.1	ONE LINE DIAGRAM

IN WITNESS WHEREOF the parties to these presents have hereunto set their hands as of the day and year first written above.

Signed, sealed and delivered
in the presence of:

CONTRACTOR'S NAME GOES HERE

By _____
signature

Please print name here

Date signed

Title

Witness

**THE BOARD OF GOVERNORS of
WAYNE STATE UNIVERSITY**

By _____
Richard J. Nork, Vice President for
Finance and Facilities

Date signed

Form Contract Approved by OGC 5/98

FORM OF GUARANTEE

PROJECT: University Tower Lightning Protection

OWNER: BOARD OF GOVERNORS, WAYNE STATE UNIVERSITY

CONTRACTOR: _____

DATE: _____

Know all men by these presents that, in consideration of my (our) having been awarded the Contract or Subcontract for complete furnishing and installation of:

University Tower Lightning Protection (507-216501)For: **Board of Governors, Wayne State University**

In conformity with drawings and specifications prepared by Architect or Engineer, **Peter Basso and Associates**, and known as the buildings indicated above, I (we) do hereby agree that, should I (we) be notified that the said work has proved faulty, etc., that I (we) will return to the buildings within three (3) working days of the receipt of such notice, and will furnish the necessary labor and material to repair such work to the satisfaction of the Owner and without cost to the Owner.

The Agreement shall remain in full force and effect **FOR A ONE YEAR PERIOD (DATE TBD)**

WITNESS:

signed: _____
Subcontractor

by: _____

address: _____

city/state/zip: _____

signed: _____
General Contractor

by: _____

(THIS FORM TO BE FILED IN DUPLICATE.)

GENERAL CONDITIONS (Revised 10-2009)

- A. Although AIA Document A201 - Twelfth Edition (April 1970) - "General Conditions of the Contract for Construction" is not bound herein, it forms a part of these construction documents.
- B. A reference copy of AIA Document A201 - Twelfth Edition (April 1970) - "General Conditions of the Contract for Construction" is on file at the following location:

Wayne State University
Finance & Facilities Management
Procurement & Strategic Sourcing
Academic / Administrative Services Building
5700 Cass Avenue
Detroit Michigan 48202

SUPPLEMENTARY GENERAL CONDITIONS
OF
THE CONTRACT FOR CONSTRUCTION

Facilities Planning & Management - Design & Construction Services
Wayne State University

WSU SUPPLEMENTARY GENERAL CONDITIONS
OF THE
CONTRACT FOR CONSTRUCTION

NOTE: The following items related to A.I.A. General Conditions, A.I.A. Document A-201 - Twelfth Edition (April 1970), by specific number being amended to. These items, as amendments, shall have precedence over the article being amended.

ARTICLE 1 - CONTRACT DOCUMENTS

1.1 DEFINITIONS

1.1.5 The Agreement

The Agreement executed by the Contractor and the Owner.

1.2 EXECUTION, CORRELATION, INTENT, AND INTERPRETATIONS

1.2.6 "General Conditions and "Supplementary General Conditions" apply with equal force to all Contractors, Subcontractors work, and extra work required under this Contract.

1.2.7 Precedence of Drawings and Specifications.
The Agreement has precedence over WSU Supplementary General Conditions.

WSU Supplementary General Conditions have precedence over A.I.A. A-201 General Conditions of the Contract.

Specifications have precedence over drawings. Full-size drawings have precedence over scale drawings. Large-scale plans and details have precedence over small-scale plans and details. Figured dimensions have precedence over plans and elevations.

ARTICLE 2 - ARCHITECT

2.1 DEFINITION

2.1.1.1 The term Architect or Architect/Engineer as used in these specifications refers to Facilities Planning and Management - Design Services, and/or Consulting Architect/Engineer.

2.2 ADMINISTRATION OF THE CONTRACT

2.2.16 The Architect will assign Field Representatives to make periodic visits to the project for the purpose of assisting the Architect in carrying out his field responsibilities at the site. The duties, responsibilities and limitations of authority of any such Field Representative shall be as follows:

- a. Explain Contract Documents: Assist the Contractor via the Contractor's Superintendent to understand the intent of the Contract Documents.
- b. Observations: Conduct on-site observations and spot checks of the work in progress as a basis for determining conformance of the work, material, and equipment with the Contract Documents.
- c. Additional Information: Obtain from the Architect, additional details or information, if and when required, at the job site for proper execution of the work.
- d. Modifications: Consider and evaluate suggestions or modifications that may be submitted by the Contractor and report them with recommendations to the Architect for final decision.
- e. Construction Schedule and Completion: Be alert to the completion, and report same to the Architect. When the construction work has been completed in accordance with the Contract Documents, advise the Architect that the work is ready for general inspection and

acceptance.

- f. Job Conferences: Attend and report to the Architect on all required conferences held at the job site.
- g. Observe Tests: See that tests which are required by the Contract Documents are actually conducted; observe, record and report to the Architect all details relative to the test procedures; and advise the architect's office in advance of the schedules of tests.
- h. Inspection by Others: If inspectors, representing local, state or federal agencies having jurisdiction over the project, visit the job site, accompany such inspectors during their trips through the project, record the outcome of these inspections, and report same to the Architect's office.
- i. Shop Drawings: Do not permit the installation of any materials and equipment for which shop drawings are required unless such drawings have been duly approved and issued by the Architect.
- j. Contractor's Requisitions for Payment: Review and make recommendations to the Architect for disposition.
- k. List of Items for Correction: After substantial completion, make a list of items for correction before final inspection and check each item as it is corrected.
- l. Owner's Occupancy of the Building: If the Owner occupies (to any degree) the building prior to actual completion of the work by the Contractor, be especially alert to possibilities of claims for damage to completed work prior to the acceptance of the building.
- m. Owner Existing Operation: In the case of additions to or Demolitions of an existing facility, which must be maintained as an operational unit, be alert to conditions on the job site which may have an effect on the Owner's existing operation.
- n. Limitations of Authority: Do not become involved in any of the following areas of responsibility unless specific exceptions are established by written instructions issued by the Architect.
 - aa. Do not authorize deviations from the Contract Documents.
 - bb. Avoid conducting any test personally.
 - cc. Do not enter into the area of responsibility of the Contractor's field superintendent.
 - dd. Do not expedite job for Contractor unless so instructed by the Architect.
 - ee. Do not advise on or issue directions relative to any aspect of the building technique or sequence unless a specific technique or sequence is called for in the Specifications or by written instructions from the Architect.
 - ff. Do not approve shop drawings or samples.
 - gg. Do not authorize or advise the Owner to occupy the Project, in whole or in part, prior to the final acceptance of the building.
 - hh. Do not issue a Certificate for Payment.

ARTICLE 3 - OWNER

3.5 OWNER'S RIGHT TO DO WORK

- 3.5.1 The Owner may exercise his right, which is hereby acknowledged by the Contractor, to let independent of the Contract for the work herein specified, any other work on the premises even if of

like character and trades, and the Owner shall not be liable for any damage, loss or expense incurred by the Contractor through the fault of any other Contractor so employed by the Owner. The Contractor acknowledges the necessity of work by others, to be performed at approximately the same time as the work hereunder, and agrees to perform his work in full cooperation with the work of such other trades and/or Contractors, partially or entirely completed, by such other trades and/or Contractors, or by the Owner, when, in the opinion of the Architect, such access or use is necessary for the performance and completion of any portion or all of the work of others or of any work on the site.

3.6 OWNER'S ACCESS AND PARTIAL OCCUPANCY

3.6.1 The Owner shall have access to the work at all times, and at his election, may from time to time (prior to the stipulated contract completion date) occupy any of the units or parts of the project as the work in connection therewith is complete to such a degree as will, in the opinion of the Owner, permit their temporary or permanent use. The Owner will, prior to any such partial occupancy, give notice to the Contractor thereof and such occupancy shall be upon the following terms:

- a. Such occupancy shall not constitute an acceptance of work not performed in accordance with the Contract nor shall such occupancy relieve the Contractor of liability to perform any work by the Contract by not complete at the time of occupancy.
- b. Except as otherwise provided by an agreement at the time of such partial occupancy, the Contractor shall be relieved of all maintenance costs on units or parts so occupied.
- c. The Contractor shall not be responsible for wear and tear or damage resulting from partial occupancy.
- d. The Owner shall assume risk of loss with respect to any unit or part so occupied.
- e. The Contractor shall, if required by the Owner, furnish heat, light, water, or other such services to the units or parts occupied and the Owner shall make proper remuneration therefore to the Contractor.

3.6.2 The Contractor agrees that the Owner shall have the right, after seven (7) days' written notice to the Contractor, to place and install as much equipment and machinery during the progress of the work as is possible before the completion of the various parts of the work; and further agrees that such placing and installation of equipment shall not in any way evidence the completion of the work or any portion thereof, nor signify the Owner's acceptance of the work or any portion thereof. Should the Owner place or install such equipment and machinery with his own forces he shall be responsible for any damage to work of the Contractor caused by the Owner's work or workmen. Should the Owner have such placement or installation performed by another Contractor, then the Owner shall require said Contractor to be responsible for all such damage caused by his work, his workers, or his subcontractors.

ARTICLE 4 - CONTRACTOR

4.4 LABOR AND MATERIALS

4.4.3 All materials shall be so delivered, stored and handled to prevent the inclusion of foreign materials and the damage of materials by water or breakage. Packaged materials shall be delivered and stored in original packages until ready for use. Packages or materials showing evidence of water or other damage shall be rejected. All materials shall be of the respective qualities specified herein.

4.4.4 The Contractor shall be responsible for the proper care and protection of all his materials, equipment, etc., delivered at the site. Building materials, equipment, etc., may be stored on the premises subject to the approval of the Architect.

4.4.5 To insure timely availability of critical materials in case of national emergency, the Contractor may order his subcontractors to proceed with fabrication of the same earlier than required by normal sequence of construction. In the event storage facilities are not available on the site or at the source of fabrication, the Owner will endeavor to provide such storage space as may be available to care for same. Where this is necessary, the Contractor shall be paid for all stored material on the

Owner's property or on the properties approved by the Owner upon approval of certified invoices. It shall be the Contractor's obligation to pay for all handling costs and damage to this material. The Contractor shall protect this property against damage.

4.6 TAXES

4.6.1 The Bidder shall include in his proposal and make payment of all Federal, State, County and Municipal taxes including Michigan State Sales and Use Taxes, now in force or which may be enacted during the progress and completion of the work covered.

4.7 PERMITS, FEES AND NOTICES

4.7.3 The Contractor shall pay highway or DPW fees for damages to sidewalks, streets, or other public property or to any public utilities.

4.7.4 Permits and licenses of a temporary nature necessary for the execution of the work shall be secured and paid for by the Contractor.

4.7.5 **Except for the General Building Permit (which is not required), the Contractor shall secure and pay for all other required permits, including the following:**

Electrical	-	State of Michigan
Plumbing	-	State of Michigan
Mechanical	-	State of Michigan
Elevator-		City of Detroit

4.7.6 The Contractor shall secure certificates of inspection and of occupancy that may be required by authorities having jurisdiction over the work. These certificates shall be delivered to the Architect upon completion of the work.

4.9 SUPERINTENDENT

4.9.2 The Contractor shall give sufficient supervision to the work, using his best skill and attention. He shall carefully study and compare all drawings, specifications, and other instructions, and shall at once report to the Architect any error, inconsistency, or omission which he may discover, but he shall not be held responsible for their existence or discovery.

4.9.3 The Contractor's superintendent shall periodically inspect the entire project to make certain that all of the stipulations of all of the articles of the General Conditions are being observed.

4.12 DRAWINGS AND SPECIFICATIONS AT THE SITE

4.12.1.1 Refer to Paragraph 4.12.1, of A.I.A. General Conditions of the Contract for Construction. Modify the last sentence of this paragraph to read:

"The Drawings, marked to record all changes made during construction, shall be incorporated in the Contractor's 'Informational Package'."

4.12.2 As a basic and interim step for the fulfillment of the "Informational Package", accurate records of all non-structural underground and concealed work shall be kept, including, but not limited to, all piping, conduit, equipment, and drainage and tunnel work. In addition, such records shall be available for review during various steps of the project.

4.13 SHOP DRAWINGS AND SAMPLES

4.13.9 Immediately before and as a condition of substantial completion, the Contractor shall provide the Owner an "Informational Package" and instructional sessions on the operation, maintenance, and service of the facility. The "Informational Package" shall include:

1. One (1) set of transparency (sepia) of the approved shop drawings and descriptive material submitted during construction. Any shop documents unobtainable in sepia shall be supplied in three (3) sets.
2. One (1) set of transparency (sepia) of constructional shop drawings with all installation revisions incorporated to reflect the as-built condition. Examples of constructional shop drawings are dimensioned conduit, piping and ductwork layout drawings.
3. Three (3) sets of instructional manuals on the installation, operation, maintenance and service of equipment and systems, including parts lists.

Examples of Specific Information Required:

1. Electrical
 - a. Conduit layout of light, power, and special systems, indicating dimensionally the locations and size of runs; circuit grouping and conductor size and number in conduit runs.
 - b. System description and elementary diagrams, connection and interconnection diagrams, and device internal diagrams.
2. Mechanical
 - a. Piping and ductwork layout indicating dimensionally the location and size of the runs.
 - b. Description and diagrams of control systems.

Following the submittal of the "Informational Package", the Contractor shall schedule and provide, at the Owner's convenience, instructional sessions for Owner's personnel to acquaint them with the operation, maintenance, and service of the system.

3. Elevators
 - a. Elementary diagrams and description of sequence of operation of the system control components, connection and interconnection diagrams, and device internal diagrams.

ARTICLE 5 - SUBCONTRACTORS

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

5.2.3 Delete Article 5.2.3 in its entirety.

5.2.4 Delete Article 5.2.4 in its entirety.

ARTICLE 7 - MISCELLANEOUS PROVISIONS (Revised 6-13-2011)

7.5 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

7.5.1 The successful Bidder will be required to furnish a Performance Bond and Labor and Material Payment bond in an amount equal to 100% of the contract award amount, and include such cost in the Proposal, complying with the laws of the State of Michigan. The graduated formula no longer applies.

- A. Performance Bond and Labor and Material Payment Bond shall be from a surety company acceptable to the Owner and made payable as follows:
- (1) A Labor and Material Payment bond for 100% of the contract award amount to the Board of Governors of Wayne State University, and guaranteeing the payment of all subcontractors and all indebtedness incurred for labor, materials, or any cause whatsoever on account of the Contractor in accordance with the laws of the State of Michigan relating to such bonds.
 - (2) A Performance bond for 100% of the contract award amount to the Board of Governors of Wayne State University to guarantee and insure the completion of work according to the Contract.
- B. **The only acceptable Performance Bond shall be the AIA A312 – 2010.**
- C. The Contractor shall include with his bid evidence of his ability to obtain a Performance Bond in the amount of 100% of the bid amount, and in accordance with the terms and conditions outlined in this section, Such evidence shall be project specific and shall be submitted on a form provided by the Surety or Agent thereof.

7.7 ROYALTIES AND PATENTS

- 7.7.1 The Contractor hereby agrees to indemnify, protect and save harmless the Architect and the Owner from and against any and all liability, loss or damage, and to reimburse the Owner and the Architect for any expenses, including legal fees and disbursements to which the Owner or the Architect may be put because of claims of litigation on account of infringement or alleged infringement of any letters patent or patent rights by reason of the work or materials, equipment, or other items used by the Contractor in its performance.

7.9 INTEREST

- 7.9.1 Delete Article 7.9 in its entirety.

ARTICLE 8 - TIME

8.1 DEFINITIONS

- 8.1.3 The Date of Substantial Completion of the Work is the Date certified by the Architect when construction of the entire work is sufficiently complete, in accordance with the Contract Documents, so the Owner may occupy the Work for the use for which it is intended. It is the beginning date for the guarantees on all the Project Work.

8.3.5 LIQUIDATED DAMAGES

It is understood that if said Contract is not completed within the time specified in the Contract plus any extension of time thereto, the Contractor shall pay Liquidated Damages to the Owner as set forth in Article 11 of the Agreement between Contractor and Owner for Construction.

ARTICLE 9 - PAYMENT AND COMPLETION

9.3 PROGRESS PAYMENTS

- 9.3.1 On or before the 20th day of each month, the Contractor shall submit to the Architect on the Owner's Standard Form, a written application for payment showing the proportionate value of the work installed to date from which shall be deducted, a reserve of 10% and all previous payments, and the balance of the amount as approved by the Architect shall be due and payable to the Contractor on or about the 15th day of the succeeding month.

- 9.3.2.2 No payments will be made because of materials or equipment stored off the site, except as provided for in Subparagraph 4.4.5 of the Supplementary General Conditions or other special cases the Owner may approve.

9.6 FAILURE OF PAYMENT

9.6.1 Delete Article 9.6 in its entirety.

ARTICLE 11 - INSURANCE (Revised 3-22-2012)

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.2 The insurance required by Subparagraph 11.1.1 shall be written for not less than any limits of liability specified herein, or required by law, whichever is greater, and shall include contractual liability insurance as applicable to the Contractor's obligations under Paragraph 4.18.

During the life of the Contract, the Contractor shall maintain the following types of insurance:

A. General Requirements

<u>Type of Insurance</u>	<u>Minimum Requirement</u>	
1.Comprehensive General Liability	Bodily Injury	\$ 500,000 each person \$1,000,000 aggregate
	Property Damage	\$ 500,000 each occurrence \$1,000,000 aggregate or \$2,000,000 combined single limit (CSL)
2.Fire Legal Liability		\$ 100,000
3.Comprehensive Automobile Liability (including Hired and non-owned vehicles)	Bodily Injury	\$ 500,000 each person \$1,000,000 each accident
	Property Damage	\$ 500,000 each accident
		or \$2,000,000 combined single limit (CSL)
4.Workers' Compensation (Employer's Liability)	Statutory - Michigan \$100,000	
5.Property - All Risk	In an amount sufficient to cover the total value of the contractor's property in the care, custody or control of WSU.	

B. Maximum Acceptable Deductibles

<u>Type of Insurance</u>	<u>Maximum Deductible</u>	
Comprehensive General Liability	\$5,000	
Fire Legal Liability		\$5,000
Comprehensive Automobile Liability	-0-	
Workers' Compensation	-0-	
Property - All Risk	\$ 500	

11.1.3 The Board of Governors, Wayne State University, shall be named as an additional insured but only with respect to accidents arising out of the performance of said contract. The contractor shall prepare a certificate of insurance which shall name the "Office of Risk Management; 5700 Cass Avenue" as the Wayne State University certificate holder.

11.1.3.1 The Contractor shall either 1) require each of his Subcontractors to procure and to maintain during the life of his subcontract, Subcontractors' Comprehensive General Liability, Automobile Liability and Property Damage Liability Insurance of the type and in the same amounts as specified in the Subparagraph, or 2) insure the activity of his subcontractors in his own policy.

11.2 OWNER'S LIABILITY INSURANCE

Delete Article 11.2 in its entirety.

11.3 PROPERTY INSURANCE

Delete Article 11.3 in its entirety and replace with the following:

- 11.3.1 The Contractor shall purchase and maintain property insurance upon the entire work at the site to the full insurable value thereof. This insurance shall include the interests of the Owner, the Contractor, Subcontractors, and sub-subcontractors in the work and shall insure against the perils of Fire, Extended Coverage, Vandalism, and Malicious Mischief.
- 11.3.2 The Owner and Contractor waive all rights against each other for damages caused by fires or other perils to the extent covered by insurance provided under Subparagraph 11.3.1. The Contractor shall require similar waivers by Subcontractors and sub-subcontractors in accordance with Clause 5.3.1.5.
- 11.3.3 Insurance must be issued by an insurance company with an "A rating as denoted in the AM Best Key Rating Guide".

ARTICLE 12 - CHANGES IN THE WORK

12.1 CHANGE ORDERS

- 12.1.8 Percentage markups in pricing under Subparagraphs 12.1.3.1, 12.1.3.3, and 1.2.4 shall be as limited in the Contract Documents. Unit price of Subparagraph 12.1.3.2 shall represent total unit cost to the Owner and shall include the Contractor's markup for overhead and profit.

ARTICLE 14 - TERMINATION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

- 14.1.1 If the work is stopped for a period of thirty days under any order of any court or other public authority having jurisdiction, or as a result of any act of government, such as a declaration of a national emergency making materials unavailable, through no act or fault of the contract or a subcontractor or their agents or employees or other persons performing any of the Work under a contract with the contractor, then the contractor may, upon seven days' written notice to the Owner and the Architect, terminate the contract and recover from the Owner payment for all Work executed and for any proven loss sustained upon any materials, equipment, tools, construction equipment, and machinery, including reasonable profit and damages.

ARTICLE 15 - ADDITIONAL CONDITIONS

15.1 SUBSTITUTION OF MATERIALS AND EQUIPMENT

- 15.1.1 Whenever a material, article, or piece of equipment is identified on the Drawings or in the Specifications by reference to manufacturers' or vendors' names, trade names, catalog numbers, or the like, it is so identified for the purpose of establishing a standard, and any material, article, or piece of equipment of other manufacturers or vendors, which will perform adequately the duties imposed by the general design will be considered equally acceptable provided the material, article, or piece of equipment so proposed is, in the opinion of the Architect, of equal substance, appearance, and function. It shall not be purchased or installed by the Contractor without the Architect's written approval.

