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**Attachment 1: Prevailing Wages for this Project.**

**Drawings:** Separate Documents
INVITATION TO BID

PROJECT: Dillman Hall - Fire Alarm and Mass Notification System

DUE DATE: Until 2:00 P.M. local time on November 12th, 2015, the Owner will receive sealed proposals for the work as herein set forth at the offices of:

Attn. Penny Foetisch
Facilities Management
100 Facilities Building - Waterfront
1400 Townsend Drive
Michigan Technological University
Houghton, MI   49931

at which time and place all proposals will be publicly opened and read aloud.

DOCUMENTS: Bidding documents consisting of proposal forms, plans, specifications, and other pertinent data can be viewed and downloaded from the Facilities Management web site at the following address: http://www.mtu.edu/facilities/planning/bids/ Please call Project Engineer at 906-487-2305, Jim Rathbun if you have technical questions.

WALK THROUGH: Bidders are invited to a mandatory Pre-Bid Walk-through 2 PM October 22nd 2015 in 1st floor lobby of Dillman Hall on Michigan Tech’s campus.

PROPOSAL GUARANTEE: All bidders submitting bids in excess of $50,000 must provide a certified check or bank draft payable to Michigan Technological University, or a satisfactory Bid Bond executed by the Bidder and surety company, in an amount equal to but not less than five percent (5%) of the maximum proposal amount.

CONTRACT SECURITY: The successful bidders will be required to furnish a satisfactory performance bond and labor and material payment bond in amounts each of one-hundred percent (100%) of the accepted bid.

EQUAL EMPLOYMENT OPPORTUNITY: All bidders submitting bids in excess of $50,000.00 must be certified by the Department of Civil Rights for compliance with the State of Michigan Equal Employment Opportunity requirements prior to submission of bids. A copy of the bidder’s valid certificate of compliance or award ability shall be submitted with the proposal. Failure to enclose the certificate with the proposal will not disqualify the bidder providing a valid certificate is submitted within a time acceptable to the owner.

Michigan Technological University reserves the right to reject any or all bids and to waive any informality or irregularity in any bid received.

Michigan Technological University is an equal opportunity educational institution/equal opportunity employer, which includes providing equal opportunity for protected veterans and individuals with disabilities.

Invitation to Bid
001113-1
10/15/2015
Attn: Penny Foetisch  
Facilities Management  
Michigan Technological University  
1400 Townsend Drive  
Houghton, MI 49931-1295

Having carefully read the specifications and drawings dated October 15, 2015 for the Dillman Hall - Fire Alarm and Mass Notification System Project, the undersigned agrees to perform the work in accordance with Invitation to Bid No. **14-16-01**

The undersigned also agrees to complete all work for this project by January 30, 2016 or sooner

Our bid to furnish and install all materials complete is:

$______________________________

(Bid price in numbers and words)

Bidder acknowledges receipt of the following addenda:

Addendum No. ______________ Dated: ______________
Addendum No. ______________ Dated: ______________
Addendum No. ______________ Dated: ______________

Name: ________________________ Date: __________

(Signature)

Name: _______________________

(Print)

Title: _________________________

Firm: _________________________

Sealed proposals will be received at Facilities Management, Bldg. 44, on the waterfront of Michigan Technological University, Houghton, Michigan until 2:00 P.M. on November 12, 2015.

(Return one copy to Facilities Management. Retain one copy for your files.)

MICHIGAN TECHNOLOGICAL UNIVERSITY  
DILLMAN HALL - FIRE ALARMS & MASS NOTIFICATION SYSTEM  
14-16-01

BID PROPOSAL FORM 14-16-01
# MICHIGAN TECHNOLOGICAL UNIVERSITY

**DILLMAN HALL - FIRE ALARMS & MASS NOTIFICATION SYSTEM**

**14-16-01**

**005200 Agreement between Contractor and Owner for Construction (DRAFT)**

<table>
<thead>
<tr>
<th>Owner:</th>
<th>Michigan Tech University, 1400 Townsend Dr., Houghton, MI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project:</td>
<td>Fire Alarm and Mass Notification Project – Dillman Hall</td>
</tr>
<tr>
<td>Project #:Owner:</td>
<td>14-16-01</td>
</tr>
<tr>
<td>Contract for:</td>
<td>Purchase and installation of a new fire alarm and mass notification system including, new fire panel, detectors, alarm devises, strobes and speakers. The system will be connected through University Telecom connections to MTU’s Public Safety and Police ServicesDepartment.</td>
</tr>
<tr>
<td>Contractor:</td>
<td>TBD</td>
</tr>
<tr>
<td>Contract Start Date:</td>
<td>TBD</td>
</tr>
<tr>
<td>Contract Completion Date:</td>
<td>January 30, 2016 or Date of Final Payment</td>
</tr>
</tbody>
</table>

This Agreement, is authorized and made to be effective as of this day of ___________ between Michigan Technological University, a Michigan constitutional corporation located in Houghton, Michigan, (the “University”) and < >, (the “Contractor”), a corporation located at < >, for contract services to be provided by the Contractor, to the University for, and in connection with, the following described project located at the University’s campus in Houghton, Michigan. The Contractor and the Owner, agree as follows:

**ARTICLE 1 - THE CONTRACT DOCUMENTS:**

The Contract Documents consists of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Specifications, Construction Plans/Drawings, etc. as listed in this Agreement and Modifications issued after execution of this Agreement; these form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents other than Modifications, appears in Article 6.