15.2 NON-DISCRIMINATION PROVISION AND WAGE AND HOUR ACT

- 15.2.1 During the performance of this contract, the Contractor agrees as follows:

- 15.2.1.1 The Contractor shall not discriminate against any employee or applicant for employment because of sex, race, creed, color, age, or national origin. The Contractor will take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to

their sex, race, age, creed, color, or national origin.

- 15.2.1.2 Such action shall include but not be limited to, the following: employment; upgrading; demotion; or transfer; recruitment or recruitment advertising; layoff or terminations; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this non-discrimination clause.
- 15.2.1.3 The Contractor will, in all solicitations, or advertisements for employees, placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to sex, race, creed, color, age or national origin.
- 15.2.1.4 The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice advising the labor union or worker's representative of the Contractor's commitments under Section 202 of Executive Order No. 11246 of October 27, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- 15.2.1.5 The Contractor will comply with all provisions of the Executive Order No. 11246 of October 27, 1965, and of the rules, regulations and relevant orders of the Secretary of Labor or other government agency or authority having jurisdiction.
- 15.2.1.6 The Contractor will furnish all information and reports required by Executive Order No. 11246 of October 27, 1965, and by the rules, regulations, and orders of the Secretary of Labor or other government agency or authority having jurisdiction, and will permit access to his books, records, and accounts by the administrative agency and the Secretary of Labor for the purposes of investigation to ascertain compliance with such rules, regulations and orders.
- 15.2.1.7 In the event of the Contractor's noncompliance with the non-discrimination clauses of this contract, or with any of the said rules, regulations, or orders, this Contract may be canceled, terminated or suspended in whole or in part, and the Contractor may be declared ineligible for further University contracts or federally-assisted contracts in accordance with procedure authorized in Executive Order No. 11246 of October 27, 1965, or by rule, regulation, or order of the Secretary of Labor or other government agency or authority having jurisdiction.
- 15.2.1.8 The Contractor will include in the provisions of Subparagraph 15.2.1.1 through 15.2.1.8 in every subcontract or purchase order unless exempted by rules, regulations or orders of the President's Committee on Equal Employment Opportunity issued pursuant to Section 204 of Executive Order No. 11246 of September 14, 1965, so that provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event the Contractor becomes involved as a result of such direction by the administering agency, the Contractor may request the United States to enter into such litigation to protect the interest of the United States.
- 15.3 COMPLIANCE WITH COPELAND ANTI-KICKBACK ACT AND REGULATIONS
- 15.3.1 The Contractor shall comply with the Copeland Anti-Kickback Act and Regulations of the Secretary of Labor (29CFR, Part 3) which are herein incorporated by reference.
- 15.4 PREVAILING WAGES
- 15.4.1 Contractors and subcontractors shall pay all mechanics and laborers, including apprentices and trainees, no less than the wage and fringe benefit rates prevailing in the locality in which the work is performed. Wage and fringe benefit rates are determined by the Federal Government Department of Labor.
- 15.4.2 Classifications not provided in the schedule shall be determined prior to the award of the contract and shall be no less than the wage and fringe benefit rates determined by the Federal Department of Labor.

- 15.4.3 Contractors and subcontractors shall adhere to the ratios of apprentices to journey workers as determined by the Federal Department of Labor.
- 15.4.4 Contractors and subcontractors shall keep a copy of the prescribed wage and benefit rates posted at the construction site in a conspicuous place.
- 15.4.5 Contractors and subcontractors shall keep an accurate record of the name, occupation, and the actual benefits paid to each mechanic or laborer for the contract. This record shall be made available for reasonable inspection by the Federal Department of Labor and the Owner.

DRAWINGS

The Technical Specifications dated **June 7, 2013**, and the following List of Drawings represent the scope of work as defined in the Contract Documents from Article 4.

DRAWINGS

Drawing No.	Description
E0.1	ELECTRICAL STANDARDS AND DRAWING INDEX
E0.2	ELECTRICAL STANDARD SCHEDULES AND DETAILS
E3.0	ELECTRICAL COMPOSITE PLAN
E3.1	FIRST FLOOR POWER PLAN
E3.2	ELECTRICAL ROOF PLAN
E5.1	ONE LINE DIAGRAM

GENERAL REQUIREMENTS**GENERAL****A. CONTRACTOR'S RESPONSIBILITY**

It is not the responsibility of the Architect/Engineer or Owner's Representative to notify the Contractor or subcontractors when to commence, to cease, or to resume work; nor in any way to superintend so as to relieve the Contractor of responsibility or of any consequences of neglect or carelessness by him or his subordinates. All material and labor shall be furnished at times best suited for all Contractors and subcontractors concerned, so that the combined work of all shall be properly and fully completed on the date fixed by the Contract.

The Contractor shall be responsible for all items contained in both the specifications and on the drawings for all trades. He shall be responsible for the proper division of labor according to current labor union agreements regardless of the division of responsibility implied in the contract documents.

B. CODES AND STANDARDS

Reference to standard specifications for workmanship, apparatus, equipment and materials shall conform to the requirements of latest specifications of the organization referenced, i.e., American Society for Testing Materials (ASTM), Underwriters Laboratories, Inc. (UL), American National Standards Institute, Inc. (ANSI), and others so listed in the Technical Specifications.

C. PERMITS, FEES AND NOTICES

See Supplementary General Conditions.

D. MEASUREMENTS

Before proceeding with each Work Item, Contractor shall locate, mark and measure any quantity or each item and report quantities to Engineer. If measured quantities exceed Engineer's estimate, Contractor shall obtain written authorization to proceed from Owner before executing Work required for that Work Item.

Measurement of quantities for individual Work Items will be performed by Contractor and reviewed by Engineer. Coordinate measurements with inspection as required in Section "Coordination."

Cost of Work included in Work Item for quantities as indicated in Contract Documents shall be included in Base Bid.

1. Additions to or deductions from lump sum price for quantities of each Work Item added to or deducted from Work respectively shall be at unit prices indicated in Bid Form and shall constitute payment or deductions in full for all material, equipment, labor, supervision and incidentals necessary to complete Work.

E. CONTRACTOR'S MEASUREMENTS

Before ordering material, preparing Shop Drawings, or doing any work, each Contractor shall verify, at the building, all dimensions which may affect his work. He assumes full responsibility for the accuracy of his figures. No allowance for additional compensation will be considered for minor discrepancies between dimensions on the drawings and actual field dimensions.

F. CONTINUITY OF SERVICE (*Revised 3-26-2012*)

Continuity of all existing services in the building shall be maintained throughout the construction period. Where it is necessary to tie into the existing electrical service, water or waste systems, it shall be done as directed by the Architect/Engineer. This Contract shall also provide temporary lines or bypasses that may be required to maintain continuous service in the building. All utility shutdowns must be approved by the Owners Representative / Project Manager, not less than **7 business days** prior to the event, so that proper notification can be posted.

G. SUBMITTALS

All submittals (except Shop Drawings) and samples required by the Specifications shall be submitted in triplicate unless otherwise specified for a particular item under an individual Specification Section.

Each sample shall be clearly identified on a tag attached, showing the name of the Project Consultant, the project number and title, the names of the Contractor, manufacturer (and supplier if same is not the manufacturer), the brand name or number identification, pattern, color, or finish designation and the location in the work.

Each submittal shall be covered by a transmittal letter, properly identified with the project title and number and a brief description of the item being submitted.

Contractor shall be responsible for all costs of packing, shipping and incidental expenses connected with delivery of the samples to the Project Consultant or other designated address.

If the initial sample is not approved, prepare and submit additional sets until approval is obtained.

Materials supplied or installed which do not conform to the appearance, quality, profile, texture or other determinant of the approval samples will be rejected, and shall be replaced with satisfactory materials at the Contractor's expense.

H. GENERAL/STANDARD ELECTRONIC EQUIPMENT AND INFRASTRUCTURE REQUIREMENTS (*Revised 11-2008*)**1. Compliance with WSU Standards for Communications Infrastructure**

- A. All applicable work, products, materials and methods shall comply with the latest version of the "WSU Standards for Communications Infrastructure" except as where noted.
- B. This document is available at the following website/URL: **<http://networks.wayne.edu/WSU-Communications-Standards.pdf>**

2. Automation System Program Code

- A. All automation system uncompiled and compiled program codes, source codes, custom modules, graphical user interface screen shots and any other automation system programming data and material (Program Code) shall be provided to the UNIVERSITY in hard copy and on CD Rom in an unencrypted format acceptable to the UNIVERSITY.
- B. Copyright for the Program Code shall be assigned to the UNIVERSITY for purposes of system maintenance.

PROTECTION OF OCCUPANCY (*Revised 3-2006*)**A. FIRE PRECAUTIONS**

Take necessary actions to eliminate possible fire hazards and to prevent damage to construction work, building materials, equipment, temporary field offices, storage sheds, and other property.

During the construction, provide the type and quantity of fire extinguishers and fire hose to meet safety and fire prevention practices by National Fire Protection Association (NFPA) Codes and Standards (available at <http://www.nfpa.org/>)

In the event that construction includes "hot work", the contractor shall provide the Owner's Representative with a copy of their hot work policy, procedures, or permit program. No hot work activity (temporary maintenance, renovation, or construction by operation of a gas or electrically powered equipment which produces flames, sparks or heat that is sufficient to start a fire or ignite combustible materials) shall be performed until such documents are provided. During such operations, all highly combustible or flammable materials shall be removed from the immediate working area, and if removal is impossible, same shall be protected with flame retardant shield.

Not more than one-half day's supply of flammable liquids such as gasoline, spray paint and paint solvent shall be brought into the building at any one time. Flammable liquids having a flash point of 100 degrees F. or below which must be brought into the building shall be confined in an Underwriters Laboratories (UL) labeled safety cans. The bulk supply of flammables shall be stored at least 75 feet from the building and other combustible materials. Spigots on drums containing flammable liquids are prohibited on the project site. Drums shall be equipped with approved vented pumps, and be grounded and bonded.

Only a reasonable working supply of combustible building materials shall be located inside the building.

All oil-soaked rags, papers, and other similar combustible materials shall be removed from the building at the close of each day's work, or more often if necessary, and placed in metal containers, with self-closing lids.

Materials and equipment stored in cardboard cartons, wood crates or other combustible containers shall be stored in an orderly manner and accessibly located, fire-fighting equipment of approved types shall be placed in the immediate vicinity of any materials or equipment stored in this type of crate or carton.

No gasoline, benzene, or like flammable materials shall be poured into sewers, manholes, or traps.

All rubbish shall be removed from the site and legally disposed of. Burning of rubbish, waste materials or trash on the site shall not be permitted.

The contractor shall be responsible for the conduct of employees relative to smoking and all smoking shall be in the area designated by the Architect/Engineer.

B. GENERAL SAFETY AND BUILDING PRECAUTIONS

Provide and maintain in good repair barricades, railings, etc., as required by law for the protection of the Public. All exposed material shall be smoothly dressed.

At dangerous points throughout the work environment provide and maintain colored lights or flags in addition to above guardrails.

Isolate Owner's occupied areas from areas where demolition and alteration work will be done, with temporary, dustproof, weatherproof, and fireproof enclosures as conditions may require and as directed by the Architect/Engineer.

Cover and protect furniture, equipment and fixtures to remain from soiling, dust, dirt, or damage when demolition work is performed in rooms or areas from which such items have not been removed.

Protect openings made in the existing roofs, floors, and other construction with weatherproof coverings, barricades, and temporary fire rated partitions to prevent accidents.

Repair any damage done to existing work caused by the construction and removal of temporary partitions, coverings, and barricades.

The Contractor will be held responsible for all breakage or other damage to glass up to the time the work is completed.

Provide protection for existing buildings, interior and exterior, finishes, walls, drives, landscaping, lawns (see below), etc. All damages shall be restored to match existing conditions to the satisfaction of the Architect/Engineer.

The Contractor and Owner will define the anticipated area of lawn damage at the project Pre-Construction Meeting. Whether the lawn is sparse or fully developed, any lawn damaged due to the Contractor's work will be replaced with sod by the University. The University's unit cost of \$10.00 per square yard and landscaping at a rate of 1.5 times the cost of the sod repairs, the full cost of which will be assessed against the Contractor. At the completion of the project, a deductive Change Order reflecting this cost will be issued.

The Contractor is to include an allowance in his bid for this corrective work.

C. INTERFERENCE WITH OWNER'S OPERATIONS

The Owner will be utilizing the Building Facilities to carry on his normal business operation during construction. The Contractor shall schedule performance of the work necessary to complete the project in such a way as to interfere as little as possible with the operation during construction. The Contractor shall schedule performance of the work necessary to complete the project in such a way as to interfere as little as possible with the operation of the Owner.

Work which will interfere with the Owner's occupancy, including interruptions to the Owner's mechanical and electrical services, and essentially noisy operations (such as jackhammering) shall be scheduled in advance. The schedule of alterations shall be approved by the Architect/Engineer and the work shall be done in accordance with the approved schedule.

It is understood that the work is to be carried through to completion with the utmost speed consistent with good workmanship and to meet the construction schedule.

The Contractor shall begin work under the Contract without delay upon receipt of the fully-executed contract and shall substantially complete the project ready for unobstructed occupancy and use of the Owner for the purposes intended within the completion time stated in the contract.

The Contractor shall, immediately upon award of contract, schedule his work and expedite deliveries of materials and performance of subcontractors to maintain the necessary pace to meet the construction schedule.

CONTRACTOR'S REPRESENTATION AND COORDINATION**A. FIELD SUPERINTENDENT**

Contractor shall assign a full time project manager/superintendent for the duration of the project. This person shall be experienced and qualified in all phases of the work and shall be present at the site during Contractor's working hours. The project manager shall have Contractor's full authority to represent Contractor in all routine operations including payment, changes to the work, and scheduling. Contractor shall not re-assign this individual without prior written permission of the Owner.

B. MEETINGS

When directed by the Architect/Engineer, meetings shall be held for the purpose of coordinating and expediting the work. The invited contractors or subcontractors will be required to have qualified representatives at these meetings, empowered to act in their behalf.

C. COORDINATION

The Contractor shall also provide a staff adequate to coordinate and expedite the work properly and shall at all times maintain competent supervision of its own work and that of its subcontractors to insure compliance with contract requirements.

The Contractor shall be solely responsible for all construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the work under the Contractor.

D. CONSTRUCTION SCHEDULE

The Construction Schedule shall be prepared after the award of contract. Soon after, a pre-construction meeting is held with the Owner and the Architect/Engineer to determine the areas to which the Contractor will be allowed access at any one time.

The Contractor is alerted to the fact that areas in which he will be working will be occupied by students and employees of the University as well as the general public. The Contractor's access, to and from the project site, will be confined to limited areas so as not to unduly disrupt the normal activities of the University.

TEMPORARY FACILITIES

A. GENERAL

The following temporary facilities descriptions represent standard conditions. Verify accuracy with Architect/Engineer at time of bids.

B. CONTRACTOR'S OFFICE

Provide field offices as required. Locate temporary field offices on site where directed by Architect/Engineer.

Appearance and location of field offices shall be approved by the Architect/Engineer.

Provide for all other administrative facilities and storage off the Owner's property.

C. STORAGE OF MATERIALS

All materials shall be stored in areas designated by the Architect/Engineer. All stored materials shall be arranged for the minimum disruption to occupants and to allow full access to and throughout the building. Materials stored outdoors shall be neat and orderly and covered to prevent damage or vandalism.

D. PARKING**1. GENERAL**

University parking regulations will be strictly enforced.

Maintain Owner's parking areas free of dirt and debris resulting from operations under the contract.

2. STANDING AND UNLOADING/LOADING VEHICLES

All Contractors are to call Wayne State University Public Safety at 577-2222, and give at least 24 hours advance notice that they have vehicles that must be at the job site.

Vehicles will be permitted at the project site only as long as the vehicles are needed for loading/unloading, and must be immediately moved upon completion.

All unauthorized and/or unattended standing vehicles will be subject to ticketing and removal by University Police. Towed vehicles may be reclaimed by calling 577-2222, and paying any assessed charges.

3. COMPLIMENTARY PARKING

There is no complimentary parking for Contractor's employee vehicles.

4. WAYNE STATE UNIVERSITY PUBLIC/STUDENT PARKING AREAS

Public Parking, on a first-come first-served basis is available. Contact the office of the One Card System, at 313.577.9513 for information on availability of parking on a contractual basis.

E. TOILET FACILITIES

The Owner's designated existing toilet facilities may be used by workers on the project. Contractor shall maintain such facilities in a neat and sanitary condition.

F. TELEPHONE USE

If required, the Contractor shall provide and pay for a temporary telephone within the building for his use and that of his subcontractors.

No use of the Owner's telephone (except pay telephones) will be permitted.

G. ACCESS DEVICES

The Contractor shall furnish and maintain temporary hoists, ladders, railings, scaffolds, runways, and the like as required for safe, normal access to the permanent construction until the permanent facilities are complete. Each trade shall furnish such additional means of access as may be required for the progress and completion of the work. Such temporary access devices shall meet all applicable local, state, and federal codes and regulations.

H. HEAT AND VENTILATION

Provide cold weather protection and temporary heat and ventilation as required during construction to protect the work from freezing and frost damage.

Provide adequate ventilation as required to maintain reasonable interior building air conditions and temperatures, to prevent accumulation of excess moisture, and to remove construction fumes.

Tarpaulins and other materials used for temporary enclosures. Coverings and protection shall be flameproofed.

I. WATER SERVICE

Sources of water are available at the site. The Owner will pay for reasonable amounts of water used for construction purposes.

The Contractor shall provide, at the earliest possible date, temporary connections to the water supply sources and maintain adequate distribution for all construction requirements. The Contractor shall protect sources against damage.

Methods of conveying this water shall be approved by the Architect/Engineer and shall not interfere with the Owner's operations.

J. ELECTRICAL SERVICES

All charges for reasonable amounts of electrical power energy used for temporary lighting and power required for this work will be paid by the Owner.

The Contractor shall provide and maintain any temporary electrical lighting and power required for this work. At the completion of the work, all such temporary electrical facilities shall be removed and disposed of by the Contractor.

Temporary lighting and power shall comply with the regulations and requirements of the National Electrical Code

INSPECTIONS AND TESTS

The Architect/Engineer shall at all times have access to the work wherever it is in preparation or in progress and the Contractor shall provide proper facilities for such access and for observation.

No failure of the Architect/Engineer, during the progress of the work, to discover or reject materials or work not in accordance with the Contract Specifications and Drawings shall be deemed an acceptance thereof nor a waiver of defects therein. Likewise, no acceptance or waiver shall be inferred or implied due to payments made to contractor or by partial or entire occupancy of the work, or installation of materials that are not strictly in accordance with the Contract Specifications and Drawings.

Where tests are specifically called for in the Specifications, the Owner shall pay all costs of such tests and engineering services unless otherwise stated in the contract.

Where tests are not specifically called for in the Specifications, but are required by the Architect/Engineer or Consultant, the Owner shall pay all costs of such tests and engineering services unless the tests reveal that the workmanship or materials used by the Contractor are not in conformity with the Drawings, Specifications, and/or approved shop drawings. In such event, the Contractor shall pay for the tests, shall remove all work and materials so failing to conform and replace with work and materials that are in full conformity.

CLEAN-UP

The Contractor shall at all times keep the Owner's premises and the adjoining premises, driveways and streets clean of rubbish caused by the Contractor's operations and at the completion of the work shall remove all the rubbish, all of his tools, equipment, temporary work and surplus materials, from and about the premises, and shall leave the work clean and ready for use. If the contractor does not attend to such cleaning immediately upon request, the Architect/Engineer may cause such cleaning to be done by others and charge the cost of same to the Contractor.

The Contractor will be responsible for all damage from fire that originates in, or is propagated by, accumulations of rubbish or debris.

All rubbish and debris shall be disposed of off the Owner's property in an approved sanitary landfill site. No open burning of debris or rubbish will be permitted. Job site shall be left neat and clean at the completion of each day's operation.

PROJECT CLOSE-OUT

A. RECORD DRAWINGS

At beginning of job, provide one copy of Working Drawings, and record changes, between Working Drawings and "As Builts", including changes made by Addenda, Change Orders, Shop Drawings, etc. These shall be kept up to date. Update to indicate make of all mechanical and electrical equipment and fixtures installed. Keep these Record Prints in good condition and available for inspection by the Architect/Engineer.

Upon completion of the job, turn over to the Architect/Engineer Record Prints of Working Drawings showing all job changes.

B. OPERATING AND MAINTENANCE DATA

Prepare and furnish to the Architect/Engineer three (3) bound copies of "Operating and Maintenance Manual" on all equipment installed under this Contract.

Manual shall include copies of all Manufacturers' "Operating and Service Instructions", including Parts List, Control Diagrams, Description of Control Systems, Operating, Electrical Wiring, and any other information needed to understand, operate and maintain the equipment. The names and addresses of all subcontractors shall be included. These instructions shall be custom-prepared for this job -- catalog cuts will **not** be accepted. Equipment shall be cross-referenced to Section of Specifications and to location shown and scheduled on drawings.

Include Test-Adjust-Balance Report in the Manual.

C. FINAL INSPECTION

Secure final inspections from the State of Michigan as soon as the work is completed and immediately submit such Certificates to the Architect/Engineer.

D. GUARANTEES (See Sections 00510 and 01781)

Guarantees on material and labor from the General Contractor and his subcontractors shall be as required in Sections 00510 and 01781.

E. SWORN STATEMENT AND WAIVER OF LIENS *(revised 4-11-2012)*

Prior to final payment, the General Contractor shall provide a Contractor's Sworn Statement and Full Unconditional Waivers of Liens from all subcontractors for material and labor and from all suppliers who provide materials exceeding \$1,000. Sworn Statements and Signed waivers from all Subcontractors must accompany Pay Applications or they will be returned for such documentation prior to approval.

ASBESTOS HAZARD

- A. The contractor shall not start any work in any area that has not been inspected for asbestos by the Owner's Industrial Hygiene Department, or a qualified representative of the Owner, and approval is given for work to be done. If asbestos is found, safety measures as recommended by the Owner's Industrial Hygiene Department, or a qualified representative of the Owner, shall be completed, or approval given for work to be done before work is started. The contractor shall not perform any asbestos removal or containment work under the contract.

KEYS

- A. The Owner shall provide the contractor keys on loan to have access to the various spaces in order to complete the contract. Contractor will sign for and be responsible for each key on loan, returnable to Owner upon completion of the contract. In case of any lost keys, the Owner will backcharge the contract \$250.00 for each core change. In the event that a Contractor wants access to a secured area, he shall give the Owner a minimum 48-hour notice.

SUMMARY OF WORK

SUMMARY OF WORK

PROJECT: University Tower Lightning Protection

WSU PROJECT NO. 507-216501

PROJECT MANAGER: Thomas J. Edwards

1. EXAMINATION

The Contractor shall visit the site and become familiar with conditions under which he will be working. Also meet with the project manager and review site access, storage areas, etc.

- 2. Description of Work** – Project includes providing and installing a complete lightning protection, grounding, surge protection, and integrate into the existing building service at University Tower (Residence Hall) and the University's Radio Station, WDET - FM. Limited demolition and architectural work to support the additional grounding and equipment.. The building is located at:

Wayne State University
University Tower, 4500 Cass Avenue
Detroit, Michigan 48202

WAYNE STATE UNIVERSITY TOWER LIGHTING PROTECTION



**Specification Manual
Issued For Bids
WSU Project No. 507-216501**

June 7, 2013

PBA Project No. 2013.0097.00



Division	Section Title
DIVISION 01 - GENERAL REQUIREMENTS	
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011010	SUMMARY OF WORK
011019	CONTRACT CONSIDERATIONS
011039	COORDINATION AND MEETINGS
011300	SUBMITTALS
011400	PROTECTION, CLEAN UP
011630	PRODUCT SUBSTITUTIONS
011650	STARTING OF SYSTEMS
011700	CONTRACT CLOSEOUT

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary General Conditions and Division-1 Specification sections, apply to work of this section.
- B. These specifications are of abbreviated short form, or streamlined type, and include incomplete sentences. Omissions of words or phrases such as "the contractor shall," "in conformity therewith," "shall be," "shall furnish (and/or install)," "as noted on the drawings," "according to the plans," "a," "an," "the," "is," "are," and "all" are intentional. Omitted words and phrases shall be supplied by inference in the same manner as they are when a note occurs on the drawings.
- C. The words "shall," or "shall be" shall be supplied by inference where a colon (:) is used within a sentence. In general, phrases and clauses which follow a semi-colon (;) within a sentence shall refer to the subject of the preceding colon within the sentence.
- D. Titles to divisions, sections of these specifications are introduced merely for convenience and are not necessarily correct segregation of labor or materials. Such separations shall not operate to make Engineer an arbiter to establish limits between contractor and subcontractors.
- E. Contractor: clarify, allocate furnishing of materials, performance of work to various trades in accordance with local customs, jurisdictional awards, regulations, decisions insofar as they are applicable.

1.2 MANUFACTURERS SPECIFICATIONS

- A. Latest edition of manufacturers recommendations, instructions, specifications for products, materials employed in work apply, unless specified otherwise herein.

1.3 STANDARDS, REFERENCES

- A. Latest editions of specifications, instructions, recommendations of following organizations govern where applicable to work specified herein:
 - 1. AAMA - Architectural Aluminum Mfrs. Associations
 - 2. ACI - American Concrete Institute
 - 3. AGA - American Gas Association
 - 4. AIA - American Institute of Architects

5. AISC - American Institute of Steel Construction
6. AISI - American Iron and Steel Institute
7. AITC - American Institute of Timber Construction
8. AMA - Acoustical Manufacturers Association
9. APA - American Plywood Association
10. ASA - American Standards Association
11. ASHRAE - American Society of Heating, Refrigerating & Air Conditioning Engineers
12. ASTM - American Society for Testing Materials
13. AWS - American Welding Society
14. BRI - Building Research Institute
15. CRSI - Concrete Reinforcing Steel Institute
16. CSI - Construction Specifications Institute
17. DFPA - Douglas Fir Plywood Association (Now APA)
18. FPL - Forest Products Laboratory
19. FS - Federal Specification
20. NAAMM - National Association of Architectural Metal Mfrs.
21. NBHA - National Builders Hardware Association
22. NBS - National Bureau of Standards
23. NCMA - National Concrete Masonry Association
24. NEC - National Electrical Code
25. NFPA - National Fire Protection Association
26. NHLA - National Hardwood Lumber Association
27. NLMA - National Lumber Manufacturers Association
28. NPVLA - National Paint Varnish & Lacquer Association
29. PCA - Portland Cement Association
30. PDCA - Painting & Decorating Contractors of America
31. RMA - Rubber & Plastic Adhesive & Sealant Mfrs. Council
32. SDI - Steel Door Institute
33. SMACNA - Sheet Metal & Air Cond. Contractors Nat'l. Assoc.
34. SPR - Simplified Practice Recommendation
35. UL - Underwriters Laboratory
36. USDC - U. S. Department of Commerce
37. WRI - Wire Reinforcement Institute

1.4 COOPERATION AND CO-RESPONSIBILITY

- A. Each Subcontractor: cooperate with General Contractor and/or subcontractor for other trades in performance of their work and with men employed by Owner for purposes of installing equipment, furnishings, and like.
- B. When material furnished by one Subcontractor, to be set by another, arrange mutually for time and place of its delivery. Subcontractor for setting: responsible for condition of material, after its acceptance, and replace without charge any such items lost, stolen, or damaged before completion of his work even though installed.
- C. Each Subcontractor: make reasonable provision for protection of work; if damage occurs, restoration done only by installing subcontractor with costs borne by party causing damage.

1.5 CONTRACT LIMITS, OPERATIONAL REQUIREMENTS

- A. Work at project: confined to areas within contract limits as indicated, unless otherwise defined.
- B. Construction operations, delivery, storage of materials, movements of equipment: governed by applicable local building codes, by-laws, traffic regulations, safety, fire regulations of the municipality and Owner's requirements.

1.6 JOB SAFETY

- A. Maintain proper standards of safety in accordance with federal, state, local rules, regulations for the construction industry.

1.7 PROTECTION OF WORK, PROPERTY

- A. Contractor: Provide against damage from elements, undermining or displacement due to conditions of the site, methods of construction.
- B. Work: carried on in manner which will cause as little inconvenience as possible to Owner in his use of property, existing facilities, structures. Contractor: provide, maintain adequate protective coverings, barricades about work which might be injured during construction; keep same in repair throughout entire work; responsible for injury, damage resulting from his operations.
- C. Protect existing sidewalks, pavements, curbs, lawns, adjacent property during construction. Restore to conditions existing prior to construction, any damaged parts, areas.
- D. No explosives will be permitted on the Owner's premises.
- E. No smoking will be allowed on the Owner's premises.
- F. Conform with NFPA 101 (1991) and Interim Life Safety Measures.

1.8 PARKING

- A. Contractor will be responsible for payment of WSU parking fee. Refer to WSU Front End Specifications.

1.9 VANDALISM

- A. Contractor: pay for, satisfactorily repair all damage done to site, equipment, and/or stored material of work under his contract due to acts of vandalism during construction and until final acceptance by Owner. See General Conditions for reimbursement.
- B. Contractor may elect to hire a watchman and/or secure additional insurance coverage at his own expense. This option is not a demand to contract.

1.10 RETAINED PERCENTAGE

- A. There shall be retained ten (10) percent of the estimated amounts until the final completion and acceptance of all work covered by the Contract.
- B. The balance of the retained percentage shall be paid thirty (30) days after Owner's acceptance of project, provided that all requirements of the Contract are met.

1.11 GUARANTEE

- A. Contractors: furnish, unless otherwise indicated in trade sections, written one year guarantee on form included under the Contract Conditions in accordance with the terms of the General Conditions and Supplementary General Conditions.

1.12 JOB RECORDS, AS-BUILT DRAWINGS

- A. Contractor: keep available in field office accurate, up to date record of actual construction, whether or not covered by official revisions, drawings, specifications.
- B. On completion of project, Contractor: furnish marked-up set of copies of contract drawings showing changes, variations from contract documents, accurately dimensioned with sizes, depths, elevations properly noted.

1.13 CRITICAL PHASING AND CRITICAL STAGES OF CONSTRUCTION

- A. Due to the necessity for certain areas and services to remain in operation up to a certain date or through the life of the project, critical phasing and critical stages of construction have been established herein for the project. It is extremely important that the "Critical Phasing and Critical Stages of Construction" requirements be understood and complied with. The Contractor shall coordinate detailed critical phasing and construction sequencing and scheduling with the Owner. The Contractor shall expedite the submittal of shop drawings, ordering and delivering of materials and equipment, etc., to meet these critical phasing and staging requirements and the established completion date for the project.
- B. The requirements set forth by the "Time of Completion" section of the Proposal Form shall be strictly adhered to.
- C. Include proposed sequencing and phasing of work and shutdowns in the "Schedule of Operations" which is required.
- D. Submit a separate detailed schedule to the Owner and the Engineer prior to initiating critical phasing work. Include information such as: dates, times, shutdowns, interruptions, duration of same, connections, etc.
- E. All costs for the critical phasing work shall be included in the Bid Proposal, including cost for any necessary overtime work.
- F. Submit shop drawings immediately on equipment items required for the critical stages of construction.
- G. Coordinate new work and modifications to existing work to hold the number of shutdowns to a minimum. Schedule all shutdowns in advance with the Owner's Representative.
- H. Schedule and plan delivery, storage and erection of materials to avoid disruption of Owner's operations. Coordinate unavoidable disruptions with the Owner's Representative.
- I. Perform work so as to maintain access to emergency exits at all times.

END OF SECTION 01000

SECTION 011010 - SUMMARY OF WORK

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary General Conditions and other Division-1 Specification Sections, apply to work of this Section.

1.2 PROJECT DESCRIPTION

- A. The Work includes, but is not limited to:

1.3 CONTRACTOR USE OF PREMISES

- A. General: Limit use of the premises to construction activities in areas indicated; allow for Owner occupancy and use by the public. Take care not to contaminate indoor air systems with smoke, fumes, or exhaust from construction activities.
- B. Confine operations to areas within Contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.
- C. Keep driveways and entrances serving the premises clear and available to the Owner and the Owner's employees at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.

1.4 OWNER OCCUPANCY

- A. Full Owner Occupancy: The Owner will occupy the site and existing building during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with the Owner's operations.
- B. The Time of Completion requirements set forth in the Form of Proposal shall be complied with by the Contractor with regards to shutdown of the Owner's operation.

END OF SECTION 011010

SECTION 011019 - CONTRACT CONSIDERATIONS

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary General Conditions and other Division-1 Specification Sections, apply to work of this Section.

1.2 SECTION INCLUDES

- A. Schedule of Values.
- B. Application for Payment.
- C. Change Procedures.

1.3 RELATED SECTIONS

- A. Section 01300 - Submittals: Schedule of Values.
- B. Section 01600 - Material and Equipment: Product substitutions.

1.4 SCHEDULE OF VALUES

- A. Submit typed schedule on AIA Form G703 - Application and Certificate for Payment Continuation Sheet. Contractor's standard form or electronic media printout will be considered.
- B. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.
- C. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the major specification Section. Identify site mobilization, bonds and insurance, breakdown by major category of work, or as directed by Engineer.
- D. Revise schedule to list approved Change Orders, with each Application For Payment.

1.5 APPLICATIONS FOR PAYMENT

- A. Submit three copies of each application on AIA Form G702 - Application and Certificate for Payment.
- B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.
- C. Payment Period: Refer to Agreement.

- D. Waivers of LIEN shall accompany each application for payment.

1.6 CHANGE PROCEDURES

- A. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time as authorized by AIA A201, 1987 Edition, Article 7.4 by issuing supplemental instructions.
- B. The Engineer may issue a Notice of Change, which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications. Contractor will prepare and submit an estimate within ten (10) days.
- C. Execution of Change Orders: Engineer will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

END OF SECTION 01019

SECTION 011039 - COORDINATION AND MEETINGS

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary General Conditions and other Division-1 Specification Sections, apply to work of this Section.

1.2 SECTION INCLUDES

- A. Coordination.
- B. Alteration project procedures.
- C. Cutting and patching.
- D. Preconstruction conference.
- E. Progress meetings.

1.3 COORDINATION

- A. Coordinate scheduling submittals, and Work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements.
- B. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements and installation of mechanical and electrical work, which are indicated diagrammatically on Drawings. Follow routing shown for conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, conceal conduit and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean up of Work of separate Sections in preparation for Substantial Completion and for portions of Work designated for Owners occupancy.
- F. Coordinate work to minimize disruption of Owner's activities.

1.4 ALTERATION PROJECT PROCEDURES

- A. Materials: As specified in product Sections; match existing products and work for patching and extending work, unless specified or indicated otherwise.
- B. Remove, cut, and patch work in a manner to minimize damage and to provide a means of restoring products and finishes to original condition.
- C. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.
- D. Where new work abuts or aligns with existing, perform a smooth and even transition. Patched work to match existing adjacent work in texture and appearance.
- E. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Engineer.
- F. Finish surfaces as specified in individual product Sections.

1.5 CUTTING AND PATCHING

- A. Employ skilled and experienced installer to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements which affects:
 - 1. Structural integrity of element.
 - 2. Integrity of weather exposed or moisture-resistant elements.
 - 3. Efficiency, maintenance, or safety of element.
 - 4. Visual qualities of sight-exposed elements.
- C. Execute cutting, fitting, and patching, including excavation and fill, to complete Work, and to:
 - 1. Fit the several parts together, to integrate with other Work.
 - 2. Uncover Work to install or correct ill-timed Work.
 - 3. Remove and replace defective and non-conforming Work.
 - 4. Remove samples of installed Work for testing.
 - 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute work by methods, which will avoid damage to other Work, and provide proper surfaces to receive patching and finishing.
- E. Cut rigid materials using masonry saw or core drill.
- F. Restore Work with new products in accordance with requirements of Contract Documents.
- G. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- H. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
- I. Identify any hazardous substance or condition exposed during the Work to the Engineer for decision or remedy.

1.6 PRECONSTRUCTION CONFERENCE

- A. Owner will schedule a conference after Notice of Award.

B. Attendance Required: Owner, Engineer and Contractor.

C. Agenda:

1. Submission of executed bonds and insurance certificates.
2. Distribution of Contract Documents.
3. Submission of list of Subcontractors, list of products, Schedule of Values, and progress schedule.
4. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.
5. Use of premises by Owner and Contractor.
6. Owner's requirements and occupancy.
7. Construction facilities and controls provided by Owner.
8. Temporary utilities provided by Owner.
9. Security and housekeeping procedures.
10. Schedules.
11. Downtime of systems.
12. Requirements for start-up of equipment.
13. Record documents.
14. Permits.
15. Owner training.

1.7 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at monthly intervals and prior to critical phases.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies within two days to Engineer, Owner, participants, and those affected by decisions made.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Engineer, as appropriate to agenda topics for each meeting.

1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems which impede planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work.

END OF SECTION 01039

SECTION 011300 – SUBMITTALS

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary General Conditions and other Division-1 Specification Sections, apply to work of this Section.

1.2 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Engineer accepted form.
- B. Identify Project, Contractor or supplier; pertinent Drawing sheet and detail number(s), and Specification Section number, as appropriate.
- C. Apply Contractor's stamp, signed or initialed certifying that review, 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.
- D. Schedule submittals to expedite the Project, and deliver to Engineer at business address. Coordinate submission of related items.
- E. Identify variations from Contract Documents and Product or system limitations, which may be detrimental to successful performance of the completed Work.
- F. Provide space for Contractor and Engineer review stamps. Allow ten (10) working days for review by the Engineer.
- G. Revise and resubmit submittals as required, identify all changes made since previous submittal.
- H. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.3 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit initial progress schedule in duplicate within ten (10) days after date Notice to Proceed for Engineer review.
- B. Revise and resubmit as required.
- C. Submit revised schedules with each Application for Payment, identifying changes since previous version.

- D. Submit a computer generated or horizontal bar chart with separate line for each major section of work or operation, identifying first work day of each week.
- E. Indicate estimated percentage of completion for each item of Work at each submission.
- F. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates.

1.4 PROPOSED PRODUCTS LIST

- A. Within ten (10) days after date of Notice to Proceed, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.5 SHOP DRAWINGS

- A. Submit in the form of one (1) reproducible transparency and three (3) copies. After review, the Engineer will retain all three (3) copies of the shop drawings, and will return the reviewed and noted transparency to the Contractor. Any required re-submittal shall follow the same procedure.

1.6 PRODUCT DATA

- A. Submit six (6) copies.
- B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers standard data to provide information unique to this Project.

1.7 SAMPLES

- A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- B. Submit samples of finishes, textures, and patterns for Engineer's selection.
- C. Include identification on each sample, with full Project information.
- D. Submit the number or samples specified in individual specification Sections.
- E. Reviewed samples which may be used in the Work are indicated in individual specification Sections.

1.8 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.
- B. Identify conflicts between manufacturers' instructions and Contract Documents.

1.9 MANUFACTURER'S CERTIFICATES

- A. When specified in individual specification Sections, submit manufacturers' certificate to Engineer for review, in quantities specified for Product Data.

- B. Indicate material or product conforms to or exceed specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

END OF SECTION 01300

SECTION 011400 - PROTECTION, CLEANING UP

PART 1 - GENERAL	1
1.1 RELATED DOCUMENTS	1
PART 2 - PRODUCTS	1
2.1 CLEANING MATERIALS	1
PART 3 - EXECUTION	1
3.1 CLEANING	1
3.2 COMPLETION	1

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary General Conditions and Division-1 Specification sections, apply to work of this Section.
- B. Comply with latest applicable provisions of -

AGC - Associated General Contractors of America, Inc.
JCIC - Joint Construction Industry Committee.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS

- A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.
- B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.
- C. Use cleaning materials only on surfaces recommended by cleaning materials manufacturer.

PART 3 - EXECUTION

3.1 CLEANING

- A. Contractor: clean project immediately prior to turning project over to Owner.

3.2 COMPLETION

- A. At completion Contractor shall remove all tools, scaffolding, surplus material and debris from building site.
- B. Wash, clean exposed finished metal, glass parts of mechanical, electrical and special equipment in accordance with above requirements.

END OF SECTION 01400

SECTION 011630 - PRODUCT SUBSTITUTIONS

PART 1 - GENERAL	1
1.1 RELATED DOCUMENTS	1
1.2 SECTION INCLUDES	1
1.3 RELATED SECTIONS	1
1.4 BIDDER'S OPTIONS	1
1.5 SUBSTITUTIONS	1
1.6 BIDDER'S REPRESENTATION	2
1.7 ENGINEERS DUTIES	3

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary General Conditions and Division - 1 Specification Sections, apply to work of this Section.

1.2 SECTION INCLUDES

- A. Furnish and install Products specified, under options and conditions for substitutions stated in this section.

1.3 RELATED SECTIONS

- A. Section 01300 - Submittals.

1.4 BIDDER'S OPTIONS

- A. For products that are specified only by reference standard, select Product that is standard by any manufacturer.
- B. For Products specified by naming several Products or manufacturers, select any one of products and manufacturers named which complies with Specifications.
- C. For Products specified by naming several Products or manufacturers submit a request as for substitutions, for any Product or manufacturer that is not specifically named for review and approval by the Engineer.
- D. For Products specified by naming only one Product and manufacturer, there is no option and no substitution will be allowed.

1.5 SUBSTITUTIONS

- A. Base Bid shall be in accordance with the Contract Documents.
 - 1. Engineer will consider requests from the Bidder for substitution of products in place of those specified as set forth in this section. Upon receiving a substitution request substantiating product ten (10) days prior to Bid Date.
 - 2. Those submitted the specified calendar days prior to Bid Date will be included in an addendum if acceptable.
 - 3. After the end of the bidding period, requests will be considered only in case of Product unavailability or other conditions beyond the control of Contractor.

4. Bids shall not be based on assumed acceptance of any item that has not been approved by addendum.
- B. Submit separate request for each substitution. Support each request with:
 1. Complete data substantiating compliance of proposed substitution with requirements stated in Contract Documents.
 - a. Product identification, including manufacturer's name and address.
 - b. Manufacturer's literature; identifying:
 - 1) Product description.
 - 2) Reference standards.
 - 3) Performance and test data.
 - c. Samples, as applicable.
 - d. Name and address of similar projects on which product has been used, and date of each installation.
 2. Itemized comparison of the proposed substitution with product specified; list significant variations.
 3. Data relating to changes in delivery or construction schedule.
 4. All effects of substitution on separate contracts.
 5. Accurate cost data comparing proposed substitution with product specified.
 - a. Amount of any net change to Contract Sum.
 6. Designation of required license fees or royalties.
 7. Designation of availability of maintenance services, sources of replacement materials.
- C. Substitutions will not be considered for acceptance when:
 1. They are indicated or implied on shop drawings or product data submittals without a formal request from Bidder.
 2. Acceptance will require substantial revision of Contract Documents.
 3. In judgment of Engineer, do not include adequate information necessary for a complete evaluation.
 4. Requested after Contract Award directly by a subcontractor or supplier.
- D. Substitute products shall not be ordered or installed without written acceptance of Engineer.
- E. Engineer will determine acceptability of proposed substitution.