**ARTICLE 2 - SCOPE OF THE WORK:**

The Contractor shall furnish all of the materials and perform all of the Work shown on the Drawings and described in the Specifications for DILLMAN HALL FIRE AND MASS NOTIFICATION SYSTEM-01 Fire Alarm and Mass Notification Project – Dillman Hall, prepared by Michigan Tech Facilities Management, 1400 Townsend Dr., Houghton, MI, 49931.

The Project consists of the purchase and installation of a new fire alarm and mass notification system

DRAFT CONTRACT

010001- 1

10/15/2015
including, detectors, alarm devises, strobes and speakers. The system will be connected through University Telecom connections to MTU’s Police and Public Safety Department.

ARTICLE 3 - TIME OF COMPLETION:

The Work to be performed under this Contract shall begin_________ or Date of Notice to Proceed, and shall be substantially completed on or before the Completion Date, January 30, 2016 or Date of Final Payment.

ARTICLE 4 - PROGRESS PAYMENTS:

Michigan Tech shall make payments as provided in Articles 1.2.14 of the General Requirements and 012900 Payment Procedures and conditions set forth and agreed upon herein:

Based upon Applications for Payment submitted to Michigan Tech by the Contractor and Certificates for Payment issued by Michigan Tech, Michigan Tech shall make payments on the Total Contract Amount to the Contractor as provided below and elsewhere in the Contract Documents.

The period covered by each Application for Payment shall be one month ending on the 14th of each month.

Each Application for Payment and Conditional Waiver and Release on Progress Payment shall be based upon schedule of values consistent with format of AIA Documents G702, G703. The schedule of values (G703) shall allocate the entire Total Contract Amount among the various portions of the Work and supported by such data to substantiate its accuracy as Michigan Tech may require. This schedule of values, unless objected to by Michigan Tech, shall be used as a basis for reviewing the Contractor’s Application for Payment.

Applications for Payment shall indicate the percentage of completion of each portion of Work as of the end of the period covered by the Application for Payment. The amount of each Application for Payment (progress payment) shall be computed by:

1) Multiply the percentage complete of each portion of the work by the share of the Total Contract Amount allocated to that portion of the Work in the schedule of values, less retainage of ten (10%). Pending final determination of cost to Michigan Tech of changes in the Work, changes for amounts not in the dispute may be included per Section 1.2.8 of the General Requirements. The Total Contract Amount must be adjusted to reflect the changes in the Work by Change Order, then payment shall be allocated as to the completed portion of the Work in the adjusted schedule of values, less retainage of ten (10%).
2) The portion of the Total Contract Amount that is materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by Michigan Tech, suitably stored off the site at a location agreed upon in writing), may be included in the Application for Payment less retainage ten (10%).

3) The amount of the Application for Payment requested shall not include any previous payments made by Michigan Tech.

4) The amount of the Application for Payment requested shall not include any previous amounts that Michigan Tech has withheld or a nullified Application for Payment.

5) Michigan Tech shall review the Application for Payment and sign it certifying it, thus it will become a Certificate of Payment.

6) Provided an Application for Payment and Conditional Waiver and Release on Progress Payment are received and approved by Michigan Tech, Michigan Tech shall make payment to the Contractor not later than thirty (30) days after receipt of the Application for Payment.

ARTICLE 5 - ACCEPTANCE AND FINAL PAYMENTS:

Final Payment, constituting the entire unpaid balance of the Total Contract Amount, shall be made by Michigan Tech to the Contractor when (1) the Contract has been fully performed by the Contractor except for the Contractor’s responsibility to correct nonconforming Work as provided in Subparagraph 1.2.12. of the General Conditions and to satisfy other requirements, if any, which necessarily survive final payment; and (2) a Final Certificate for Payment has been issued by Michigan Tech.

1) The Contractor may request in writing that Michigan Tech issue Substantial Completion. Upon receipt of written notice that the Work is ready for inspection and acceptance, Michigan Tech shall promptly inspect the Work.

2) When the Work has been Substantially Completed and accepted, Michigan Tech shall issue upon request by the contractor, Substantial Completion and a Final Completion Checklist as necessary. Upon completion of the Final Completion Checklist and upon request by the Contractor, Michigan Tech shall complete a Certificate of Completion. Michigan Tech shall make payments up to ninety five percent (95%); less such amounts as determined by Michigan Tech for incomplete Work, unsettled claims, and any Work that is materially delayed through no fault of the Contractor; of the Total Contract Amount of the balance due for that portion of the Work Substantially Completed and accepted.
3) The Contractor may request in writing that Michigan Tech issue a Certificate of Final Completion and Final Payment upon completion of the Final Completion Checklist. Upon receipt of written notice that the Work is ready for final inspection and acceptance, Michigan Tech shall promptly inspect the Work.

4) When Michigan Tech finds the work is sufficiently complete per the Final Completion Checklist and Contract Documents in their entirety, Michigan Tech shall promptly issue the Certificate of Final Completion that states that the Work provided in this Contract is complete,

and that the Final Payment is due the Contractor, as noted in the Certificate of Substantial Completion. Final payment shall be due thirty (30) days after the Contract is fully performed.

ARTICLE 6 - THE CONTRACT DOCUMENTS:

The Contract Documents, together with this Agreement, form the Contract, and they are as fully a part of the Contract as attached:

- Specifications for this project dated 10/15/2015 as listed in the Table of Contents
- Drawings for this project dated 10/15/2015 as listed on the Cover Sheet
- Any Addendum issued prior to the bid date.

The Contractor’s signature on this Agreement indicates that the Contractor has read and will comply with each of these documents.
ARTICLE 7 - THE CONTRACT AMOUNT:

The **Contract Lump Sum** is as noted below.

The amount shown below shall be both in words and in figures. In case of discrepancy, the amount shown in words shall govern.

<table>
<thead>
<tr>
<th>Base Bid Lump Sum</th>
<th>$ __________</th>
</tr>
</thead>
</table>

IN WITNESS, WHEROF, each of the parties has caused this Contract to be executed by its duly authorized representatives on the date first mentioned above.

**FOR THE CONTRACTOR**

________________________________________/________________________

Signature   Date

Title ______________________________________________

**FOR MICHIGAN TECHNOLOGICAL UNIVERSITY**

________________________________________  Ellen S. Horsch
Date  ________________  S. Horsch
Vice President for Administration
010000 - GENERAL REQUIREMENTS

1. INSTRUCTION TO BIDDERS

1.1. PREPARATION OF PROPOSALS: All proposals shall include supplying all materials, equipment, and labor, and shall be submitted on the attached proposal form. The forms are to be filled out in ink or typewriter and signed with the bidder's agent's signature in longhand. Each proposal shall be delivered in an opaque sealed envelope marked with the project name, Bid No., and bidders name.

1.1.2. FACSIMILE BID: No telephonic, telegraphic or digital facsimile (FAX) bid or telephonic, telegraphic or digital facsimile (FAX) modification of a bid will be considered. No bids received after the time fixed for receiving them will be considered. Late bids will be filed unopened.

1.1.3. BID GUARANTEE: Each proposal for which the base bid exceeds $50,000.00 shall be accompanied by either a certified or cashier's check on an open, solvent bank or a bid bond with an authorized surety company in the amount of 5% of the base bid, payable to Michigan Technological University, as a guarantee of good faith. If the successful bidder fails to furnish satisfactory bonds and insurance as required by the General Conditions within 7 days after notice of award, such guarantee shall be forfeited to the Owner as liquidated damages and the Owner shall be entitled at its sole option to immediately cancel, revoke, withdraw, or rescind its award. The guarantees of the three lowest bidders will be retained until the bond and insurance of the Contractor have been approved by the University. The guarantees of all other bidders will be returned within 10 days after the bid opening.

1.1.4. REJECTION OR WITHDRAWAL: The Owner reserves the right to accept or reject any or all proposals, in whole or in part, and also reserves the right to waive any informalities or irregularities in any or all proposals and to make such award as it deems, in its sole discretion, to be in the best interest of the Owner. No bid may be withdrawn within 60 days after opening date without forfeiting bid security.

1.1.5. CONTRACT: Upon acceptance of any proposal by the Owner, a purchase order will be issued incorporating the accepted proposal and upon the Contractor furnishing satisfactory proof of compliance with all bond and insurance requirements will constitute the Contract. The Contract shall not be binding upon the Owner until the Contractor has furnished the Owner's Facilities Management Department satisfactory certification of compliance with the insurance and bond requirements under General Conditions and the Owner may withdraw or cancel its purchase order at any time prior to receipt of all such certifications.

1.1.6. TAXES: The Contractor shall include all applicable Michigan sales and use taxes currently imposed by Legislative enactment and as administered by the Michigan Department of Treasury, all applicable local or state permit, license or inspection fees, and all Federal taxes or fees applicable, and no additional payment over and above the bid amount shall be allowed for the same.

1.2. GENERAL CONDITIONS

1.2.1. DEFINITIONS

1.2.2. CONFLICT AND OMissions: The intent of the Contract Documents is to provide everything necessary for the proper execution of the work. In the event of conflict among or ambiguity in the Contract Documents the Contractor shall immediately notify the Director of Engineering Services and the work shall not proceed until a decision has been agreed upon by all parties concerned. Any adjustment or interpretation by the Contractor without such agreement shall be at his own risk and expense. No work stoppage by the Contractor will extend the time for completion.

1.2.3. ROYALTIES, PATENTS, NOTICES, AND FEES: The Contractor shall give all notices and pay all royalties and fees, shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof, and shall comply with all laws, ordinances, and codes applicable to any portion of the work.

1.2.4. EXAMINATION OF PREMISES: The Contractor shall become familiar with local and on-site conditions affecting the job and the cost thereof, shall take independent measurements and make an examination and determination of all physical conditions affecting the work, and be responsible for the correctness of same even if they differ from those anticipated or indicated in the Contract. The Contractor shall be held to have made such examinations prior to bid submission and no allowances will be made in his behalf nor will any additional expenses be recoverable by reason of any error, omission, or misunderstanding on the part of the Contractor even if such actual conditions differ from those anticipated or indicated in the Contract. In the event of any disagreement or ambiguity in the Contract Documents the Contractor shall immediately notify the Director of Engineering Services and the work shall not proceed until a decision has been agreed upon by all parties concerned. Any adjustment or interpretation by the Contractor without such agreement shall be at his own risk and expense. No work stoppage by the Contractor will extend the time for completion.

1.2.5. MOVING MATERIALS: If at any time it becomes necessary for the operation of the University to move materials temporarily located which are to enter into the final construction the Contractor furnishing the material shall, when so directed and without expense to the Owner, move them to another location.

1.2.6. MATERIALS AND WORKMANSHIP: All materials and workmanship shall be first-class in every respect and, unless otherwise specified, all materials and equipment shall be new and of the latest design. Should any disputes arise as to the quality and fitness of workmanship, equipment, materials or items, the decisions shall rest strictly with the University, and shall be based upon the requirements of the Contract Documents. The Contractor shall, if requested by the University, furnish evidence as to kind and quality of materials, at no additional cost to the University.