1.6 BIDDER'S REPRESENTATION

- A. In making formal request for substitution the Bidder represents that:
 1. They have investigated proposed product and determined it is equivalent to or superior in all respects to that specified.
 2. They will provide same warranties or bonds for substitution as for product specified.
 3. They will coordinate installation of accepted substitution into the Work, and will make such changes as may be required for the Work to be complete in all respects.
 4. They waive claims for additional costs caused by substitution that may subsequently become apparent.
 5. Cost data is complete and includes related costs under their Contract, but not:
 - a. Costs under separate contracts.
 - b. Engineer's costs for redesign or revision of Contract Documents.
- B. Any modifications necessary as a result of the use of an approved substitute shall be paid by the Contractor proposing the substitution.

- C. Any additional engineering costs required to be performed by the Engineer to approve, implement or coordinate the substitution above reasonable review services, shall be paid by the Contractor proposing the substitution.
- D. Under no circumstances will the Engineer be required to prove that a product proposed for substitution is or is not equal to the quality of the product specified.

1.7 ENGINEERS DUTIES

- A. Review requests for substitutions with reasonable promptness.
- B. Coordinate review/approval of "Engineer Approved" substitutions with the Owner.
- C. Issue a written instruction of decision to accept the substitution.
- D. Substitution requests that are not approved will be returned to the party submitting the request with an explanation for the rejection.

END OF SECTION 01630

SECTION 011650 - STARTING OF SYSTEMS

PART 1 - GENERAL	1
1.1 RELATED DOCUMENTS	1
1.2 SECTION INCLUDES	1
1.3 RELATED SECTIONS	1
1.4 STARTING SYSTEMS	1
1.5 DEMONSTRATION AND INSTRUCTIONS	1

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary General Conditions and Division - 1 Specification Sections, apply to work of this Section.

1.2 SECTION INCLUDES

- A. Starting systems.
- B. Demonstration and instructions.

1.3 RELATED SECTIONS

- A. Section 01300 - Submittals.
- B. Section 01700 - Contract Closeout: System operation and maintenance data and extra materials.

1.4 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Engineer seven (7) days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions that may cause damage.
- D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of responsible Contractors' personnel in accordance with manufacturers' instructions.

1.5 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel two (2) weeks prior to date of Substantial Completion and as described within the individual specification sections.
- B. Provide Owner training as described within the individual specification sections.

END OF SECTION 01650

SECTION 011700 - CONTRACT CLOSEOUT

PART 1 - GENERAL	1
1.1 RELATED DOCUMENTS	1
1.2 SECTION INCLUDES	1
1.3 RELATED SECTIONS	1
1.4 CLOSEOUT PROCEDURES	1
1.5 FINAL CLEANING	2
1.6 ADJUSTING	2
1.7 PROJECT RECORD DOCUMENTS	2
1.8 OPERATION AND MAINTENANCE DATA	2
1.9 WARRANTIES	3
1.10 SPARE PARTS AND MAINTENANCE MATERIALS	3

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary General Conditions and Division-1 Specification Sections, apply to work of this Section.

1.2 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Adjusting.
- D. Project record documents.
- E. Operation and maintenance data.
- F. Warranties.
- G. Spare parts and maintenance materials.

1.3 RELATED SECTIONS

- A. Section 01650 - Starting of Systems: System start-up.
- B. Section 15990 - Testing, Adjusting, and Balancing.

1.4 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's inspection.
- B. Provide submittals to Owner that are required by governing or other authorities.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

- D. Owner will occupy all portions of the building as specified in Section 01010.
- E. Submit appropriate permits.

1.5 FINAL CLEANING

- A. Execute final cleaning prior to final inspection.
- B. Clean interior and exterior surfaces exposed to view for new work or existing surfaces affected by the new work.
- C. Clean equipment and fixtures to a sanitary condition.
- D. Clean site.
- E. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.6 ADJUSTING

- A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.7 PROJECT RECORD DOCUMENTS

- A. Maintain on site, one (1) set of the following record documents; record actual revisions to the Work:
 - 1. Contract Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other Modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
- B. Store Record Documents separate from documents used for construction.
- C. Record information concurrent with construction progress.
- D. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 2. Field changes of dimension and detail.
- E. Submit documents to Engineer with claim for final Application for Payment.

1.8 OPERATION AND MAINTENANCE DATA

- A. Submit three (3) sets prior to final inspection, bound in 8-1/2 x 11 inch or 11 x 17 inch text pages, three ring binders with durable plastic covers, as described below and as supplemented in the individual specification sections.
- B. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS" and title of project.
- C. Contents: Prepare a Table of Contents with each Product or system description identified.

- D. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.
- E. Part 2: Operation and maintenance instructions.
- F. Part 3: Project documents and certificates, including the following:
 - 1. Shop drawings and product data.
 - 2. Balance reports.
 - 3. Certificates.
 - 4. Photocopies of warranties.

1.9 WARRANTIES

- A. Submit warranties required in the General Conditions of the Contract and in the individual specification Sections.

1.10 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.
- B. Deliver to Project site and place in location as directed. Obtain receipt prior to final payment.

END OF SECTION 01700

Division	Section Title
DIVISION 07 – THERMAL AND MOISTURE PROTECTION	
078413	PENETRATION FIRESTOPPING
078446	FIRE-RESISTIVE JOINT SYSTEMS
079200	JOINT SEALANTS

END OF DIVISION 07 - TABLE OF CONTENTS

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Penetrations in fire-resistance-rated walls.
- B. Related Sections:
 - 1. Division 07 Section "Fire-Resistive Joint Systems" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.
 - 1. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.
- C. Qualification Data: For qualified Installer.
- D. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been evaluated or approved by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements."
- B. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its

penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

C. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:

1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
 - b. Classification markings on penetration firestopping correspond to designations listed by the following:
 - 1) UL in its "Fire Resistance Directory."

D. Preinstallation Conference: Conduct conference at Project site.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.6 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.
- C. Notify Owner's testing agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Grace Construction Products.
 2. Hilti, Inc.
 3. Johns Manville.
 4. 3M Fire Protection Products.
 5. USG Corporation.

2.2 PENETRATION FIRESTOPPING

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
 - 1. Fire-resistance-rated walls include fire walls, fire-barrier walls, smoke-barrier walls and fire partitions.
 - 2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. W-Rating: Provide penetration firestopping showing no evidence of water leakage when tested according to UL 1479.
- D. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- E. VOC Content: Provide penetration firestopping that complies with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Architectural Sealants: 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 - 3. Sealant Primers for Porous Substrates: 775 g/L.
- F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
 - 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-wool-fiber or rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 - 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Collars.
 - 5. Steel sleeves.

2.3 FILL MATERIALS

- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

- D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.
- E. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

2.4 MIXING

- A. For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.

2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

- A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.
- C. Install fill materials for firestopping by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Designation of applicable testing and inspecting agency.
 4. Date of installation.
 5. Manufacturer's name.
 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Owner will engage a qualified testing agency to perform tests and inspections.

- B. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.
- C. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

3.7 PENETRATION FIRESTOPPING SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.
- B. Firestopping with No Penetrating Items:
 - 1. Type of Fill Materials:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Intumescent putty.
 - d. Mortar.
- C. Firestopping for Metallic Pipes, Conduit, or Tubing:
 - 1. Type of Fill Materials:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Intumescent putty.
 - d. Mortar.
- D. Firestopping for Nonmetallic Pipe, Conduit, or Tubing:
 - 1. Type of Fill Materials:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Intumescent putty.
 - d. Intumescent wrap strips.
 - e. Firestop device
- E. Firestopping for Electrical Cables:
 - 1. Type of Fill Materials:

- a. Latex sealant.
- b. Silicone sealant.
- c. Intumescent putty.
- d. Silicone foam.
- e. Pillow/bags.

F. Firestopping for Cable Trays with Electric Cables:

1. Type of Fill Materials:

- a. Pillow bags.

G. Firestopping for Insulated Pipes:

1. Type of Fill Materials:

- a. Latex sealant.
- b. Intumescent putty.
- c. Silicone foam.
- d. Intumescent wrap strips.

H. Firestopping for Miscellaneous Electrical Penetrants:

1. Type of Fill Materials:

- a. Latex sealant.
- b. Intumescent putty.
- c. Mortar.

I. Firestopping for Miscellaneous Mechanical Penetrants:

1. Type of Fill Materials:

- a. Latex sealant.
- b. Mortar.

J. Firestopping for Groupings of Penetrants:

1. Type of Fill Materials:

- a. Latex sealant.
- b. Mortar.
- c. Intumescent wrap strips.
- d. Firestop device.
- e. Intumescent composite sheet.

END OF SECTION 078413

SECTION 078446 - FIRE-RESISTIVE JOINT SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Joints in or between fire-resistance-rated constructions.
- B. Related Sections:
 - 1. Division 07 Section "Penetration Firestopping" for penetrations in fire-resistance-rated walls, horizontal assemblies, and smoke barriers.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Schedule: For each fire-resistive joint system. Include location and design designation of qualified testing agency.
 - 1. Where Project conditions require modification to a qualified testing agency's illustration for a particular fire-resistive joint system condition, submit illustration, with modifications marked, approved by fire-resistive joint system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.
- C. Qualification Data: For qualified Installer.
- D. Installer Certificates: From Installer indicating fire-resistive joint systems have been installed in compliance with requirements and manufacturer's written recommendations.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fire-resistive joint systems.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been evaluated or approved by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements."
- B. Installer Qualifications: A firm experienced in installing fire-resistive joint systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its fire-resistive joint system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

- C. Fire-Test-Response Characteristics: Fire-resistive joint systems shall comply with the following requirements:
1. Fire-resistive joint system tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
 2. Fire-resistive joint systems are identical to those tested per testing standard referenced in "Fire-Resistive Joint Systems" Article. Provide rated systems complying with the following requirements:
 - a. Fire-resistive joint system products bear classification marking of qualified testing agency.
 - b. Fire-resistive joint systems correspond to those indicated by reference to designations listed by the following:
 - 1) UL in its "Fire Resistance Directory."
- D. Preinstallation Conference: Conduct conference at Project site.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure fire-resistive joint systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.6 COORDINATION

- A. Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
- B. Coordinate sizing of joints to accommodate fire-resistive joint systems.
- C. Notify Owner's testing agency at least seven days in advance of fire-resistive joint system installations; confirm dates and times on day preceding each series of installations.

PART 2 - PRODUCTS

2.1 FIRE-RESISTIVE JOINT SYSTEMS

- A. Where required, provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which fire-resistive joint systems are installed. Fire-resistive joint systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
- B. Joints in or between Fire-Resistance-Rated Construction: Provide fire-resistive joint systems with ratings determined per ASTM E 1966 or UL 2079:
1. Joints include those installed in or between fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies.
 2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of construction they will join.

3. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Grace Construction Products.
 - b. Hilti, Inc.
 - c. Johns Manville.
 - d. 3M Fire Protection Products.
 - e. USG Corporation.
- C. Exposed Fire-Resistive Joint Systems: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- D. VOC Content: Provide fire-resistive joint systems that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 1. Architectural Sealants: 250 g/L.
 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 3. Sealant Primers for Porous Substrates: 775 g/L.
- E. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install fill materials and to maintain ratings required. Use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing agency for systems indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean joints immediately before installing fire-resistive joint systems to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.
 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by fire-resistive joint system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent fill materials of fire-resistive joint system from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing fire-resistive joint system's seal with substrates.

3.3 INSTALLATION

- A. General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.
- C. Install fill materials for fire-resistive joint systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
 - 2. Apply fill materials so they contact and adhere to substrates formed by joints.
 - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Identify fire-resistive joint systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of joint edge so labels will be visible to anyone seeking to remove or penetrate joint system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 - 1. The words "Warning - Fire-Resistive Joint System - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Designation of applicable testing agency.
 - 4. Date of installation.
 - 5. Manufacturer's name.
 - 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Where deficiencies are found or fire-resistive joint systems are damaged or removed due to testing, repair or replace fire-resistive joint systems so they comply with requirements.
- C. Proceed with enclosing fire-resistive joint systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by fire-resistive joint system manufacturers and that do not damage materials in which joints occur.
- B. Provide final protection and maintain conditions during and after installation that ensure fire-resistive joint systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration

occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

3.7 FIRE-RESISTIVE JOINT SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHBN.
- B. Floor-to-Wall, Fire-Resistive Joint Systems:
 - 1. UL-Classified Systems
 - 2. Assembly Rating: Equivalent to wall rating or as indicated on drawings.
 - 3. Nominal Joint Width: As indicated.
 - 4. Movement Capabilities: Class I - 25 percent compression, extension, or horizontal shear.
- C. Wall-to-Wall, Fire-Resistive Joint Systems:
 - 1. UL-Classified Systems:
 - 2. Assembly Rating: Equivalent to wall rating or as indicated on drawings.
 - 3. Nominal Joint Width: As indicated.
 - 4. Movement Capabilities: Class I - 25 percent compression, extension, or horizontal shear.
- D. Head-of-Wall, Fire-Resistive Joint Systems:
 - 1. UL-Classified Systems:
 - 2. Assembly Rating: Equivalent to wall rating or as indicated on drawings.
 - 3. Nominal Joint Width: As indicated.
 - 4. Movement Capabilities: Class I - 25 percent compression, extension, or horizontal shear.

END OF SECTION 078446

SECTION 07 92 00 - JOINT SEALANTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Exterior polyurethane sealants.
 - 2. Interior polyurethane sealants.
 - 3. Interior latex sealants.
- B. Related Sections:
 - 1. Section 07 84 86 Fire resistive joint systems.
 - 2. Section 07 84 13 Penetration Firestopping

1.2 REFERENCES

- A. ASTM International Inc.
 - 1. ASTM C 510 - Standard Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants.
 - 2. ASTM C 719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
 - 3. ASTM C 794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
 - 4. ASTM C834 - Standard Specification for Latex Sealants.
 - 5. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.
 - 6. ASTM C 1087 - Standard Test Method for Determining Compatibility of Liquid- Applied Sealants with Accessories Used in Structural Glazing Systems.
 - 7. ASTM C 1193 - Standard Guide for Use of Joint Sealants.
 - 8. ASTM C 1247 - Standard Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids.
 - 9. ASTM C 1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants.
 - 10. ASTM C 1311 - Standard Specification for Solvent Release Sealants.
 - 11. ASTM D 2203 - Standard Test Method for Staining from Sealants.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Materials list of items proposed to be provided under this Section;
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
- B. Samples:
 - 1. Submit color charts for each sealant type for initial selection.
 - 2. Submit standard cured color samples for each sealant type illustrating selected colors.
- C. Manufacturer's Certificate:
 - 1. Certify products are suitable for intended use and products meet or exceed specified requirements.
 - 2. Certify applicator is approved by manufacturer.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data:

1. Submit recommended inspection intervals.
2. Submit instructions for repairing and replacing failed sealant joints.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with the following:
 1. Building Joints: ASTM C 1193.
- B. Field Pre-Construction Testing:
 1. Test each elastomeric sealant and joint substrate in accordance with the following, before beginning work of this section:
 - a. Install sealants in field samples using joint preparation methods determined by laboratory pre-construction testing.
 - b. Install field-test joints in [n]conspicuous location.
 - c. Test Method: Manufacturer's standard field adhesion test to verify joint preparation and primer required to obtain optimum adhesion of sealants to joint substrate.
 - d. When test indicates sealant adhesion failure, modify joint preparation, primer, or both and retest until joint passes sealant adhesion test.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten years documented experience.
- B. Applicator Qualifications:
 1. Company specializing in performing work of this section with minimum three years documented experience, minimum three successfully completed projects of similar scope and complexity, and approved by manufacturer.
 2. Designate one individual as project foreman who shall be on site at all times during installation.

1.7 PRE-INSTALLATION MEETINGS

- A. Convene meeting minimum one week prior to commencing work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in manufacturers unopened original packaging. Inspect for damage.
- B. Store primers and sealants in cool dry location with ambient temperature range of 60 to 80 degrees F (15 to 27 degrees C).

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Do not install primers or sealants when atmospheric temperatures or joint surface temperatures are less than 40 degrees F (4 degrees C).

1.10 SCHEDULING

- A. Schedule work so waterproofing, water repellents and preservative finishes are installed after sealants, unless sealant manufacturer approves otherwise in writing.
- B. Ensure sealants are cured before covering with other materials.

1.11 WARRANTY

- A. Submit signed copies of the following warranties against adhesive and cohesive failure of sealant and against infiltration of water and air through sealed joint for period of 3 years from date of completion.
 - 1. Manufacturer's standard warranty covering sealant materials.
 - 2. Applicator's standard warranty covering workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Tremco Sealant/Weatherproofing Division of RPM International, Inc.
- B. BASF Building Systems.
- C. Bostik, Inc.
- D. May National Associates, Inc.
- E. Pecora Corporation.
- F. Schnee-Morehead, Inc.

2.2 URETHANE SEALANTS

- A. Single Component Urethane: ASTM C 920, Type S, Grade NS, Class 25, Uses NT, M, A, O; single component, moisture curing, nonstaining, non-bleeding, color as selected.
 - 1. Dymonic.
 - 2. Vulkem 116.
 - 3. Vulkem 921.

2.3 OTHER SEALANTS

- A. Latex Sealant: ASTM C 834; single component, solvent curing, nonstaining, nonbleeding, nonsagging; color as selected.
 - 1. Tremflex 834.

2.4 ACCESSORIES

- A. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- B. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- C. Joint Backing: Round foam rod compatible with sealant; oversized 25 to 50 percent larger than joint width; recommended by sealant manufacturer to suit application
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.
- E. Masking tape: Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate surfaces and joint openings are ready to receive work.
 - 1. Verify joint surfaces are clean and dry.
 - 2. Ensure concrete surfaces are fully cured.
- B. Report unsatisfactory conditions in writing to the Architect;
- C. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Prepare joints in accordance with ASTM C 1193 and manufacturer's instructions.
- B. Clean joint surfaces to remove dirt, dust, oils, wax, paints, and other contamination capable of affecting primer and sealant bond.
 - 1. Clean concrete joint surfaces to remove curing agents and form release agents.
- C. Protect elements surrounding the Work of this section from damage or disfiguration. Apply masking tape to adjacent surfaces when required to prevent damage to finishes from sealant installation.

3.3 SEALANT INSTALLATION

- A. Install primer and sealants in accordance with ASTM C 1193 and manufacturer's instructions.
- B. Install joint backing to maintain the following joint ratios:
 - 1. Joints up to 1/2 inch (13 mm) Wide: 1:1 width to depth ratio.
 - 2. Joints Greater than 1/2 inch (13 mm) Wide: 2:1 width to depth ratio; maximum 1/2 inch joint depth.
- C. Install bond breaker where joint backing is not used.
- D. Apply primer where required for sealant adhesion.
- E. Install sealants immediately after joint preparation.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- G. Joining Silicone and Polyurethane Sealants:
 - 1. Install polyurethane sealants first.
 - 2. Join silicone sealant to polyurethane in accordance with manufacturer's instructions.
- H. Tool exposed joint surface concave.

3.4 MANUFACTURER'S FIELD SERVICES

- A. Require sealant manufacturer to be present at project site to:
 - 1. Observe sealant mockup installation and to issue reports of observations.
 - 2. Conduct field pre-construction testing.

3.5 CLEANING

- A. Remove masking tape.

- B. Clean adjacent surfaces soiled by sealant installation.

3.6 SCHEDULE – SEALANT JOINTS

- A. Exterior Sealant Joint:
 - 1. Applications:
 - a. Control and expansion joints in cast-in-place concrete.
 - b. Control and expansion joints in unit masonry.
 - c. Perimeter joints between materials listed above and frames of doors, windows, storefronts, louvers and similar openings.
 - d. Control and expansion joints in soffits and overhead surfaces.
 - e. Other exterior joints in vertical surfaces and non-traffic horizontal surfaces for which no other sealant is specified.
 - 2. Single Component Urethane Sealants:
 - a. Dymonic FC.
 - b. Dymonic.
 - c. Vulkem 116.
- B. Interior Sealant Joint:
 - 1. Applications:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints on exposed interior surfaces of exterior openings.
 - c. Joints on precast beams and planks.
 - d. Perimeter joints between interior wall surfaces and frames of interior doors, windows, storefronts, louvers, elevator entrances and similar openings.
 - e. Other interior joints in vertical surfaces and non-traffic horizontal surfaces subject to movement for which no other sealant is specified.
 - 2. Single Component Urethane Sealants:
 - a. Dymonic FC.
 - b. Dymonic.
 - c. Vulkem 116.