1.2.7. EMPLOYEES AND SUPERINTENDENCE: The Contractor shall enforce good order among his employees and
shall not employ on the work any negligent, disorderly, interperate or unfit person, or anyone not skilled in the work assigned. All work shall be performed in a skillful and workmanlike manner. The Contractor, or an authorized representative, shall be at the site at all times, and shall have the plans and specifications available.

1.2.8. EXTRA WORK AND CHANGES IN WORK: The Owner, without invalidating the Contract, may order extra work or make changes by altering, adding to or deducting from the work, the Contract sum being adjusted accordingly. All such work shall be executed under the conditions of the original contract except that any claim for extension of time caused thereby shall be adjusted at the time of ordering such change.

In giving instructions, the Owner shall have authority to make minor changes in the work, not involving extra cost, and not inconsistent with the purposes of the work, but otherwise, except in an emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order from the Owner and no claim for an addition to the Contract sum shall be valid unless as ordered.

When so directed, the Contractor shall promptly submit his itemized estimate and proposal for such extra work or changes, as well as separate unit prices on work for both additions to and deductions from the Contract.

Adjustments in the Contract sum for any such extra work or change shall be determined by one or more of the following methods:

Method Number 1: By an acceptable estimate and lump sum proposal from the Contractor.

Method Number 2: By unit prices stated in the Contract or subsequently agreed upon.

Method Number 3: By actual cost of all labor and materials and a percentage or fixed fee for all other charges, such as overhead, profit, insurance, taxes and bonds. On any change which involves a net credit to the Owner, no allowance for overhead and profit shall be figured.

If none of the foregoing methods is agreed upon, the Contractor, upon receipt of an order as hereinbefore stated, shall proceed with the work. In such case and also under Method Number 3, the Contractor shall keep and present in such form as the Owner may direct, a correct account of the cost, together with vouchers. In any case, the Owner shall certify to the amount including the specified allowance for overhead and profit, due the Contractor.

The allowable fee for added work by Contractor's own forces shall not exceed 15% of additional cost and his fee on work performed by Subcontractors shall not exceed 7 ½% of additional cost. Quotations by Subcontractors at all times shall be subject to these same limitations.

1.2.9. OTHER CONTRACTS: The Owner may let other contracts in connection with the work and the Contractor shall properly connect and coordinate all work with the work of such other contractors. The Owner shall not be liable for any damages or increased cost occasioned by the failure of other contractors to execute their work as may be anticipated by these Contract Documents. No contractor shall commit any act which will interfere with the performance of the work by any other contractor.

1.2.10. INSURANCE: No work connected with this Contract shall be started until the Contractor has submitted evidence, satisfactory to the Owner, depicting insurance coverage in accordance with the following:

1. Worker's Disability Insurance

The Contractor shall procure and shall maintain, during the life of this contract, Worker's Disability Insurance in work on the project under this Contract. In case any such work is sublet, the Contractor shall require the Subcontractor similarly to provide Worker's Disability Insurance for all of the latter's employees engaged in such work unless such employees are covered by the protection afforded by the Contractor's Worker's Disability Insurance. In case any class of employees engaged in hazardous work on the project under this Contract is not protected under the Worker's Disability Statute, the Contractor shall provide and shall cause each Subcontractor to provide Employer's General Liability Insurance for the protection of all such employees not otherwise protected.

2. General Liability Insurance

The Contractor shall carry, from the beginning of this Contract until completion of the same, general liability in the amount of $1,000,000 for each occurrence and $2,000,000 aggregate.

3. Property Insurance

The Contractor shall carry, from the beginning of this Contract until completion of the same, $100,000 for any single occurrence.

4. Builders' Risk Insurance

The Contractor will assume all risk of loss for the first $100,000 on any single occurrence of damage to property of Owner or any third party, including the subject of this contract. This may be effected by purchase of insurance or by self-insurance, and must be primary and non-contributory. The Owner will assume all risk of loss for property damage in excess of $100,000 for any single occurrence.

5. Worker's Compensation/Employer's Liability

The Contractor shall carry, from the beginning of this Contract until completion of the same, Worker's Compensation Employer's Liability in accordance with Statutory required by the State and $500,000 per accident.

6. Automobile Liability

The Contractor shall carry, from the beginning of this Contract until the completion of the same, $1,000,000 Required Personal Injury Protection benefits.
Partial payments shall not relieve the Contractor from full responsibility for any claim which may result from any cause, including fire or any other casualty, until completion of the Contract and final payment. Any casualties shall not relieve the Contractor from performing the Contract.

Contractor will indemnify and hold harmless the University from and against all claims, judgements, liability and expense of any nature due to bodily injury, personal injury or damage to property arising out of, on account of or in connection with contractors (or any employee, subcontractor or agent of contractor) performance of the work or activity pursuant to the contract.

1.2.11. BONDS: The successful Contractor of a project for which the base bid exceeds $50,000.00 shall furnish in form and with sureties acceptable to the Owner, a performance bond and a labor and material bond, each in the amount of 100% of the Contract sum, as security for the faithful performance of all Work undertaken under the Contract and all charges in connection therewith. The cost of the aforesaid bonds shall be paid by the Contractor and included in the Contract Sum. No work connected with the Project shall be started until the Contractor has placed bonds, in proper form, on file with the University.

1.2.12. NONCOMPLIANCE WITH CONTRACT-TERMINATION: The Owner, at its option, may order suspension of the Work in whole or in part for such time as it deems necessary because of the failure of the Contractor to comply with the contractual requirements. The contract completion date shall not be extended on account of any such suspension order by the Owner. In the event the Owner orders an suspension of the work, the Contractor shall not be entitled to any costs or damages resulting from such suspension; the Owner shall not in any manner be liable or responsible for such costs or damages. The rights of the Owner provided in this clause are in addition to any other rights or remedies provided under this Contract or by law.