END OF SECTION

Division	Section Title
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DIVISION 09 – FINISHES

092900	GYPSUM BOARD
099123	PAINTING

END OF DIVISION 09 - TABLE OF CONTENTS

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.
- B. Related Requirements:
 - 1. Division 09 Section "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board panels.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Low Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 GYPSUM BOARD, GENERAL

- A. Recycled Content of Gypsum Panel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than fifty (50) percent.
- B. Regional Materials: Gypsum panel products shall be manufactured within 500 miles (800 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.
- C. Regional Materials: Gypsum panel products shall be manufactured within 500 miles (800 km) of Project site.
- D. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. CertainTeed Corp.
 - 2. Georgia-Pacific Gypsum LLC.
 - 3. Lafarge North America Inc.
 - 4. National Gypsum Company.
 - 5. USG Corporation.
- B. Gypsum Board, Type X: ASTM C 1396/C 1396M.
 - 1. Thickness: 5/8 inch (15.9 mm).
 - 2. Long Edges: Tapered.
- C. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
 - 1. Thickness: 1/2 inch (12.7 mm).
 - 2. Long Edges: Tapered.

- D. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

1. Core: 5/8 inch (15.9 mm), Type X.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10.

2.4 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint: Refer to drawing detail.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges.

- B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Fry Reglet Corp.
 - b. Gordon, Inc.
 - c. Pittcon Industries.
2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.

- B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended by panel manufacturer.

- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.

- a. Use setting-type compound for installing paper-faced metal trim accessories.
- 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
- 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
- D. Joint Compound for Tile Backing Panels:
 - 1. Cementitious Backer Units: As recommended by backer unit manufacturer.
 - 2. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.6 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.

- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc., except in chases braced internally).
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 - 2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
 - 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 - 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- B. Multilayer Application:
 - 1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
 - 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

3.4 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints at locations indicated on Drawings or according to ASTM C 840 if not shown on drawings and in specific locations approved by Architect for visual effect.

3.5 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 2. Level 2: Where indicated on Drawings.
 3. Level 3: Where indicated on Drawings.
 4. Level 4: At all panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in other Division 09 Sections.
- E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.
- F. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.6 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 099123 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following exposed exterior and interior substrates:
 - 1. Concrete masonry units (CMU).
 - 2. Steel or ferrous metal.
 - 3. Galvanized metal.
 - 4. Interior Gypsum board.
- B. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If a color or finish is not indicated, the Architect will select from the standard color and finishes available.
 - 1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.
 - 2. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts and labels.
- C. Related Requirements:
 - 1. Division 05 Sections for shop priming of metal substrates with primers specified in this Section.
 - 2. Division 08 Sections for factory priming windows, doors and frames with primers specified in this Section.
 - 3. Division 09 painting Sections for "Gypsum Board" surface finish preparation.

1.3 DEFINITIONS

- A. Standard coating terms defined in ASTM D 16 apply to this Section.
- B. Gloss Level 1 (Flat Matte Finish): Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- C. Gloss Level 2 (High Side Sheen Flat): Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. Gloss Level 3 (Eggshell Finish): 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- E. Gloss Level 4 (Satin Finish): 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

- F. Gloss Level 5 (Semi-Gloss Finish): 35 to 70 units at 60 degrees, according to ASTM D 523.
- G. Gloss Level 6 (Gloss Finish): 70 to 85 units at 60 degrees, according to ASTM D 523.
- H. Gloss Level 7 (High-Gloss Finish): More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
 - 2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.
- B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
 - 1. Submit Samples on manufacturer's standard draw-down cards
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint: Ten (10) percent, but not less than 2 gal. (7.6 L) of each material and color applied.

1.6 QUALITY ASSURANCE

- A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance
- B. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
 - 1. Deliver materials to Project site in manufacturer's original, unopened packages or containers bearing manufacture's name and required submittal product data.
 - 2. Maintain containers in clean condition, free of foreign materials and residue.
 - 3. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Benjamin Moore & Co.
 - 2. Frazee Paint.
 - 3. ICI Dulux Paints.
 - 4. PPG Architectural Finishes, Inc.
 - 5. Pratt & Lambert.
 - 6. Sherwin-Williams Company (The).
 - 7. Vista Paint.
- B. Products: Subject to compliance with requirements, provide product available products that may be incorporated into the Work include, but are not limited to products listed in other Part 2 articles for the paint category indicated.

2.2 PAINT, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24), and in accordance with 40 CFR 51.100(s).
 - 1. Interior Flat Paints and Coatings: 50 g/L.
 - 2. Interior Nonflat Paints and Coatings: 150 g/L.
 - 3. Exterior Nonflat Paints and Coatings: 200 g/L.
 - 4. Dry-Fog Coatings: 400 g/L.
 - 5. Primers, Sealers, and Undercoaters: 200 g/L.
 - 6. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
 - 7. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
 - 8. Pretreatment Wash Primers: 420 g/L.
 - 9. Floor Coatings: 100 g/L.

10. Clear Wood Finishes: 350 g/L.
11. Interior Stains: 250 g/L.
12. Shellacs, Clear: 730 g/L.
13. Shellacs, Pigmented: 550 g/L.

- D. Low-Emitting Materials: Interior paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- E. Colors: As selected by Architect from manufacturer's full range to match Architect's samples as indicated on drawings.

2.3 BLOCK FILLERS

A. Block Filler, Latex, Interior:

1. Benjamin Moore; Moorcraft Super Craft Latex Block Filler 285-01: Applied at a dry film thickness of 8.1 mils – 11.0 mils.
2. Sherwin-Williams; PrepRite Acrylic Latex Masonry Block Filler, B25W25: Applied at a dry film thickness of not less than 8.0 mils.
3. Pittsburgh Paints; 6-15 SpeedHide Interior/Exterior Masonry Latex Block Filler: Applied at a dry film thickness of not less than 6.0 to 12.5 mils.
4. ICI Dulux Paints; Bloxfil 4000-1000 Interior/Exterior Heavy Duty Acrylic Block Filler: Applied at a dry film thickness of not less than 7.0 to 14.5 mils.

2.4 INTERIOR PRIMERS (Gypsum Board)

A. Primer, Latex, Interior:

1. Benjamin Moore; Eco Spec WB, Interior Latex Primer: Applied at a dry film thickness of not less than 1.2 mils.
2. Sherwin-Williams; Harmony, Interior Latex Primer, B11W900: Applied at a dry film thickness of not less than 1.5 mils.
3. ICI Dulux (Glidden); Carefree Earth Coat Interior Latex Primer, 6000: Applied at a dry film thickness of not less than 1.2 mils.
4. Pittsburgh Paints; SpeedHide Interior Latex, 6-2: Applied at a dry film thickness of not less than 1.5 mils.

2.5 CMU PRIMERS

A. Primer, Latex, Interior:

1. Benjamin Moore; Eco Spec WB, Interior Latex Primer: Applied at a dry film thickness of not less than 1.2 mils.
2. Sherwin-Williams; Harmony, Interior Latex Primer, B11W900: Applied at a dry film thickness of not less than 1.5 mils.
3. ICI Dulux (Glidden); Carefree Earth Coat Interior Latex Primer, 6000: Applied at a dry film thickness of not less than 1.2 mils.
4. Pittsburgh Paints; SpeedHide Interior Latex, 6-2: Applied at a dry film thickness of not less than 1.5 mils.

2.6 METAL PRIMERS

A. Primer, Rust-Inhibitive, Enamel:

1. Benjamin Moore; IMC M04 Acrylic Metal Primer: Applied at a dry film thickness of not less than 2.0 mils.
2. Sherwin-Williams; Galvite HS Prime, B50WZ3: Applied at a dry film thickness of not less than 2.0 mils.
3. ICI Dulux (Glidden); 4020 Devflex DTM Primer: Applied at a dry film thickness of not less than 2.2 mils.
4. Pittsburgh Paints; Pitt-Tech DTM 90-712: Applied at a dry film thickness of not less than 2.0 – 3.0 mils.

2.7 WATER-BASED PAINTS (Gypsum Board)

A. Latex, Interior, Flat, (Gloss Level 1):

1. Benjamin Moore; Moorecraft Super Spec Latex No. 275- coordinate with color requirements: Applied at a dry film thickness of not less than 1.2 mils.
2. ICI Dulux (Glidden) Paints; 1200-XXXX Dulux Professional Velvet Matte Interior Flat Latex Wall & Trim Finish- coordinate with color requirements: Applied at a dry film thickness of not less than 1.4 mils.
3. Sherwin-Williams; Base as indicated on color and material schedule: Applied at a dry film thickness of not less than 1.8 mils.
4. Pittsburgh Paints; Pure Performance, Interior Latex, 9-100- coordinate with color requirements: Applied at a dry film thickness of not less than 1.5 mils.

B. Latex, Interior, Eggshell, (Gloss Level 3):

1. Benjamin Moore; Moorecraft Super Spec Latex No. 274- coordinate with color requirements: Applied at a dry film thickness of not less than 1. mils.
2. ICI Dulux (Glidden) Paints; Diamond 350 Interior Acrylic, 1403- coordinate with color requirements : Applied at a dry film thickness of not less than 1.4 mils.
3. Sherwin-Williams; Base as indicated on color and material schedule: Applied at a dry film thickness of not less than 1.7 mils.
4. Pittsburgh Paints; Pure Performance, Interior Latex, 9-300- coordinate with color requirements: Applied at a dry film thickness of not less than 1.5 mils.

C. Latex, Interior, Semi-Gloss, (Gloss Level 5):

1. Benjamin Moore; Regal Interior Acrylic, Semi-Gloss Finish, W333- coordinate with color requirements: Applied at a dry film thickness of not less than 1.3 mils.
2. ICI Dulux (Glidden) Paints; Ultra Interior Latex Semi-Gloss, 94800 Series- coordinate with color requirements: Applied at a dry film thickness of not less than 1.3 mils.
3. Pittsburgh Paints; SpeedHide Interior Semi-Gloss Acrylic Latex, 6-500- coordinate with color requirements: Applied at a dry film thickness of not less than 1.2 mils.
4. Sherwin-Williams; Base as indicated on color and material schedule Applied at a dry film thickness of not less than 1.6 mils

2.8 CMU SUBSTRATES

A. Acrylic-Latex Masonry Finish, Semi-gloss (Gloss Level 4):

1. Benjamin Moore; Regal Interior Acrylic, Semi-Gloss Finish, W333: Applied at a dry film thickness of not less than 1.3 mils.
2. ICI Dulux (Glidden) Paints; Ultra Interior Latex Semi-Gloss, 94800 Series: Applied at a dry film thickness of not less than 1.3 mils.
3. Pittsburgh Paints; SpeedHide Interior Semi-Gloss Acrylic Latex, 6-500: Applied at a dry film thickness of not less than 1.2 mils.

4. Sherwin-Williams; ProGreen Latex Semi-Gloss B31-600 Series: Applied at a dry film thickness of not less than 1.6 mils

2.9 FERROUS METAL SUBSTRATES

A. Acrylic-Latex Enamel, Semi-Gloss (Gloss Level 5):

1. Benjamin Moore; Super Spec HP, DTM Acrylic Semi-Gloss; P29/KP29: Applied at a dry film thickness of not less than 1.3 mils.
2. ICI Dulux (Glidden) Paints; DEVFLEX 4216 High Performance WB Acrylic SG Enamel Series: Applied at a dry film thickness of not less than 1.3 mils.
3. Pittsburgh Paints; Pitt Tech Int/Ext Satin DTM Industrial Enamel, 90-474: Applied at a dry film thickness of not less than 2.0 - 3.0 mils.
4. Sherwin-Williams; ProGreen Latex Semi-Gloss B31-600 Series: Applied at a dry film thickness of not less than 1.6 mils.

2.10 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 1. Concrete: 12 percent.
 2. Masonry (CMU): 12 percent.
 3. Wood: 15 percent.
 4. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions, finish preparation and compatibility with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 1. Notify Architect about anticipated problems when using the materials specified over substrates prepared by others.
 2. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.
- F. Ferrous Metal Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer, but not less than the following:
 - 1. SSPC-SP 2, "Hand Tool Cleaning."
 - 2. SSPC-SP 3, "Power Tool Cleaning."
 - 3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
 - 4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 1. Paint the following work where exposed in equipment rooms:
 - a. Equipment, including panelboards and switch gear.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.
 - h. Mechanical equipment factory primed and indicated for field paint finish.
 - i. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 2. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Other items as directed by Architect.
 3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

- A. Galvanized-Metal Substrates:
 - 1. Water-Based Light Industrial Coating System:
 - a. Prime Coat: Primer, rust-inhibitive, water based.
 - b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
 - c. Topcoat: Light industrial coating, interior, water based, semi-gloss (Gloss Level 5).
- B. CMU Substrates:
 - 1. Latex System:
 - a. Block Filler: Block filler, latex, interior/exterior.
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, Satin, (Gloss Level 4).

3.7 INTERIOR PAINTING SCHEDULE

- A. CMU Substrates:
 - 1. Latex System:
 - a. Block Filler: Block filler, latex, interior/exterior.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Latex, interior, Satin, (Gloss Level 4).
- B. Steel Substrates:
 - 1. Water-Based Light Industrial Coating System:
 - a. Prime Coat: Primer, rust-inhibitive, water based.
 - b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
 - c. Topcoat: Light industrial coating, interior, water based, semi-gloss (Gloss Level 5).
- C. Galvanized-Metal Substrates:
 - 1. Water-Based Light Industrial Coating System:

- a. Prime Coat: Primer, rust-inhibitive, water based.
- b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
- c. Topcoat: Light industrial coating, interior, water based, semi-gloss (Gloss Level 5).

D. Gypsum Board Substrates:

1. Latex System:

- a. Prime Coat: Primer sealer, latex, interior.
- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Latex, interior, flat, (Gloss Level -Varies).

END OF SECTION 099123

Division	Section Title
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DIVISION 26 – ELECTRICAL

260010	ELECTRICAL GENERAL REQUIREMENTS
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260526	GROUNDING AND BONDING
260529	HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
260533	RACEWAYS AND BOXES
260553	ELECTRICAL IDENTIFICATION
260999	ELECTRICAL TESTING
262413	SWITCHBOARDS
262416	PANELBOARDS
262813	FUSES
262816	ENCLOSED SWITCHES AND CIRCUIT BREAKERS
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264313	SURGE PROTECTIVE DEVICES

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. This Section includes electrical general administrative and procedural requirements. The following requirements are included in this Section to supplement the requirements specified in Division 1 Specification Sections.

1.3 REFERENCES

- A. All materials shall be new. The electrical and physical properties of all materials, and the design, performance characteristics, and methods of construction of all items of equipment, shall be in accordance

with the latest issue of the various, applicable Standard Specifications of the following recognized authorities:

1. A.N.S.I. - American National Standards Institute
2. A.S.T.M. - American Society for Testing Materials
3. I.C.E.A. - Insulated Cable Engineers Association
4. I.E.E.E. - Institute of Electrical and Electronics Engineers
5. N.E.C. - National Electrical Code
6. N.E.C.A. - National Electrical Contractors Association
7. N.E.M.A. - National Electrical Manufacturer's Association
8. U.L. - Underwriters Laboratories, Inc.
9. N.E.C.A. 1-2000, "Practices for Good Workmanship in Electrical Contracting (ANSI)."

1.4 QUALITY ASSURANCE

- A. Scope of Work: Furnish all labor, material, equipment, technical supervision, and incidental services required to complete, test and leave ready for operation the electrical systems as specified in the Division 26 Sections and as indicated on Drawings.
- B. Ordinances and Codes: Perform all Work in accordance with applicable Federal, State and local ordinances and regulations, the Rules and Regulations of NFPA, NECA, and UL, unless otherwise indicated.
 1. Notify the Architect/Engineer before submitting a proposal should any changes in Drawings or Specifications be required to conform to the above codes, rules or regulations. After entering into Contract, make all changes required to conform to above ordinances, rules and regulations without additional expense to the Owner.
- C. Source Limitations: All equipment of the same or similar systems shall be by the same manufacturer.
- D. Tests and Inspections: Perform all tests required by state, city, county and/or other agencies having jurisdiction. Provide all materials, equipment, etc., and labor required for tests.
- E. Performance Requirements: Perform all work in a first class and workmanlike manner, in accordance with the latest accepted standards and practices for the trades involved.
- F. Sequence and Schedule: Work so as to avoid interference with the work of other trades. Be responsible for removing and relocating any work which in the opinion of the Owner's Representatives causes interference.

1.5 CODES, PERMITS AND FEES

- A. Unless otherwise indicated, all required permits, licenses, inspections, approvals and fees for electrical work shall be secured and paid for by the Contractor. All work shall conform to all applicable codes, rules and regulations.
- B. All work shall be executed in accordance with the rules and regulations set forth in local and state codes. Prepare any detailed Drawings or diagrams which may be required by the governing authorities. Where the Drawings and/or Specifications indicate materials or construction in excess of code requirements, the Drawings and/or Specifications shall govern.

1.6 DRAWINGS

- A. The Drawings show the location and general arrangement of equipment, electrical systems and related items. They shall be followed as closely as elements of the construction will permit.

- B. Examine the Drawings of other trades and verify the conditions governing the work on the job site. Arrange work accordingly, providing such fittings, conduit, junction boxes and accessories as may be required to meet such conditions.
- C. Deviations from the Drawings, with the exception of minor changes in routing and other such incidental changes that do not affect the functioning or serviceability of the systems, shall not be made without the written approval of the Architect/Engineer.
- D. The architectural and structural Drawings take precedence in all matters pertaining to the building structure, mechanical Drawings in all matters pertaining to mechanical trades and electrical Drawings in all matters pertaining to electrical trades. Where there are conflicts or differences between the Drawings for the various trades, report such conflicts or differences to the Architect/Engineer for resolution.
- E. Drawings are not intended to be scaled for rough-in or to serve as shop drawings. Take all field measurements required to complete the Work.

1.7 MATERIAL AND EQUIPMENT MANUFACTURERS

- A. All items of equipment shall be furnished complete with all accessories normally supplied with the catalog items listed and all other accessories necessary for a complete and satisfactory operating system. All equipment and materials shall be new and shall be standard products of manufacturers regularly engaged in the production of electrical equipment and shall be of the manufacturer's latest design.
- B. If an approved manufacturer is other than the manufacturer used as the basis for design, the equipment or product provided shall be equal in size, quality, durability, appearance, capacity, and efficiency through all ranges of operation, shall conform with arrangements and space limitations of the equipment shown on the plans and/or specified, shall be compatible with the other components of the system and shall comply with the requirements for Items Requiring Prior Approval specified in this section of the Specifications. All costs to make these items of equipment comply with these requirements including, but not limited to, electrical work, and building alterations shall be included in the original Bid. Similar equipment shall be by one manufacturer.
- C. Where existing equipment is modified to include new switches, circuit breakers, metering or other components, the new components shall be by the original equipment manufacturer and shall be listed for installation in the existing equipment. Where original equipment manufacturer components are not available, third party aftermarket components shall be listed for the application and submitted to the engineer for approval. Reconditioned or salvaged components shall not be used unless specifically indicated on the drawings.

1.8 INSPECTION OF SITE

- A. Visit the site, examine and verify the conditions under which the Work must be conducted before submitting Proposal. The submitting of a Proposal implies that the Contractor has visited the site and understands the conditions under which the Work must be conducted. No additional charges will be allowed because of failure to make this examination or to include all materials and labor to complete the Work.

1.9 ITEMS REQUIRING PRIOR APPROVAL

- A. Bids shall be based upon manufactured equipment specified. All items that the Contractor proposes to use in the Work that are not specifically named in the Contract Documents must be submitted for review prior to bids. Such items must be submitted in compliance with Division 1 specifications. Requests for prior approval must be accompanied by complete catalog information, including but not limited to, model, size, accessories, complete electrical information and performance data in the form given in the equipment

schedule on the drawings at stated design conditions. Where items are referred to by symbolic designations on the drawings, all requests for prior approval shall bear the same designations.

1. Equipment to be considered for prior approval shall be equal in quality, durability, appearance, capacity and efficiency through all ranges of operation, shall fulfill the requirements of equipment arrangement and space limitations of the equipment shown on the plans and/or specified and shall be compatible with the other components of the system.
2. All costs incurred to make equipment comply with other requirements, including providing maintenance, clearance, electrical, replacement of other components, and building alterations shall be included in the original bid.

- B. Voluntary alternates may be submitted for consideration, with listed addition or deduction to the bid.

1.10 SHOP DRAWINGS/SUBMITTALS

- A. Submit project-specific submittals for review in compliance with Division 1.
- B. All shop Drawings shall be submitted in groupings of similar and/or related items (lighting fixtures, switchgear, etc.). Incomplete submittal groupings will be returned unchecked.
- C. If deviations (not substitutions) from Contract Documents are deemed necessary by the Contractor, details of such deviations, including changes in related portions of the project and the reasons therefore, shall be submitted with the submittal for approval.
- D. Submit for approval shop drawings for all electrical systems or equipment but not limited to the items listed below. Where items are referred to by symbolic designation on the Drawings and Specifications, all submittals shall bear the same designation (light fixtures). Refer to other sections of the electrical Specifications for additional requirements.
1. Enclosed Switches and Circuit Breakers
 2. Fuses
 3. Lightning Protection

1.11 COORDINATION DRAWINGS

- A. Submit project specific coordination drawings for review in compliance with Division 1 Specification Sections.

1.12 OPERATION AND MAINTENANCE INSTRUCTIONAL MANUALS

- A. Submit project specific Operation and Maintenance Instructional Manuals for review in compliance with Division 1 Specification Sections.
- B. Provide complete operation and maintenance instructional manuals covering all electrical equipment herein specified, together with parts lists. Maintenance and operating instructional manuals shall be job specific to this project. Generic manuals are not acceptable. Three (3) copies of all literature shall be furnished for Owner and shall be bound in ring binder form. Maintenance and operating instructional manuals shall be provided when construction is approximately 75% complete.
- C. The operating and maintenance instructions shall include a brief, general description for all electrical systems including, but not limited to:
1. Routine maintenance procedures.
 2. Trouble-shooting procedures.
 3. Contractor's telephone numbers for warranty repair service.

4. Submittals.
5. Recommended spare parts lists.
6. Names and telephone numbers of major material suppliers and subcontractors.
7. System schematic drawings on 8-1/2" x 11" sheets.

1.13 RECORD DRAWINGS

- A. Submit record drawings in compliance with Division 1.
- B. Contractor shall submit to the Architect/Engineer, record drawings on electronic media in a disk and three (3) hard copies which have been neatly marked to represent as-built conditions for all new electrical work.
- C. The Contractor shall keep accurate note of all deviations from the construction documents and discrepancies in the underground concealed conditions and other items of construction on field drawings as they occur. The marked up field documents shall be available for review by the Architect, Engineer and Owner at their request.

1.14 INSTRUCTION OF OWNER PERSONNEL

- A. Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of electrical equipment and systems at agreed upon times. A minimum of 8 hours of formal instruction to Owner's personnel shall be provided for each building. Additional hours are specified in individual specification sections.
- B. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.
- C. In addition to individual equipment training provide overview of each electrical system. Utilize the as-built documents for this overview.
- D. Prepare and insert additional data in operation and maintenance manual when need for such data becomes apparent during instruction, or as requested by Owner.

1.15 WARRANTY

- A. Warranty: Comply with the requirements in Division 1 Specification Sections. Contractor shall warranty that the electrical installation is free from defects and agrees to replace or repair, to the Owner's satisfaction, any part of this electrical installation which becomes defective within a period of one year (unless specified otherwise in other Division 26 sections) from the date of substantial completion following final acceptance, provided that such failure is due to defects in the equipment, material, workmanship or failure to follow the contract documents.
- B. Contractor shall be responsible for any temporary services including equipment and installation required to maintain operation as a result of any equipment failure or defect during warranty period.
- C. File with the Owner any and all warranties from the equipment manufacturers including the operating conditions and performance capacities they are based on.

1.16 USE OF EQUIPMENT

- A. The use of any equipment, or any part thereof for purposes other than testing even with the Owner's consent, shall not be construed to be an acceptance of the work on the part of the Owner, nor be construed to obligate the Owner in any way to accept improper work or defective materials.

- B. Do not use Owner's lamps for temporary lighting except as allowed and directed by the Owner. Equip lighting fixtures with new lamps when the project is turned over to the Owner.

1.17 COORDINATION

- A. Coordinate arrangement, mounting, and support of electrical equipment:
 - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 3. To allow right of way for piping and conduit installed at required slope.
 - 4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 8 Section "Access Doors and Frames."
- D. Coordinate electrical testing of electrical, mechanical, and architectural items, so equipment and systems that are functionally interdependent are tested to demonstrate successful interoperability.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to raceways and piping systems installed at a required slope.

3.2 DEMOLITION WORK

- A. All demolition of existing electrical equipment and materials will be done by this Contractor unless otherwise indicated. Include all items such as, but not limited to, electrical equipment, devices, lighting

fixtures, conduit, and wiring called out 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. In general, demolition work is indicated on the Drawings. However, the Contractor shall visit the job site to determine the full extent and character of this work.
- C. Unless specifically noted to the contrary, removed materials shall not be reused in the work. Salvaged materials that are to be reused shall be stored safe against damage and turned over to the appropriate trade for reuse. Salvaged materials of value that are not to be reused shall remain the property of the Owner unless such ownership is waived. Items on which the Owner waives ownership shall become the property of the Contractor, who shall remove and legally dispose of same, away from the premises.

3.3 INSTALLATION OF EQUIPMENT

- A. Install all equipment in strict accordance with all directions and recommendations furnished by the manufacturer. Where such directions are in conflict with the Drawings and Specifications, report such conflicts to the Architect/Engineer for resolution.

3.4 WORK IN EXISTING BUILDINGS

- A. The Owner will provide access to existing buildings as required. Access requirements to occupied buildings shall be identified on the project schedule. The Contractor, once Work is started in the existing building, shall complete same without interruption so as to return work areas as soon as possible to Owner.
- B. Adequately protect and preserve all existing and newly installed Work. Promptly repair any damage to same at Contractor's expense.
- C. Consult with the Owner's Representative as to the methods of carrying on the Work so as not to interfere with the Owner's operation any more than absolutely necessary. Accordingly, all service lines shall be kept in operation as long as possible and the services shall only be interrupted at such time as will be designated by the Owner's Representative.
- D. Prior to starting work in any area, obtain approval for doing so from a qualified representative of the Owner who is designated and authorized by the Owner to perform testing and abatement of all hazardous materials including but not limited to, asbestos. The Contractor shall not perform any inspection, testing, containment, removal or other work that is related in any way whatsoever to hazardous materials under the Contract.

3.5 CHASES AND RECESSES

- A. Provided by the Contractor.

3.6 CUTTING, PATCHING AND DAMAGE TO OTHER WORK

- A. Refer to General Conditions for requirements.
- B. All cutting, patching and repair work shall be performed by the Contractor through approved, qualified subcontractors. Contractor shall include full cost of same in bid.

3.7 EXCAVATION AND BACKFILLING

- A. Provide all excavation, trenching, tunneling, dewatering and backfilling required for the electrical work. Coordinate the work with other excavating and backfilling in the same area.
- B. Backfill all excavations with well-tamped granular material. Backfill all excavations under wall footings with lean mix concrete up to underside of footings and extend concrete within excavation a minimum of four (4) feet each side of footing. Granular backfill shall be placed in layers not more than 8 inches in thickness, 95 percent compaction throughout with approved compaction equipment. Tamp, roll as required. Excavated material shall not be used.

3.8 EQUIPMENT CONNECTIONS

- A. Make connections to equipment and other items included in the work in accordance with the approved shop Drawings and rough-in measurements furnished by the manufacturers of the particular equipment furnished. All additional connections not shown on the Drawings, but called out by the equipment manufacturer's shop Drawings shall be provided.

3.9 CLEANING

- A. All debris shall be removed daily as required to maintain the work area in a neat, orderly condition.
- B. Final cleanup shall include, but not be limited to, washing of fixture lenses or louvers, switchboards, substations, motor control centers, panels, etc. Fixture reflectors and lenses or louvers shall be left with no water marks or cleaning streaks.

3.10 PROTECTION AND HANDLING OF EQUIPMENT AND MATERIALS

- A. Equipment and materials shall be protected from theft, injury or damage.
- B. Protect conduit openings with temporary plugs or caps.
- C. Provide adequate storage for all equipment and materials delivered to the job site. Location of the space will be designated by the Owner's representative or Architect/Engineer. Equipment set in place in unprotected areas must be provided with temporary protection.

3.11 EXTRA WORK

- A. For any extra electrical work which may be proposed, this Contractor shall furnish to the General Contractor, an itemized breakdown of the estimated cost of the materials and labor required to complete this work. The Contractor shall proceed only after receiving a written order from the Engineer establishing the agreed price and describing the work to be done.

3.12 DRAWINGS AND MEASUREMENTS

- A. These Specifications and accompanying Drawings are intended to describe and provide for finished work. They are intended to be cooperative, and what is called for by either shall be as binding as if call for by both. The Contractor understands that the work herein described shall be complete in every detail.

- B. The Drawings are not intended to be scaled for rough-in measurements nor to serve as Shop Drawings. Field measurements necessary for ordering materials and fitting the installation to the building construction and arrangement are the Contractor's responsibility. The Contractor shall check latest Architectural Drawings and locate light switches from same where door swings are different from Electrical Drawings.

END OF SECTION 26 0010

SECTION 26 0519 - CONDUCTORS AND CABLES

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.
- B. Related Sections include the following:
 - 1. Division 26 Section "Electrical Identification" for conductor and cable color-coding.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Qualification Data: For testing agency.
- C. Field Quality-Control Test Reports: From a qualified testing and inspecting agency engaged by Contractor.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Testing agency as defined by OSHA in 29 CFR 1910.7 or a member company of the InterNational Electrical Testing Association and that is acceptable to authorities having jurisdiction.
 - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- B. Manufacturers, Copper:
 - 1. Aetna.
 - 2. Cerro Wire.
 - 3. Encore.
 - 4. Prysmian.
 - 5. Service Wire.
 - 6. Southwire.
 - 7. United Copper.
- C. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- D. Refer to Part 3 "Conductor and Insulation Applications" Article for insulation type, cable construction, and ratings.
- E. Conductor Material: Copper complying with NEMA WC 70; stranded conductor.
- F. Conductor Insulation Types: Type THHN-THWN, complying with NEMA WC 70.

2.2 CONNECTORS AND SPLICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AFC Cable Systems, Inc.
 - 2. AMP Incorporated/Tyco International.
 - 3. Hubbell/Anderson.
 - 4. O-Z/Gedney; EGS Electrical Group LLC.
 - 5. 3M Company; Electrical Products Division.
 - 6. T & B.
 - 7. Burndy.
 - 8. ILSCO.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR AND INSULATION APPLICATIONS

- A. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

- B. Feeders Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.
- C. Feeders Concealed in Concrete, below Slabs-on-Grade, and in Crawlspace: Type THHN-THWN, single conductors in raceway.
- D. Exposed Branch Circuits, including in Crawlspace: Type THHN-THWN, single conductors in raceway.
- E. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway Metal-clad cable, Type MC.

3.2 INSTALLATION

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."
- F. Seal around cables penetrating fire-rated elements according to Division 7 Section "Through-Penetration Firestop Systems."
- G. Each feeder shall be of the same conductor and insulation material (phase, neutral, and parallel).
- H. Identify and color-code conductors and cables according to Division 26 Section "Electrical Identification."
- I. All wiring shall be installed in conduit or approved raceway. All raceways shall be provided with a ground conductor unless noted otherwise on the Contract Documents.
- J. Use conductor not smaller than 12 AWG for power and lighting circuits. Unless indicated otherwise, all circuits shall be 2#12, 1#12G, $\frac{3}{4}$ "C.
- K. Use conductor not smaller than 14 AWG for control circuits, provided by Electrical Contractor.
- L. Use suitable cable fittings and connectors.
- M. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- N. Clean conductor surfaces before installing lugs and connectors.
- O. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- P. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and larger.
- Q. Use piercing connector with insulating covers for conductor splices and taps, 8 AWG and larger.
- R. Use Sta-Kon connectors to terminate stranded conductors #10 AWG and smaller to screw terminals.

- S. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
- T. Provide a separate neutral conductor for each circuit.
- U. Electrical Contractor shall be responsible for derating of conductors as required by N.E.C.
- V. AC/MC cable shall not be used.

3.3 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
 - 1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.
 - 2. Use compression type terminations for aluminum conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.4 FIELD QUALITY CONTROL

- A. Testing: Perform the following field quality control tests in accordance with Division 26 section "Electrical Testing"
 - 1. Description: Test all feeders rated 100 A and above.
 - 2. Visual and Mechanical Inspection
 - a. Inspect cables for physical damage and proper connection in accordance with the one line diagram.
 - b. Test cable mechanical connections with an infrared survey.
 - c. Check cable color-coding against project Specifications and N.E.C. requirements.
 - 3. Electrical Tests
 - a. Perform insulation resistance test on each conductor with respect to ground and adjacent conductors. Applied potential to be 1000 volts dc for 1 minute.
 - b. Perform continuity test to insure proper cable connection.
 - 4. Test Values
 - a. Minimum insulation resistance values shall be not less than fifty mega-ohms.
- B. Test Reports: Prepare a written report to record the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION 26 0519

SECTION 26 0526 - GROUNDING AND BONDING

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.
- B. Related Sections include the following:
 - 1. Division 26 Section "Lightning Protection" for additional grounding and bonding materials.
 - 2. Division 26 Section "Electrical General Requirements".
 - 3. Division 26 Section "Conductors and Cables".

1.3 REFERENCES

- A. ASTM B 3: Specification for Soft or Annealed Copper Wire.
- B. ASTM B 8: Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard or Soft.
- C. ASTM B 33: Specification for Tinned Soft or Annealed Copper Wire for Electrical Purposes.
- D. ASTM B 187: Specification for Copper, Bus Bar, Rod, and Shapes and General Purpose Rod, Bar, and Shapes.
- E. IEEE 81: Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System.

- F. IEEE 142: Grounding of Industrial and Commercial Power Systems.
- G. IEEE C2: National Electrical Safety Code.
- H. NETA MTS – 2001: Maintenance Testing Specifications.
- I. NFPA 70: National Electrical Code.
- J. NFPA 70B: Recommended Practice for Electrical Equipment Maintenance.
- K. NFPA 780: Lightning Protection Code.
- L. TIA/EIA 607: Commercial Building Grounding and Bonding Requirements Standard.
- M. UL 467: Grounding and Bonding Equipment.
- N. UL 486 A: Wire Connectors and Soldering Lugs for Use with Copper Conductors.
- O. UL 486B: Wire Connectors for Use with Aluminum Conductors.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Data: For the following:
 - 1. Ground rods.
- C. Qualification Data: For firms and persons specified in "Quality Assurance" Article.
- D. Field Test Reports: Submit written test reports to include the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
 - 4. Indicate overall system resistance to ground.
 - 5. Indicate overall Telecommunications system resistance to ground.

1.5 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Division 26 "Electrical General Requirements".
- B. Accurately record actual locations of grounding electrodes and connections to building steel.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Refer to specification section "Electrical Testing."
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - 1. Comply with UL 467.

- C. Comply with NFPA 70; for overhead-line construction and medium-voltage underground construction, comply with IEEE C2.
- D. Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system.
- E. Comply with ANSI/TIA/EIA-607 "Standard for Commercial Building Grounding and Bonding Requirements for Telecommunications".
- F. Comply with ANSI/IEEE 1100 -1992 "Powering and Grounding Sensitive Electronic Equipment".

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Grounding Conductors and Cables:
 - a. Refer to Division 26 Section "Conductors and Cables".
 - 2. Grounding Rods:
 - a. American Electric-Blackburn.
 - b. Apache Grounding/Erico Inc.
 - c. Chance/Hubbell.
 - 3. Mechanical Connectors:
 - a. American Electric-Blackburn.
 - b. Burndy.
 - c. Chance/Hubbell.
 - 4. Exothermic Connections:
 - a. Cadweld.

2.2 GROUNDING CONDUCTORS

- A. For insulated conductors, comply with Division 26 Section "Conductors and Cables."
- B. Material: Copper.
- C. Equipment Grounding Conductors: Insulated with green-colored insulation.
- D. Isolated Ground Conductors: Insulated with green-colored insulation with yellow stripe. On feeders with isolated ground, use colored tape, alternating bands of green and yellow tape to provide a minimum of three bands of green and two bands of yellow.
- E. Grounding Electrode Conductors: Stranded cable.
- F. Underground Conductors: Bare, stranded, copper unless otherwise indicated.
- G. Bare Copper Conductors: Comply with the following:

1. Solid Conductors: ASTM B 3.
2. Assembly of Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.

H. Copper Bonding Conductors: As follows:

1. Bonding Conductor: Stranded copper conductor; size per the NEC.
2. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; size per the NEC.
3. Tinned Bonding Jumper: Tinned-copper tape, braided copper conductors, terminated with copper ferrules; size per the NEC.

2.3 CONNECTOR PRODUCTS

- A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.
- B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.
- C. Welded Connectors: Exothermic-welded type, in kit form, and selected for the specific application per manufacturer's written instructions.
- D. Compression-Type Connectors: Pure, wrought copper, per ASTM B187.

2.4 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel.
 1. Size: 3/4 in diameter.
 2. Length: 120 inches.

PART 3 - EXECUTION

3.1 EQUIPMENT GROUNDING

- A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.
- B. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.
- C. Underground Grounding Conductors: No. 2/0 AWG minimum. Bury at least 24 inches below grade or bury 12 inches above duct bank when installed as part of the duct bank.
- D. In raceways, use insulated equipment grounding conductors.
- E. Install equipment grounding conductors in all feeders and circuits. Terminate each end on suitable lugs, bus or bushing.
- F. Verify specific equipment grounding requirements with the manufacturer's recommendations.

3.2 CONNECTIONS

- A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 - 4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
 - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections, except those at test wells. Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. Equipment Grounding Conductor Terminations
 - 1. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and larger.
 - 2. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
- D. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.
- E. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- F. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.3 INSTALLATION

- A. Equipotential Ground: Interconnect grounding electrodes to form one, electrically continuous, equipotential grounding electrode system. Grounding electrodes to be interconnected include:
 - 1. Ground rods.
- B. Common Ground Bonding with Lightning Protection System: Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor. Install in conduit where routed above grade.
- C. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage. Install in conduit where routed above grade.
- D. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor

locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.

- E. Equipment Grounding: Provide a permanent and continuous bonding of conductor enclosures, equipment frames, power distribution equipment ground busses, cable trays, metallic raceways, and other non-current carrying metallic parts of the electrical system.

3.4 FIELD QUALITY CONTROL

- A. Testing: Perform the following field quality control tests in accordance with Division 26 section "Electrical Testing"
 - 1. Inspect grounding and bonding system conductors and connections for tightness and proper installation and for compliance with the Drawings and Specifications.
 - 2. After installing grounding system but before permanent electrical circuitry has been energized, test for compliance with requirements.
 - a. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal.
 - b. Measure ground resistance not less than two full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - c. Perform tests, by the fall-of-potential method according to IEEE 81. Instrumentation utilized shall be as defined in Section 12 of IEEE 81 and shall be specifically designed for ground impedance testing. Provide sufficient spacing so that curves flatten in the 62% area of the distance between the item under test and the current electrode.
 - d. Equipment Grounds: Utilize two-point method of IEEE 81. Measure between equipment ground being testing and known low-impedance grounding electrode or system.
 - 3. Provide drawings locating each ground rod and ground rod assembly and other grounding electrodes, identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
 - 4. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer promptly and include recommendations to reduce ground resistance.

3.5 GRADING AND PLANTING

- A. Restore surface features, including vegetation, at areas disturbed by Work of this Section. Reestablish original grades, unless otherwise indicated. If sod has been removed, replace it as soon as possible after backfilling is completed. Restore areas disturbed by trenching, storing of dirt, cable laying, and other activities to their original condition. Include application of topsoil, fertilizer, lime, seed, sod, sprig, and mulch. Comply with Division 2 Section "Landscaping." Maintain restored surfaces. Restore disturbed paving as indicated.

END OF SECTION 26 0526

SECTION 26 0529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.
- B. Related Sections include the following:
 - 1. Division 26 Section "Vibration and Seismic Controls for Electrical Systems" for products and installation requirements necessary for compliance with seismic criteria.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. IMC: Intermediate metal conduit.
- C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- C. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Comply with NFPA 70.

1.6 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. ERICO International Corporation.
 - d. GS Metals Corp.
 - e. Thomas & Betts Corporation.
 - f. Unistrut; Tyco International, Ltd.
 - g. Wesanco, Inc.
 - 2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - 3. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 - 4. Channel Dimensions: Selected for applicable load criteria.
- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

- F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Hilti Inc.
 - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 3) MKT Fastening, LLC.
 - 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
 2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) Hilti Inc.
 - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 5) MKT Fastening, LLC.
 3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 6. Toggle Bolts: All-steel springhead type.
 7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with:
 - a. Two-bolt conduit clamps
- D. Spring-steel clamps shall not be used.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
 - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
 - 6. To Steel:
 - a. Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
 - b. Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69
 - c. Spring-tension clamps.
 - 7. To Light Steel: Sheet metal screws.
 - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel support systems attached to substrate.
- E. Slotted support systems applications:
 - 1. Indoor dry and damp Locations: Painted Steel
 - 2. Outdoors and interior wet locations: Galvanized Steel
 - 3. Corrosive Environments, including pool equipment rooms: Nonmetallic
- F. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.
- G. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.
- H. Obtain permission from Architect/Engineer before using powder-actuated anchors.
- I. Obtain permission from Architect/Engineer before drilling or cutting structural members.

- J. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
- K. Install surface-mounted cabinets and panelboards with minimum of four anchors.
- L. In wet and damp locations use steel channel supports to stand cabinets and panelboards one inch off wall.
- M. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.
- N. The Contractor shall replace all supports and channels that sag, twist, and/or show signs of not providing proper structural support, to the equipment, it is intended for, as determined by the Owner and Architect/Engineer. All costs associated with replacing supports and steel channels shall be incurred by the Contractor.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

- A. Provide concrete bases for all floor mounted electrical equipment.
- B. Base/Pad Construction:
 - 1. Construct per manufacturer's recommendations for particular equipment, including suggested piers and dowel rods.
 - 2. Construct concrete bases for primary and secondary power distribution equipment per requirements of the electrical utility, where submitted for its review.
- C. Anchor equipment to base per both supports and equipment manufacturer's instructions.
- D. Coordinate conduit openings and sleeve locations in base with requirements of equipment to be supported.
 - 1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around full perimeter of the base.
 - 2. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.