In addition to all other rights and remedies contained herein, or at law or equity, the Owner may terminate this Contract when any default is not stopped, remedied or corrected within a reasonable length of time after notification by the Owner. In the event of such termination the Owner may complete the contracted work and the Contractor and his surety will be liable for any excess cost occasioned by the Owner. In such case the Owner may take possession of and utilize in completing the work such necessary materials and equipment as may be on the Site.

1.2.13. GUARANTEE: The Contractor shall provide a written guarantee warranting all work under this Contract against faulty workmanship and defective materials, and to make good, at his own expense and promptly upon request by the Owner, all defective work and all damage to other work caused by such defective work, for 1 year from the date of signing of the Owner's Certificate of Substantial Completion form. The provisions of this express warranty shall not affect or impair any of the Owner's rights under any other applicable, implied, or expressed warranties.

1.2.14. PAYMENT: Payment for the work will be made in one sum at the completion of the contract except that partial payments aggregating 90% of the value of the completed work may be made at monthly intervals. If the contractor expects to request partial payments he shall submit a schedule of costs and quantities of the various parts of the work aggregating the total contract sum. When applying for partial or full payments, the Contractor shall submit a statement based upon this schedule, itemized and supported as the Director of Facilities Management may require and a Sworn Statement and Conditional Waiver and Release on Progress Payment setting forth the amounts due each subcontractor, supplier, and laborer.

The Contract will not be considered complete until the work has been finally accepted by the Director of Facilities Management and the following have been furnished: (1) the required guarantee, and (2) a sworn statement that all payrolls, material bills, and other indebtedness connected with the work have been paid, including such lien waivers as the M may request.

No presence, inspection, supervision, testing, or monitoring by the Owner or by any agent or representative thereof shall relieve the Contractor of responsibility for compliance with the terms of and performance pursuant to this Contract and the Contract Documents; nor shall any such conduct of the Owner or its agents or representatives constitute or be interpreted as constituting a waiver of any rights whatsoever or serve to stop them from requiring full performance by the Contractor.

1.2.15. NON-DISCRIMINATION CLAUSE: In connection with the performance of work under this Contract, the Contractor agrees as follows:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, national origin, age, sex, height, weight, or marital status. Such action shall include, but not be limited to, the following: employment upgrading; demotion or transfer; recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, national origin, age, sex, height, weight, or marital status.

3. The Contractor or his collective bargaining representative will send, to each labor union or worker's representative with which he has a collective bargaining agreement or other contract or understanding, a notice advising the said labor union or worker's representative of the Contractor's commitments under this section.

4. The Contractor will comply with all published rules, regulations, directives, and orders of the Michigan Civil Rights Commission relevant to Article 6, 1976 PA 453, as amended, which may be in effect prior to the taking of bids for any individual State project, also elicit information as to the practices, policies, program, and employment statistics of each Subcontractor as the Contractor himself, and said Contractor will permit access to his books, records, and

GENERAL CONDITIONS
010000 - 3
10/15/2015
accounts by the Michigan Civil Rights Commission, and/or its agent, for purposes of investigation to ascertain compliance with this Contract and with rules, regulations, and orders of the Michigan Civil Rights Commission relevant to Article 6, 1976 PA 453, as amended.

6. In the event that the Civil Rights Commission finds, after a hearing held pursuant to its rules, that a contractor has not complied with the contractual obligations under this agreement, the Civil Rights Commission may, as part of its order based upon such findings, certify said findings to the State Administrative Board of the State of Michigan, which the Board may order the cancellation of the Contract found to have been violated, and/or declare the contractor ineligible for future contracts with the State and its political and civil subdivisions, departments, officers, and including the governing boards of institutions of higher education, until the contractor complies with said order of the Civil Rights Commission. Notice of said declaration of future ineligibility may be given to any or all of the persons with whom the contractor is declared ineligible to contract as a contracting party in future contracts. In any case before the Civil Rights Commission in which cancellation of an existing contract is a possibility, the contracting agency shall be notified of such possible remedy and shall be given the option by the Civil Rights Commission to participate in such proceedings.

7. The Contractor will include, or incorporate by reference, the provisions of the foregoing paragraphs "1" thru "6" in every subcontract or purchase order unless exempted by the rules, regulations, and orders of the Michigan Civil Rights Commission and will provide in every subcontract or purchase order that said provisions will be binding upon each subcontractor or seller.

1.2.16 PERMITS, FEES AND NOTICES: The Contractor shall pay for all permits, fees, and licenses required by State or Local governments necessary for the proper execution and completion of the work. The Contractor shall specifically secure Houghton County permits for Electrical, Mechanical and Plumbing work and schedule work inspections as required for approval. The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations, and orders of any public authority bearing on the performance of the work. The University retains full jurisdiction of construction on campus and will make final determination of all variances.

1.2.17. USE OF SERVICES: The Contractor may use the Owner's water and power by contacting Michigan Tech Facilities Management for arrangements.

1.2.18. SCHEDULING: The Contractor shall meet with the Director of Engineering Services as follows: (1) prior to the start of work; (2) to schedule any interruption of University services; and (3) monthly, or as directed, to review the progress of work.

At the time work is commenced on the project, the Contractor shall prepare a progress schedule showing the dates for the commencement and completion of the various stages of construction. This schedule shall be coordinated with the Owner's required use of the facilities and other contractors' construction schedules, and shall be arrived at in consultation with the Director of Engineering Services and approved by all affected parties.