3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

- B. Touchup: Comply with requirements in Division 09 painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 0529

SECTION 26 0533 - RACEWAYS AND BOXES

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- B. Related Sections include the following:
 - 1. Division 07 Section, "Penetration Firestopping" for firestopping materials and installation at penetrations through walls, ceilings, and other fire-rated elements.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. ENT: Electrical nonmetallic tubing.
- C. FMC: Flexible metal conduit.
- D. IMC: Intermediate metal conduit.
- E. LFMC: Liquidtight flexible metal conduit.
- F. LFNC: Liquidtight flexible nonmetallic conduit.

- G. RNC: Rigid nonmetallic conduit.
- H. PVC: Polyvinyl Chloride.
- I. HDPE: High Density Polyethylene.

1.4 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.
- C. All work in natatoriums, pool areas and fountain structures shall be in accordance with N.E.C. article 680, "Swimming Pools, Fountains, and Similar Installations."

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Alflex Inc.
 - 3. Allied Tube Triangle Century.
 - 4. Anamet Electrical, Inc.; Anaconda Metal Hose.
 - 5. International Metal Hose.
 - 6. Electri-Flex Co
 - 7. Grinnell Co./Tyco International; Allied Tube and Conduit Div.
 - 8. LTV Steel Tubular Products Company – Manhattan/CDT/Cole-Flex.
 - 9. Maverick.
 - 10. O-Z Gedney; unit of General Signal.
 - 11. Wheatland.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. EMT: ANSI C80.3.
- D. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
 - 1. Fittings for EMT: Steel, set-screw type.

2.2 BOXES, ENCLOSURES, AND CABINETS

- A. Sheet Metal Outlet and Device Boxes: NEMA OS 1. Shall be used within walls or ceiling.

- B. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

2.3 SLEEVES FOR RACEWAYS

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."

2.4 SLEEVE SEALS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Advance Products & Systems, Inc.
 - 2. Calpico, Inc.
 - 3. Metraflex Co.
 - 4. Pipeline Seal and Insulator, Inc.
- B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.
 - 1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
 - 2. Pressure Plates: Carbon steel. Include two for each sealing element.
 - 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.5 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Provide raceways in interior and exterior locations in accordance with the "Raceway Application Matrix" included on the drawings.
- B. Boxes and Enclosures, Exterior Aboveground: NEMA 250, Type 3R.
- C. Minimum Raceway Size: 3/4-inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

3.2 INSTALLATION

- A. Install conduit in accordance with NECA "National Electrical Installation Standards".
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."
- E. Install temporary closures to prevent foreign matter from entering raceways.
- F. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above the finished slab.
- G. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.
- H. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
 1. Install concealed raceways with a minimum of bends in the shortest practical distance, considering type of building construction and obstructions, unless otherwise indicated.
- I. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.
 1. Run parallel or banked raceways together on common supports.
 2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.
- J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- K. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- L. Tighten set screws of threadless fittings with suitable tools.
- M. Terminations:
 1. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.
 2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.
- N. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
- O. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate

having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 2. Where conduits route through, to, or from a hazardous classified space (Class I or II), provide proper seal offs when exiting or entering the hazardous classified space.
 3. Where conduits pass between spaces that are maintained at two different vapor pressures.
 4. Where otherwise required by NFPA 70.
- P. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections.
- Q. Do not route feeders across roof.
- R. Route conduits in finished areas with exposed ceilings at underside of structural deck or as high as possible.

3.3 SLEEVE INSTALLATION FOR ELECTRICAL AND COMMUNICATIONS PENETRATIONS

- A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Through-Penetration Firestop Systems."
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Rectangular Sleeve Minimum Metal Thickness:
1. For sleeve cross-section rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
 2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.
- E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- F. Cut sleeves to length for mounting flush with both surfaces of walls.
- G. Extend sleeves installed in floors 2 inches above finished floor level.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.
- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 7 Section "Joint Sealants" for materials and installation.
- J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials. Comply with Division 7 Section "Through-Penetration Firestop Systems."
- K. Roof-Penetration Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.

3.4 SLEEVE-SEAL INSTALLATION

- A. Install to seal underground, exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.5 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Through-Penetration Firestop Systems."

3.6 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.7 CLEANING

- A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and repair damaged finishes.

END OF SECTION 26 0533

SECTION 26 0553 - ELECTRICAL IDENTIFICATION

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Identification for raceway and metal-clad cable.
 - 2. Identification for conductors and communication and control cable.
 - 3. Equipment identification labels.
 - 4. Miscellaneous identification products.

1.3 QUALITY ASSURANCE

- A. Comply with ANSI A13.1 and ANSI C2.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.145.

1.4 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.

- D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 RACEWAY AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Color for Printed Legend:
 - 1. Power Circuits: Black letters on an orange field.
 - 2. Legend: Indicate system or service and voltage, if applicable.
- C. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

2.2 CONDUCTOR, COMMUNICATION AND CONTROL CABLE IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

2.3 EQUIPMENT IDENTIFICATION LABELS

- A. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. Black letters on a white background. Minimum letter height shall be 3/8 inch.
- B. Outdoor Equipment Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Accessible Raceways and Metal-Clad Cables More Than 600 V: Identify with "DANGER-HIGH VOLTAGE" in black letters at least 2 inches high, with self-adhesive vinyl labels. Repeat legend at 10-foot maximum intervals.
- B. Accessible Raceways and Cables of Auxiliary Systems: Identify the following systems with color-coded, self-adhesive vinyl tape applied in bands:
- C. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use marker tape. Identify each ungrounded conductor according to source and circuit number as indicated on Drawings. Identify control circuits by control wire number as indicated on shop drawings.
- D. Branch-Circuit Conductor Identification: Mark junction box covers in indelible ink with the panel and breaker numbers of other circuits contained within.

- E. Conductor Identification: Locate at each conductor at panelboard gutters, pull boxes, outlet and junction boxes, and each load connection or termination point.
- F. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
 - 1. Labeling Instructions:
 - a. Indoor Equipment: Engraved, laminated acrylic or melamine label mechanically secured.
 - 2. Equipment to Be Labeled: If included on project. All items may not be on project.
 - a. Disconnect switches.

3.2 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location:
 - 1. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
 - 2. Conduit Markers: Provide identification for each power conduit containing conductors rated 400A or greater.
- C. Apply identification devices to surfaces after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Attach nonadhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.
- F. System Identification Color Banding for Raceways and Cables: Each color band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- G. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Use the colors listed below for ungrounded service, feeder, and branch-circuit conductors.
 - 1. Color shall be factory applied or, for sizes larger than No. 10 AWG if authorities having jurisdiction permit, field applied.
 - 2. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - 3. Colors for 480/277-V Circuits:
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.

4. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

H. Label information arrangement for 3 lines of text.

1. Line one shall describe the panel or equipment. Line one example: "DP-XX," "RP-XX," "T-XX," "EF-XX," etc.
2. Line two shall describe the first disconnecting means feeding this panel or equipment. Line two example: "Fed from DP-XX," "Fed from RP-XX," etc.
3. Line three indicates that location of the disconnecting means as identified in line two. Line three example: "First Floor Elect. Rm #XXX."
4. Line four shall include "Via T-XX" when panel or equipment is fed from a transformer.

I. Examples:

RP-1A FED FROM DP-1A ELECTRICAL ROOM A100 VIA T-1A	EF-1 FED FROM MCC-1A MECHANICAL ROOM F101	LP-1A LOCATED IN ELECTRICAL ROOM A100
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- J. Fusible Enclosed Switches and Distribution Equipment: Install self-adhesive vinyl label indicating fuse rating and type on the outside of door on each fused switch.
- K. Painted Identification: Prepare surface and apply paint according to Division 9 painting Sections.
- L. Degrease and clean surface to receive nameplates.
- M. Install nameplate and labels parallel to equipment lines.
- N. Secure nameplate to equipment front using screws.
- O. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.
- P. Identify conduit using field painting where required.
- Q. Paint red colored band on each fire alarm conduit and junction box.
- R. Paint bands 10 feet on center, and 4 inches minimum in width.

END OF SECTION 26 0553

SECTION 26 0999 - ELECTRICAL TESTING

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.
- B. Related Sections include the following:
 - 1. Division 26 Section "Electrical General Requirements."
 - 2. Division 26 Section "Conductors and Cables."
 - 3. Division 26 Section "Enclosed Switches."
 - 4. Division 26 Section "Surge Protective Devices"
 - 5. Division 26 Section "Fuses."

1.2 SECTION INCLUDES

- A. The Electrical Contractor shall engage the services of a recognized corporately independent N.E.T.A. certified testing firm for the purpose of performing inspections and tests as herein specified
- B. The testing firm shall provide all material, equipment, labor, and technical supervision to perform such tests and inspections.
- C. It is the intent of these tests to assure that all tested electrical equipment is operational and within industry and manufacturer's tolerances and is installed in accordance with design Specifications.
- D. The test and inspections shall determine suitability for energization.
- E. Equipment to be tested and inspected shall be the equipment shown on the one line diagram and schedules as required by part three of each individual Specification Section. In addition, all equipment that is part of an emergency distribution system shall be tested.

1.3 REFERENCES

- A. All inspections and tests shall be in accordance with the latest version of the following codes and standards except as provided otherwise herein.
 - 1. National Electrical Manufacturer's Association - NEMA

2. American Society for Testing and Materials - ASTM
3. Institute of Electrical and Electronic Engineers - IEEE
4. InterNational Electrical Testing Association - NETA Acceptance Testing Specifications - ATS-1996
5. InterNational Electrical Testing Association - NETA Maintenance Testing Specifications-MTS-1997
6. American National Standards Institute - ANSI C2: National Electrical Safety Code
7. State and Local Codes and Ordinances
8. Insulated Cable Engineers Association - ICEA
9. Association of Edison Illuminating Companies - AEIC
10. Occupational Safety and Health Administration
11. National Fire Protection Association - NFPA
 - a. ANSI/NFPA 70: National Electrical Code
 - b. ANSI/NFPA 70B: Electrical Equipment Maintenance
 - c. NFPA 70E: Electrical Safety Requirements for Employee Workplaces
 - d. ANSI/NFPA 101: Life Safety Code

1.4 QUALIFICATIONS

- A. The testing firm shall be a corporately independent testing organization, which can function as an unbiased testing authority, professionally independent of the manufacturers, suppliers, and installers of equipment or systems evaluated by the testing firm.
- B. The testing firm shall be regularly engaged in the testing of electrical equipment devices, installations, and systems.
- C. The lead, on site, technical person and at least 50% of the on site crew shall be currently certified by the InterNational Electrical Testing Association (NETA) or National Institute for Certification in Engineering Technologies in Electrical Power Distribution System Testing.
- D. The testing firm shall only utilize technicians who are regularly employed by the firm on a full-time basis for testing services.
- E. The Contractor shall submit proof of the above qualifications with bid proposal.
- F. The terms used herewithin such as Test Agency, Test Contractor, Testing Laboratory, or Contractor Test Company, shall be construed to mean the testing organization.
- G. Acceptable Testing Firms:
 1. Northern Electrical Testing; Phone (248) 689-8980.
 2. Utilities Instrumentation Services; Phone (734) 482-1450.
 3. Emerson/High Voltage Maintenance Corporation; Phone (248) 305-5596.
 4. Powertech Services, Inc.; Phone (810) 720-2280.
 5. Magna Electric; Phone (248) 667-9492.
 6. Power Plus Engineering, Inc. Phone (248) 344-0200.

1.5 PERFORMANCE REQUIREMENTS

- A. The Electrical Contractor shall supply a suitable and stable source of electrical power to each test site. The testing firm shall specify the power requirements.
- B. The Electrical Contractor shall notify the testing firm when equipment becomes available for acceptance tests. Work shall be coordinated to expedite project scheduling.
- C. The testing firm shall notify the Owner's Representative prior to commencement of any testing.

- D. Any system, material or workmanship, which is found defective on the basis of acceptance tests, shall be reported to the Engineer. The Electrical Contractor shall correct all defects.
- E. The testing organization shall maintain a written record of all tests and shall assemble and certify a final test report.
- F. Safety and Precautions
 - 1. Safety practices shall include, but are not limited to, the following requirements:
 - a. Occupational Safety and Health Act.
 - b. Accident Prevention Manual for Industrial Operations, National Safety Council.
 - c. Applicable state and local safety operating procedures.
 - d. NETA Safety/Accident Prevention Program.
 - e. Owner's safety practices.
 - f. National Fire Protection Association - NFPA 70E.
 - g. American National Standards for Personnel Protection.
 - 2. All tests shall be performed with apparatus de-energized except where otherwise specifically required.
 - 3. The testing organization shall have a designated safety representative on the project to supervise operations with respect to safety.

1.6 TEST INSTRUMENT CALIBRATION

- A. Test Instrument Calibration
 - 1. The testing firm shall have a calibration program, which assures that all applicable test instruments are maintained within rated accuracy.
 - 2. The accuracy shall be directly traceable to the National Institute of Standards and Technology.
 - 3. Instruments shall be calibrated in accordance with the following frequency schedule:
 - a. Field instruments: Analog - 6 months maximum Digital - 12 months maximum
 - b. Laboratory instruments: 12 months
 - c. Leased specialty equipment: 12 months
(Where accuracy is guaranteed by Lessor)
 - 4. Dated calibration labels shall be visible on all test equipment.
 - 5. Records must be kept up-to-date which show date and results of instruments calibrated or tested.
 - 6. An up-to-date instrument calibration instruction and procedures shall be maintained for each test instrument.
 - 7. Calibrating standard shall be of higher accuracy than that of the instrument tested.
- B. Field Test Instrument Standards
 - 1. All equipment used for testing and calibration procedures shall exhibit the following characteristics:
 - a. Maintained in good visual and mechanical condition.
 - b. Maintained in safe, operating condition.
- C. Suitability of Test Equipment
 - 1. All test equipment shall be in good mechanical and electrical condition.
 - 2. Selection of metering equipment should be based on knowledge of the waveform of the variable being measured. Digital multi-meters may be average of RMS sensing and may include or exclude the dc component. When the variable contains harmonics of dc offset and, in general, any deviation

- from a pure sine wave, average sensing, average measuring RMS scaled meters may be misleading. Use of RMS measuring meters is recommended.
3. Field test metering used to check power system meter calibration must have any accuracy higher than that of the instrument being checked.
 4. Accuracy of metering in test equipment shall be appropriate for the test being performed.
 5. Waveshape and frequency of test equipment output waveforms shall be appropriate for the test and tested equipment.

1.7 TEST REPORTS

- A. A test report shall be generated for each piece of major equipment or groups of equipment and shall include the following:
 1. A list of visual and mechanical inspections required by Division 26 Specification Sections in a checklist or similar format.
 2. Test reports, including test values where applicable, for all required electrical tests. Clearly indicate where test values fall outside of the limits of recommended values.
 3. Summary and interpretation of test results detailing problems located and recommended corrective measures.
 4. Record of infrared scan and photos showing potential problem locations.
 5. Signed and dated by the testing firm field superintendent stating that all required tests have been completed.
- B. Test reports shall be furnished to the Architect/Engineer within 14 days of the completion each test on an ongoing basis. Original copies of the reports shall be furnished directly to the Architect/Engineer by the testing company prior to formal submittal via the Contractors.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.1 THERMOGRAPHIC SURVEY

- A. Visual and Mechanical Inspection
 1. Remove all necessary covers prior to scanning.
 2. Inspect for physical, electrical, and mechanical condition.
- B. Equipment to be Scanned
 1. All components of the distribution system down to and including branch circuit panelboards and motor control centers. Return 3 months after equipment has been energized and loaded to do a final scan of all equipment.
- C. Provide report indicating the following:
 1. Problem area (location of "hot spot").
 2. Temperature rise between "hot spot" and normal or reference area.
 3. Cause of heat rise.
 4. Phase unbalance, if present.
 5. Areas scanned.

D. Test Parameters

1. Scanning distribution system with ability to detect 1°C between subject area and reference at 30°C.
2. Equipment shall detect emitted radiation and convert detected radiation to visual signal.
3. Infrared surveys should be performed during periods of maximum possible loading but not less than twenty percent (20%) of rated load of the electrical equipment being inspected.

E. Test Results

1. Interpretation of temperature gradients requires an experienced technician. Some general guidelines are:
 - a. Temperature gradients of 37°F to 44.6°F indicate possible deficiency and warrant investigation.
 - b. Temperature gradients of 37°F to 59°F indicate deficiency; repair as time permits.
 - c. Temperature gradients of 61°F and above indicate major deficiency; repair immediately.

END OF SECTION 26 0999

SECTION 26 2413 - SWITCHBOARDS

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes service and distribution switchboards rated 600 V and less.

1.3 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. GFCI: Ground-fault circuit interrupter.
- C. RFI: Radio-frequency interference.
- D. RMS: Root mean square.
- E. SPDT: Single pole, double throw.

1.4 SUBMITTALS

- A. Product Data: For each type of switchboard, overcurrent protective device, transient voltage suppression device, ground-fault protector, accessory, and component indicated. Include dimensions, utility or manufacturer's anchorage and base recommendations, and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Related Submittals:

1. Provide overcurrent device coordination study to demonstrate proper overcurrent device ratings, adjustments, and settings.
- C. Shop Drawings: For each switchboard and related equipment.
 1. Dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings. Include the following:
 - a. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
- D. Field quality-control test reports including the following:
 1. Test procedures used.
 2. Test results that comply with requirements.
 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- E. Operation and Maintenance Data: For switchboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1, include the following:
 1. Routine maintenance requirements for switchboards and all installed components.
 2. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
 3. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association and that is acceptable to authorities having jurisdiction.
 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association to supervise on-site testing specified in Part 3.
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for switchboards including clearances between switchboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 MANUFACTURED UNITS

A. Manufacturers:

1. Siemens Industries, Inc.

2.3 OVERCURRENT PROTECTIVE DEVICES

- A. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.
- B. Fuses are specified in Division 26 Section "Fuses."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install switchboards and accessories according to NEMA PB 2.1 and NECA 40.
- B. Install overcurrent protective devices, transient voltage suppression devices, and instrumentation.
 - 1. Set field-adjustable switches and circuit-breaker trip ranges.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section "Electrical Identification."
- B. Switchboard Nameplates: Label each switchboard compartment with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

3.4 FIELD QUALITY CONTROL

- A. Prepare for acceptance tests as follows:
 - 1. Test insulation resistance for each switchboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- B. Testing: Perform the following field quality control tests in accordance with Division 26 section "Electrical Testing."
 - 1. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Sections 7.1, 7.5, 7.6, 7.9, 7.10, 7.11, and 7.14 as appropriate. Certify compliance with test parameters.

2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Perform the following infrared scan tests and inspections and prepare reports:
 - a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switchboard. Remove front panels so joints and connections are accessible to portable scanner.
 - b. Instruments, Equipment, and Reports:
 - 1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - 2) Prepare a certified report that identifies switchboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 CLEANING

- A. On completion of installation, inspect interior and exterior of switchboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overcurrent protective devices.

END OF SECTION 26 2413

SECTION 26 2416 - PANELBOARDS

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. GFCI: Ground-fault circuit interrupter.
- C. RFI: Radio-frequency interference.
- D. RMS: Root mean square.
- E. SPDT: Single pole, double throw.

1.3 SUBMITTALS

- A. Product Data: For each type of overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Field quality-control test reports including the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association and that is acceptable to authorities having jurisdiction.
 - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- B. Source Limitations: Obtain overcurrent protective devices, components, and accessories through one source from a single manufacturer.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of panelboards and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- E. Comply with NEMA PB 1.
- F. Comply with NFPA 70.

1.5 PROJECT CONDITIONS

- A. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
 - 1. Notify Owner no fewer than seven days in advance of proposed interruption of electrical service.
 - 2. Do not proceed with interruption of electrical service without Owner's written permission.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Overcurrent Protective Devices to match existing.

2.2 OVERCURRENT PROTECTIVE DEVICES

- A. Molded-Case Circuit Breaker: NEMA AB 3, with interrupting capacity to meet available fault currents.
 - 1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits.
 - a. Circuit Breakers 250A and Larger: Magnetic trip element with front-mounted, field-adjustable trip setting with restricted access cover.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install overcurrent protective devices and controllers.
 - 1. Set field-adjustable switches and circuit-breaker trip ranges.

3.2 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section "Electrical Identification."
- B. Create a directory to indicate installed circuit loads after balancing panelboard loads or created by retrofitting. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable. Coordinate final directory room names and numbers with Owner.

3.3 CONNECTIONS

- A. Ground equipment according to Division 26 Section "Grounding and Bonding."
- B. Connect wiring according to Division 26 Section "Conductors and Cables."

3.4 FIELD QUALITY CONTROL

- A. Prepare for acceptance tests as follows:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- B. Testing: Perform the following field quality control tests in accordance with Division 26 section "Electrical Testing"
 - 1. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers. Certify compliance with test parameters. Perform electrical tests on all breakers and switches 200A and above or that constitute a component of an emergency distribution system. Main circuit breakers in branch circuit panelboards 225A and below are not required to be tested.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3.5 CLEANING

- A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION 26 2416

SECTION 26 2813 - FUSES

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

1. Cartridge fuses rated 600 V and less for use in switches.

1.3 SUBMITTALS

- A. Product Data: Include the following for each fuse type indicated:

1. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
2. Let-through current curves for fuses with current-limiting characteristics.
3. Time-current curves, coordination charts and tables, and related data.
4. Fuse size for elevator feeders and elevator disconnect switches.

- B. Ambient Temperature Adjustment Information: If ratings of fuses have been adjusted to accommodate ambient temperatures, provide list of fuses with adjusted ratings.

1. For each fuse having adjusted ratings, include location of fuse, original fuse rating, local ambient temperature, and adjusted fuse rating.
2. Provide manufacturer's technical data on which ambient temperature adjustment calculations are based.

- C. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Division 1 Section "Closeout Procedures," include the following:

- a. Let-through current curves for fuses with current-limiting characteristics.
- b. Time-current curves, coordination charts and tables, and related data.
- c. Ambient temperature adjustment information.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain fuses from a single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with:
 1. NEMA FU 1 – Low Voltage Cartridge Fuses.
 2. NFPA 70 – National Electrical Code.
 3. UL 198C – High-Interrupting-Capacity Fuses, Current-Limiting Types.
 4. UL 198E – Class R Fuses.
 5. UL 512 – Fuseholders.

1.5 PROJECT CONDITIONS

- A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F or more than 100 deg F, apply manufacturer's ambient temperature adjustment factors to fuse ratings.

1.6 COORDINATION

- A. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Fuses: Quantity equal to 10% percent of each fuse type and size, but no fewer than one of each type and size.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Cooper Bussman, Inc.
 2. Eagle Electric Mfg. Co., Inc.; Cooper Industries, Inc.
 3. Ferraz Shawmut, Inc.
 4. Tracor, Inc.; Littelfuse, Inc. Subsidiary.

2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, nonrenewable cartridge fuse; class and current rating indicated; voltage rating consistent with circuit voltage.
 - 1. Other Branch Circuits: Class RK5, time delay.

2.3 FLUORESCENT AND H.I.D. LIGHTING BALLAST FUSES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cooper Bussman, Inc. – GLR fuses with HLR holder.
 - 2. Tracor, Inc.; Littelfuse, Inc. Subsidiary – LGR fuses with LHR-000 holder.
 - 3. Ferraz Shawmut, Inc. – SLR fuses.
- B. Provide each fluorescent and HID lighting ballast with individual protection on the line side.
- C. Provide fuse and holder mounted within or as part of the fixture.
- D. Provide fuse size and type recommended by the fixture manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
- B. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Fuses shall be shipped separately. Any fuses shipped installed in equipment, shall be replaced by the Electrical Contractor with new fuses as specified above prior to energization at no additional expense to Owner. All fuses shall be stored in moisture free packaging at job site and shall be installed immediately prior to energization of the circuit in which it is applied.
- B. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.
- C. Install spare-fuse cabinet(s).

3.3 IDENTIFICATION

- A. Install labels indicating fuse rating and type on outside of the door on each fused switch.

END OF SECTION 26 2813

SECTION 26 2816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Related Sections include the following:
 - 1. Division 26 Section "Fuses".

1.2 SUMMARY

- A. This Section includes the following individually mounted, enclosed switches and circuit breakers:
 - 1. Fusible switches.
 - 2. Nonfusible switches.

1.3 DEFINITIONS

- A. GD: General duty.
- B. GFCI: Ground-fault circuit interrupter.
- C. HD: Heavy duty.
- D. RMS: Root mean square.
- E. SPDT: Single pole, double throw.

1.4 REFERENCES

- A. NECA 1: Practices for Good Workmanship in Electrical Contracting.
- B. NETA ATS: Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- C. NEMA 250: Enclosures for Electrical Equipment (1000 Volts Maximum).
- D. NEMA AB 1: Molded Case Circuit Breakers and Molded Case Switches.
- E. NEMA FU 1: Low Voltage Cartridge Fuses.
- F. NEMA KS 1: Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
- G. NEMA PB1.1: General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less.
- H. NEMA PB2.1: General Instructions for Proper Installation, Operation, and Maintenance of Deadfront Switchboards Rated 600 Volts or Less.
- I. NFPA 70: National Electrical Code.

1.5 SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
 - 1. Enclosure types and details for types other than NEMA 250, Type 1.
 - 2. Current and voltage ratings.
 - 3. Short-circuit current rating.
 - 4. UL listing for series rating of installed devices.
 - 5. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Qualification Data: For testing agency.
- D. Field quality-control test reports including the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- E. Manufacturer's field service report.
- F. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Closeout Procedures," include the following:
 - 1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
 - 2. Time-current curves, including selectable ranges for each type of circuit breaker.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
 - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.
- D. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions, unless otherwise indicated:
 - 1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
 - 2. Altitude: Not exceeding 6600 feet.

1.8 COORDINATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with other construction, including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.9 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Spares: For the following:
 - a. Fuses for Fusible Switches: Equal to 10 percent of amount installed for each size and type, but no fewer than 3 of each size and type.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FUSIBLE AND NONFUSIBLE SWITCHES

A. Manufacturers:

1. Eaton Corporation; Cutler-Hammer Products.
2. General Electric Co.; Electrical Distribution & Control Division.
3. Siemens Industries, Inc.
4. Square D/Group Schneider.

B. Fusible Switch: NEMA KS 1, quick make, quick-break load interrupter enclosed knife switch Type HD, with clips or bolt pads to accommodate specified fuses, externally operable lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.

C. Nonfusible Switch: NEMA KS 1, quick make, quick-break load interrupter enclosed knife switch Type HD, externally operable lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.

D. Accessories:

1. Provide early break auxiliary contacts in motor disconnect switches for motors that are fed from variable frequency controllers.
2. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
3. Neutral Kit: Internally mounted; insulated, capable of being grounded, and bonded; and labeled for copper and aluminum neutral conductors.
4. Auxiliary Contact Kit: Auxiliary set of contacts arranged to open before switch blades open.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with applicable portions of NECA 1, NEMA PB 1.1, and NEMA PB 2.1 for installation of enclosed switches and circuit breakers.
- B. Mount individual wall-mounting switches and circuit breakers with tops at uniform height, unless otherwise indicated. Anchor floor-mounting switches to concrete base.
- C. Install switches with off position down.
- D. Install NEMA KS 1 enclosed switch where indicated for motor loads $\frac{1}{2}$ HP and larger and equipment loads greater than 30A.

- E. Install toggle disconnect switch, surface mounted, where indicated for motor loads less than ½ HP and equipment loads 30A. and less.
- F. Install fuses in fusible disconnect switches.
- G. Install flexible liquid tight conduit from toggle disconnect switch to portable equipment. Leave a 6'-0" (1830 mm) whip.
- H. Install flexible liquid tight conduit from toggle disconnect switch to stationary equipment.
- I. Install control wiring from early break contacts in motor disconnect switch to variable frequency controllers to shut down controller when switch is open.
- J. Install equipment on exterior foundation walls at least one inch (25 mm) from wall to permit vertical flow of air behind breaker and switch enclosures.
- K. Support enclosures independent of connecting conduit or raceway system.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section "Electrical Identification."
- B. Enclosure Nameplates: Label each enclosure with engraved metal or laminated-plastic nameplate as specified in Division 26 Section "Electrical Identification."
- C. Provide adhesive label as specified in Division 26 Section "Electrical Identification" on inside door of each switch indicating UL fuse class and size for replacement.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- B. Prepare for acceptance testing as follows:
 - 1. Inspect mechanical and electrical connections.
 - 2. Verify switch and relay type and labeling verification.
 - 3. Verify rating of installed fuses.
 - 4. Inspect proper installation of type, size, quantity, and arrangement of mounting or anchorage devices complying with manufacturer's certification.
- C. Testing Agency: Engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- D. Perform the following field tests and inspections and prepare test reports:
 - 1. Test mounting and anchorage devices according to requirements in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
 - 2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.5 for switches. Certify compliance with test parameters.
 - 3. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3.5 ADJUSTING

- A. Set field-adjustable switches and circuit-breaker trip and time delay settings to values as determined by the protective device coordination study.

3.6 CLEANING

- A. On completion of installation, vacuum dirt and debris from interiors; do not use compressed air to assist in cleaning.
- B. Inspect exposed surfaces and repair damaged finishes.

END OF SECTION 26 2816

SECTION 26 4113 - LIGHTNING PROTECTION

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Contractor sections, apply to work of this section.
- B. Related Sections include the following:
 - 1. Division 26 Section "Electrical General Requirements."

1.2 GENERAL REQUIREMENTS

- A. Provide a complete lightning protection system including all labor, materials and installation as specified herein.
- B. The entire system shall be copper and shall be installed as a concealed (in finished areas) system as required.
- C. Installers of system shall be registered with Underwriters' Laboratories and certified by the Lightning Protection Institute.
- D. The entire system shall be installed according to the Contractors of the Underwriters' Laboratories Master Label Code No. U/L-96A. Upon completion of installation deliver to the Architect/Engineer, for the Owner, the "U/L Master Label Plate."
- E. The installation of this system shall be subcontracted in its entirety, by the Electrical Contractor to a fully qualified Lightning Protection Contractor having no less than five years of continuous experience in this area, and being able to certify his having made installations similar to this and of this size or larger and shall submit a list of similar buildings on which he has installed a Master Label Lightning Protection system within the past five years.

1.3 REFERENCES

- A. ANSI/NFPA 780 - Lightning Protection Code.
- B. ANSI/UL 96 - Lightning Protection Components.

- C. LPI - Lightning Protection Institute.
- D. UL 96A - Installation Requirements for Lightning Protection Systems.

1.4 SUBMITTALS

- A. Submit shop Drawings and product data under provisions of Section 26 0100.
- B. Submit shop Drawings showing layout of air terminals, grounding electrodes, and bonding connections to structure and other metal objects. Include terminal, electrode, and conductor sizes, and connection and termination details.
- C. Submit product data showing dimensions and materials of each component, and include indication of listing in accordance with ANSI/UL 96.

1.5 PROJECT RECORD DOCUMENTS

- A. Submit project record documents under provisions of Section 26 0100.
- B. Accurately record actual locations of air terminals, grounding electrodes, bonding connections, and routing of system conductors.

1.6 SEQUENCING AND SCHEDULING

- A. Coordinate the work of this Section with roofing and exterior and interior finish installations.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Ground rods shall be copper clad minimum 5/8 inches by 10 feet, Thompson #225, or approved equal.
- B. Cable to ground rod connector shall be heavy duty cast copper bronze, Thompson #231, or approved equal.
- C. Connecting cable from steel column to ground rod shall be heavy duty Class II Copper cable, Thompson #28R, exothermic or approved equal.
- D. Bonding plates used to connect ground cable to steel columns shall be heavy duty with a minimum bonding surface or 8 square inches, Thompson #586, or approved equal.
- E. Copper air terminals shall be minimum 10 inches long, 1/2 inch diameter base, solid copper with nickel chrome plate finish, blunt tip Thompson 55BT, or approved equal.
- F. Cable to ground rod connector shall be heavy duty cast copper bronze, Thompson #230, or approved equal.
- G. "Through the roof" connectors shall be solid brass or stainless steel rods with vice grip connectors at each end: connectors shall be adjustable for roof thickness, Thompson #709, or approved equal.

- H. Roof Conductors - Copper conductor cable shall be 32 strands of 17 gauge, 99.97% pure copper wires, smooth twist, braided basket weave center with a minimum weight of 230 pounds per 1000 feet, Thompson #32S, or approved equal.
- I. All equipment used in this installation shall be U/L listed and manufactured by Thompson Lightning Protection Company or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Lightning Protection Contractor shall provide, design and install the entire system, furnishing all labor, materials and equipment, incidental thereto for a complete and functional installation.
- B. This is a structural steel building and the structural steel framework shall be utilized as the main down conductors of the lightning protection system. The use of cable down conductors will not be permitted.
- C. Grounding of the steel columns around the perimeter of the building shall average not over 60 feet apart and in no case shall the distance between any two such grounds exceed 66 feet.
- D. Connections between ground rods and structural steel columns shall be made with heavy duty Class II copper conductor.
- E. Ground rods shall be electrically driven to a minimum of 12 feet below grade level and shall be driven vertically with no slant permitted without specific approval of the Engineer.
- F. All connections, except where otherwise specifically approved or accepted, shall be bronze bolt and nut clamps.
- G. Spacing between air terminals shall not exceed 20 feet.
- H. Where the building exceeds 50 feet in width, provide center roof protection.
- I. Wherever system components pass through the roof, install "through the roof" assemblies to insure a water tight connection. In no case shall cable be brought through the roofing material.
- J. The lightning protection Contractor shall subcontract a roofing Contractor to provide flashing for all "through the roof" assemblies passing through built up roofing and it shall be this roofing Contractors responsibility to install the flashing to insure a water tight condition.
- K. All mechanical and electrical equipment on the roof shall be bonded to the lightning protection system as required.
- L. Wherever vents, ducts, exhausts, and motorized vents made of aluminum are to be bonded to a copper system, a proper aluminum to copper connector shall be used.
- M. In no case shall metal copings of fasciae be substituted for the main roof conductor. However, such metal copings or fasciae shall be bonded to the main roof conductor with an approved connector at intervals not exceeding 100 feet apart.
- N. It is intended that this shall be a complete and functional Lightning Protection system and anything necessary to accomplish this is to be provided as if herein written. All work shall be installed in a neat and workmanlike manner and in accordance with the latest standards of the industry.

3.2 FIELD QUALITY CONTROL

- A. Obtain the services of Underwriters Laboratories, Inc. to provide inspection and certification of the lightning protection system under provisions of UL 96A.
- B. Obtain UL Master Label and attach to building at location directed by Engineer.

END OF SECTION 26 4113

SECTION 26 4313 – SURGE PROTECTIVE DEVICES

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes SPDs for low-voltage power and equipment.

1.3 REFERENCES

- A. ANSI/IEEE C62.32: IEEE Standard Test Specifications for Low-Voltage Air Gap Surge-Protective Devices (Excluding Valve and Expulsion Type Devices).
- B. ANSI/IEEE C62.41: IEEE Guide on Surge Voltages in Low Voltage AC Power Circuits.
- C. ANSI/IEEE C62.45: IEEE Guide on Surge Testing for Equipment Connected to Low-Voltage AC Power Circuits.
- D. NEMA 250: Enclosures for Electrical Equipment (1000 Volts Maximum).
- E. NEMA LS 1: Low Voltage Surge Protection Devices.
- F. NETA ATS: Acceptance Testing Specifications: "Surge Arresters, Low-Voltage Surge Protection Devices".
- G. NFPA 70: National Electrical Code.

- H. NFPA 75: Standard for the Protection of Electronic Computer/Data Processing Equipment.
- I. UL 1283: Electromagnetic Interference Filters.
- J. UL 1449 Third Edition: Surge Protective Devices.

1.4 DEFINITIONS

- A. ATS: Acceptance Testing Specifications.
- B. SVR: Suppressed voltage rating.
- C. SPD: Surge Protective Devices.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Include rated capacities, operating weights, dimensions, mounting provisions, operating characteristics, furnished specialties, and accessories.
 - 2. Provide connection details and wiring diagrams indicating how SPD device is integrated within panelboards and switchgear.
- B. Product Certificates: For surge protective devices, signed by product manufacturer certifying compliance with the following standards:
 - 1. UL 1283.
 - 2. UL 1449.
- C. Field quality-control test reports, including the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Failed test results and corrective action taken to achieve requirements.
- D. Operation and Maintenance Data: For surge protective devices to include in emergency, operation, and maintenance manuals.
- E. Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain SPD's and accessories through one source from a single manufacturer. SPD units integral to switchboards, distribution panelboards and branch circuit panelboards shall be warranted and supported by the panelboard manufacturer.
- B. Product Options: Electrical performance of SPD is based on the specific system indicated. Refer to Division 1 Section "Product Requirements."
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

- D. Factory Testing: The specified system shall be factory-tested prior to shipment. Testing of each system shall include but not be limited to quality control checks, "Hi-Pot" tests per UL requirements, IEEE C62.41 Category B and C surge tests, UL ground leakage tests and operational and calibration tests.
- E. Comply with IEEE C62.41, "IEEE Guide for Surge Voltages in Low Voltage AC Power Circuits," and test devices according to IEEE C62.45, "IEEE Guide on Surge Testing for Equipment Connected to Low-Voltage AC Power Circuits."
- F. Comply with NEMA LS 1, "Low Voltage Surge Protection Devices." Provide independent test reports demonstrating complete system performance showing compliance.
- G. Comply with UL 1283, "Electromagnetic Interference Filters," and UL 1449, "Surge Protective Devices."

1.7 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than seven days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Owner's written permission.
- B. Service Conditions: Rate surge protection devices for continuous operation under the following conditions, unless otherwise indicated:
 - 1. Maximum Continuous Operating Voltage: Not less than 115 percent of nominal system operating voltage.
 - 2. Operating Frequency: 47 to 63 Hz.
 - 3. Operating Temperature: -40 to 140 deg F.
 - 4. Humidity: 0 to 95 percent, noncondensing.
 - 5. Altitude: Less than 20,000 feet above sea level.

1.8 COORDINATION

- A. Coordinate location of field-mounted surge suppressors to allow adequate clearances for maintenance.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of surge suppressors that fail in materials or workmanship within five years from date of Substantial Completion.

1.10 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Replaceable Protection Modules: One of each size and type installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cutler-Hammer, Inc.; Eaton Corporation.
2. General Electric Company.
3. Siemens Industries, Inc.
4. Square D; Schneider Electric.
5. Current Technology.

2.2 SURGE PROTECTIVE DEVICE

A. Surge Protection Device Description: Sine-wave-tracking type, with the following features and accessories:

1. MOV technology for each suppression mode.
2. Fuses, rated at 200-kA interrupting capacity. Provide fusing for each suppression path.
3. Fabrication using bolted compression lugs for internal wiring. No plug-in component modules, quick disconnect terminals or printed circuit boards shall be used in current-carrying paths.
4. Integral disconnect switch which has been tested to the surge current rating of the SP to match or exceed the fault current rating of the board. Use of circuit breakers for disconnecting means is acceptable.
5. LED indicator lights for power and protection status for each phase mounted in panelboard front cover:
 - a. Green indicates fully operational circuit.
 - b. Red indicates loss of protection.
6. EMI-RFI Noise Rejection: based on MIL-STD-E220A, 50-ohm standard Insertion Loss Test:
 - a. 34dB at 100 kHz.
 - b. 51dB at 1 MHz.
 - c. 54dB at 10 MHz.
 - d. 48dB at 100 MHz.
7. The maximum continuous operating voltage (MCOV) for all voltage configurations shall be 115% if nominal or greater.
8. Audible alarm, with silencing switch, to indicate when protection has failed.

B. Peak Single-Impulse Surge Current Rating for service entrance equipment (B2 Rating): 240 kA per phase; 120 kA per mode based on a single pulse, IEEE C62.41 standard 8 x 20 microsecond waveform. Device shall not suffer more than 10% deviation in clamping voltage at specified surge current.

C. Minimum Repetitive Surge Current Capability: 10,000 for service entrance and 5,000 for distribution panels and panelboards impulse per mode in accordance with ANSI/IEEE C62.41 and ANSI/IEEE C62.45 utilizing a Category C3 bi-wave at one minute intervals without suffering either performance degradation or more than 10% deviation of specified UL 1449 Suppression Voltage Ratings at specified surge current.

D. Connection Means:

1. External: Cable connection, parallel wired.

E. Protection modes and UL 1449 Listed and Recognized Component Surge Voltage Rating for grounded wye circuits with voltages of 480Y/277V, 3-phase, 4-wire circuits shall not exceed the following:

1. Line to Neutral: 1200V.
2. Line to Ground: 1200V
3. Neutral to Ground: 1200V
4. Line to Line: 2000V

- F. Protection modes and UL 1449 Listed and Recognized Component Surge Voltage Rating for grounded wye circuits with voltages of 208Y/120V, 3-phase, 4-wire circuits shall not exceed the following:

1. Line to Neutral: 700V.
2. Line to Ground: 700V
3. Neutral to Ground: 700V
4. Line to Line: 1500V

- G. Protection modes and UL 1449 Listed and Recognized Component SVR for voltages of 480V, 3-phase, 3-wire, delta circuits shall not exceed the following:

1. Line to Line: 2000V
2. Line to Ground: 2000V.

2.3 ENCLOSURES

- A. NEMA 250, with type matching the enclosure of panel or device being protected.

PART 3 - EXECUTION

3.1 INSTALLATION OF SURGE PROTECTION DEVICES

- A. Surge protective devices shall be factory installed in all new distribution equipment.
- B. Install devices at service entrance on load side, with ground lead bonded to service entrance ground.
- C. Install devices for service entrance equipment and panelboards with conductors or buses between suppressor and points of attachment as short and straight as possible. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.
1. Provide a dedicated disconnect for suppressor as indicated on one line or in panel schedules.

3.2 PLACING SYSTEM INTO SERVICE

- A. Do not energize or connect distribution equipment to their sources until surge protection devices are installed and connected.

3.3 FIELD QUALITY CONTROL

- A. Testing: Perform the following field tests and inspections and prepare test reports. Test all service entrance and electronic grade panelboard suppressors.
1. After installing surge protection devices, but before electrical circuitry has been energized, test for compliance with requirements.
 2. Complete startup checks according to manufacturer's written instructions.

3. Perform each visual and mechanical inspection and electrical test stated in NETA ATS, "Surge Arresters, Low-Voltage Surge Protection Devices" Section. Certify compliance with test parameters.

- a. Visual and Mechanical Inspection

- 1) Inspect for physical damage and compare nameplate data with Drawings and Specifications.
- 2) Inspect for proper mounting and adequate clearances.
- 3) Check ground lead on each device for individual attachment to ground bus or ground electrode.

- B. Remove and replace malfunctioning units and retest as specified above.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain surge protection devices. Refer to Division 1.

END OF SECTION 26 4313