The Contractor shall furnish sufficient forces and construction plant and equipment to insure protection and progress of the work in accordance with the schedule. Any changes in the work schedule are to be approved in advance by the Director of Engineering Services.

1.2.19. TEMPORARY CONSTRUCTION FACILITIES: All temporary construction facilities shall be neatly constructed and arranged on the Site in an orderly manner. Suitable weather tight storage sheds, with raised floors, of capacity required to contain all materials which might be damaged by storage in the open shall be provided.

Construction equipment and other facilities such as ladders, ramps, etc., shall be strong, substantial, safe, and suitable for the purpose intended and shall comply with all University, Federal, State, and local requirements so as to maintain adequate and safe temporary access to all existing facilities. Temporary walkways, bridges, etc., shall be built with proper handrails, curbs, etc.

The Contractor will assume all risk of loss for any damage or destruction to the Contractor's temporary office, equipment, shanties, protective fence, scaffolding, staging, and all other miscellaneous materials and items owned or rented by the Contractor or any subcontractor used in the performance of this contract.

A temporary dust-proof enclosure of the work area, including existing machines and equipment, must be erected and maintained throughout the length of the project where required in the various Divisions herein.

1.2.20. CLEANLINESS OF THE WORK: The work and any public or private property occupied by the Contractor shall be kept in a neat and orderly condition at all times. Waste materials, rubbish, and debris shall be removed daily.

At the completion of the work all the Contractor's temporary buildings, equipment, tools, surplus or waste materials, and rubbish of every nature shall be removed from all occupied public and private premises and such premises shall be restored, as nearly as practicable, to the original condition. Such restoration shall be subject to the approval of the Director of Engineering Services.

Debris removed from the site must be disposed of in a licensed landfill as required by the Solid Waste Management Act, 1978 PA 614, as amended, being MCLA 299.402; MSA 13.29(1) and the administrative rules applying to the Act contained in the Michigan Administrative Code R 299.4101. The Contractor shall provide the Director of Engineering Services with written, dated a charge against the Contractor.

At all exposed surfaces of the work shall be left clean and free from all mud, grease, stains, or other extraneous materials.

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The streets and service roads occupied or used by the Contractor shall be continuously kept clean of waste materials and refuse resulting from the work operations. Should the Contractor be negligent in the duties of maintaining proper cleanliness, the Owner will take steps to cause the required cleaning to be done and will deduct the cost thereof from any monies due the Contractor.

The elevators, if used, shall not be overloaded and suitable protection for the walls, floor, and ceiling shall be provided during use. Any damage to the elevators must be repaired to the Facilities Management Manager of Planning, Engineering, and Construction satisfaction.

1.2.21. FIRE PROTECTION DURING CONSTRUCTION: The Contractor shall have on the Site at all times fire protection equipment as required by applicable codes and ordinances and requirements of the Owner's insurance carriers. Prior to start of work, the Contractor shall have knowledge and proficiency in Hot Work safety and in the Owner's Hot Work policies, procedures and requirements. The Contractor must faithfullly follow the Owner's Hot Work Policy, which regulates any temporary operation involving open flames or producing heat and/or sparks. The Contractor shall designate a Fire Safety Supervisor and Fire Watch for each Hot Work operation. The Fire Safety Supervisor shall not permit a hot work operation to proceed unless and until the provisions and required precautions checklist of the Owner's Hot Work permit are adequately addressed. The Fire Watch shall monitor the Hot Work area during and after the hot work operation to take measures to prevent fires and to respond to fires if they start.

During all construction operations in occupied building space, the Contractor shall construct and maintain a one-hour fire resistance separation between the part of the building under construction and the occupied part of the building, per the Life Safety Code NFPA 101, Section 1-3.11, 1997 Edition.

1.2.22. PARKING AND USE OF ROADS: Immediately after the award of the Contract, the Contractor shall consult with the Director of Engineering Services to determine authorized parking and access to the Site, routing of all construction vehicles, and re-routing of other traffic during construction, and shall organize the work in relation thereto.

At the beginning of the field work, the Contractor shall post signs limiting construction parking, if available, to the construction area. Parking for worker's cars is not guaranteed and is the Contractor's responsibility.

During construction, when use of roads or sidewalks is restricted by construction work, the Contractor shall erect temporary barricades, post notices and warning lights, and when required during working hours, direct traffic to prevent congestion. The Contractor shall maintain such as long as temporary work requires and then remove from the public areas.

1.2.23. SAFETY PRECAUTIONS: During the progress of the work, the Contractor shall maintain adequate facilities for the protection and safety of all persons and property. All local, state, and federal laws, ordinances, rules, and regulations pertaining to similar considerations.

5. When the specified product or method cannot be provided in the kind, use, and loading of all apparatus and equipment shall be complied with. Work shall be done to conformance with "General Safety Rules and Regulations for the Construction Industry" published by the Department of Labor, Construction Safety Standards Commission, Lansing, Michigan 48926.

The contractor will immediately report all accidents involving persons and property to the University Public Safety Dept. A copy of the accident report must be filed with the Public Safety Dept.

The contractor shall conduct safety meetings during the progress of work. A copy of the minutes of these meetings must be submitted to the University. Contractor shall acknowledge Owner's Safety Requirements.

1.2.24. SUBSTITUTIONS:

1. The materials, products, and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution.

2. No substitution directly related to an "or equal" clause or similar language in the contract documents will be considered unless written request for approval has been submitted by the Bidder and has been received by the University at least ten days prior to the date for receipt of bids. Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute including drawings, cuts, performance, and test data and any other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment, or work that incorporation of the substitute would require shall be included. Any burden of proof of the merits of the proposed substitute is upon the proposer. The University's decision of approval or disapproval of a proposed substitution shall be final.

3. If the University approves any proposed substitution, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

After receipt of bids, the University will consider a request for substitution only for the following reasons:

1. Products listed are no longer available.

2. Where the specified product or method cannot be provided within the Contract Time. However, the request will not be considered if the product or method cannot be provided as a result of the Contractor's failure to pursue the work promptly or to coordinate the various activities properly.

3. Where the specified product or method cannot receive necessary approval by a governing authority and the requested substitution can be approved.

4. Where a substantial advantage is offered to the University, in terms of cost, time, energy conservation, or other consideration of merit, after deducting offsetting responsibilities the University may be required to bear. These additional responsibilities may include such considerations as additional compensation to the Architect for redesign and evaluation services, the increased cost of other work by the University or separate contractors, and a manner which is compatible with other materials of the work, and where the contractor certifies that the substitution will overcome the incompatibility.

6. When the specified product or method cannot be properly

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coordinated with other materials in the work, and where the Contractor certifies that the proposed substitution can be properly coordinated.

7. When the specified product or method cannot receive a warranty as required by the Contract Documents and where the Contractor certifies that the proposed substitution receive the required warranty.

1.2.25. SUBCONTRACTS: The Contractor shall, as soon as practicable after the execution of the contract, notify the Owner in writing of the names of proposed subcontractors for the work. If the Contractor submits a list of proposed subcontractors prior to the execution of the contract, the Owner must be notified in writing of any change of subcontractor after the contract is executed. The Contractor will not employ any subcontractor that the Owner may, within a reasonable time, object to as incompetent or unfit.

The Contractor agrees to be fully responsible to the Owner for the acts and omissions of his subcontractors and of persons either directly or indirectly employed by them, as he is for persons directly employed by him.

Nothing contained in the contract documents shall create any contractual relationship between any subcontractor and the Owner.

Should material or workmanship, or parties furnishing same prove objectionable under the provisions of the contract, or should violations of the contract exist at the building or elsewhere, and continue after the contractor has received from the Owner a reasonable warning, then, upon request of the Owner, such objectionable parties shall be dismissed, removed, and excluded from the building or work. Such work shall be remedied and continued by others satisfactory to the Owner.

1.2.26. RELATIONS OF CONTRACTOR AND SUBCONTRACTOR: The Contractor agrees to bind every subcontractor and every subcontractor agrees to be bound by the terms of the Contract Documents as applicable to his work, unless specifically noted to the contrary in a subcontract approved in writing by the Owner.

1.2.27. UNIVERSITY RULES AND REGULATIONS: The Contractor shall comply with all laws, ordinances, rules, regulations, and orders of the Owner, and be responsible for and shall direct his employees to conduct themselves so as not to interfere with or disrupt the University educational activities.

The Contractor, Subcontractors, and their employees and suppliers shall not use or interfere with the Owner’s existing accesses, drives, walks, and roads except as specifically indicated or by prior arrangement with the Owner.

The Contractor shall confine his activities, equipment, and personnel to the area within the construction limits, except for minor operations as noted and by prior arrangement with the permission of the Owner. Existing areas disturbed outside the scope of the work shall be restored to their original state.

1.2.28. PREVAILING WAGE: Rates of wages and fringe benefits to be paid to each class of mechanics employed by the contractor and all subcontractors, shall be not less than the wage and fringe benefit rates prevailing in the locality in which the work is to be performed. Every Contractor and Subcontractor shall keep an accurate record showing the name and occupation of, and the actual wages and benefits paid to each construction mechanic employed by him in connection with said contract. This record shall be available for reasonable inspection by the Michigan Department of Labor and the University. Contractor responsibilities under the law. 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. Every contractor and subcontractor shall keep an accurate certified payroll record showing the name and occupation of and the actual wages and benefits paid to each construction mechanic employed by him in connection with said contract. This record shall be available for reasonable inspection by the contracting agent or the department. Each contractor or subcontractor is separately liable for the payment of the prevailing rate to its employees. The prime contractor is responsible for advising all subcontractors of the requirement to pay the prevailing rate prior to commencement of work. The prime contractor is secondarily liable for payment of prevailing rates that are not paid by a subcontractor. A construction mechanic shall only be paid the apprentice rate if registered with the United States Department of Labor, Bureau of Apprenticeship and training and the rate is included in the contract. Enforcement: A person who has information of an alleged prevailing wage violation on a state project may file a complaint with the Wage and Hour Division. The agency will investigate and attempt to resolve the complaint informally. Executive Order Number 2003-001 requires that contractors doing business with the State of Michigan be in compliance with state and federal law. A violation of Act 166 of 1965, as amended, the Prevailing Wages on State Projects act or Act 390 of 1978, as amended, the Payment of Wages and Fringe Benefits Act, may result in the debarment of a contractor from being awarded a contract for the provision of goods and services to the State of Michigan for a period of up to eight (8) years.

1.2.29. COMPLIANCE WITH ALL APPLICABLE LAWS, RULES AND REGULATIONS: Notwithstanding any other specific provision herein, contractor (and any subcontractor) shall, at its sole expense, comply with all applicable federal, state, local and other laws, ordinances, rules and regulations in any manner applicable to the performance of the work or contractors’ activities in furtherance of or in connection with the work. Contractor will indemnify and hold harmless the University from and against any and all costs, claims, expenses or orders (including any penalties or fines assessed to University) incurred as a result of contractor’s failure to comply or contractor’s failure to perform any obligation imposed by the contract documents.
PART 1  PROTECTION - Contractor shall properly protect all new and existing work from damage. Proper safety provisions shall be made at all times for the protection of all persons and property. Contractor shall contact "Miss Dig" for all underground construction work as required by Michigan Public Act No. 53, 1974 and amended by P.A. 204, 1975.

PART 2  SHOP DRAWINGS

2.1 The Contractor shall submit for approval a complete list of items that will require shop drawings.

2.2 The Contractor shall check and verify all field measurements and submit; with such promptness as to cause no delay in the Contractor's or any other contractor's work; electronic versions, checked and approved, of all shop or setting drawings and schedules where such submissions are stipulated in the various Divisions herein.

2.3 The University will check, with reasonable promptness, such drawings and schedules only for conformance with design concept and compliance with information given in the Contract Documents. The drawings will be stamped by the University as follows:

A. "RETURNED - NOT RELEASED" Deficiencies as marked indicate the drawings and schedules do not meet the requirements of the Contract Documents and shall be redrawn, revised, and resubmitted.

B. "REVIEWED AS NOTED" Deficiencies as marked indicate the drawings and schedules are subject to corrections to meet the requirements of the Contract Documents and are released for shop drawing work only. Drawings are released for shop work only, but are to be corrected and resubmitted for final approval.

C. "REVIEWED AND RELEASED" Indicate final action by the University and are released subject to meeting the requirements of the Contract Documents.

2.4 The University's approval of such drawings shall not relieve the Contractor from the responsibility for deviations from drawings and specifications unless he has, in accompanying letter, called the University's attention to such deviation at the time of submission and secured written approval. University's approval shall not relieve the Contractor from responsibility for errors in shop drawings and schedules.

PART 3  DEFINITIONS

A. Furnish: This term means procurement or fabrication of materials, equipment or components; or the performance of services to the extent indicated. Where used with respect to materials, equipment, or components, the term shall
included delivery to and unloading at the Project site but is not intended to include the installation of the item, either temporary or final.

B. Install: This term means the placement of materials, equipment, or components including the receiving, unloading, transporting, storage, and installing; and the performance of such testing and finish work as is compatible with the degree of installation specified.

C. Provide: This term means to Furnish and Install, complete and in place, including all accessories, finishes, tests, and services as required to render the item so specified completely ready for use.

PART 4 AS-BUILT DRAWINGS - Each contractor shall record, legibly and to scale, all field change and deviations from the contract drawings as they occur. This record shall be kept on a set of contract drawings. This set of drawings shall be turned over to the University prior to final payment.

PART 5 OPERATION AND MAINTENANCE MANUALS: The Contractor shall provide complete operation and maintenance instructions, manuals, and other information for all architectural, electrical, mechanical, elevator equipment, and other systems installed and/or provided as part of the Work by the Contractor under the Contract. The Contractor shall furnish three complete sets of manuals bound in suitable quick release three ring binders. The intent of these manuals is that the University is provided with a complete operating and maintenance document for all significant systems, in a convenient, easy to use form.

PART 6 SCHEDULE OF VALUES: Within two weeks after start of job, the contractor shall provide the University with an itemized schedule of values for each division and major subdivision of work. They may be done on AIA form G703.

PART 7 DOCUMENT CLARIFICATION - All inquiries regarding project specifications and drawings shall be made to the Director of Engineering Services.

PART 8 CONTRACT COMPLETION – Construction work Substantial Completion of the Contract shall be on or before January 22, 2016.

PART 9 EQUAL EMPLOYMENT OPPORTUNITY – In order to qualify for award, bidders submitting bids in excess of $50,000.00 must be certified by the Department of Civil Rights for compliance with State of Michigan Equal Employment Opportunity requirements. (Contract Compliance Team may be contacted at MDCR-CCT@michigan.gov or by phone at (313)456-3823. A copy of the bidder's valid certificate of compliance or awardability shall be submitted by the successful bidder prior to award of contract.

PART 10 ASBESTOS -. **This is not an asbestos abatement project** The Contractor shall not start any work in any area that has not been inspected for asbestos by the

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Owner’s Occupational Safety and Health Services, or a qualified representative of the Owner, and found to be safe. If asbestos is found, safety measures as recommended by the Owner’s Occupational Safety and Health Services, or a qualified representative of the Owner, shall be implemented by the Owner before work is started. The Contractor is prohibited from using or supplying any asbestos containing materials for this project.

PART 11 SUMMARY OF WORK

11.1 Perform all work indicated in the Contract Documents.

11.2 The Project consists of the purchase and installation of a new fire alarm and mass notification system including, detectors, alarm devises, strobes and speakers. The system will be connected through University Telecom connections to MTU’s Police and Public Safety Department. All equipment is to be fully integrated, commissioned and tested per manufacturers and code requirements.
PART 1 – GENERAL

1.1 SUMMARY
A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 SCHEDULE OF VALUES
A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor’s construction schedule.
   1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
      a. Application for Payment forms with continuation sheets.
      b. Submittal schedule.
      c. Items required to be indicated as separate activities in Contractor’s construction schedule.

2. Submit the schedule of values to Michigan Tech at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use Project Specifications table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
   1. Identification: Include the following Project identification on the schedule of values:
      a. Project name and location.
      b. Michigan Tech.
      c. Michigan Tech’s project number.
      d. Contractor’s name and address.
      e. Date of submittal.

2. Arrange schedule of values consistent with format of AIA Documents G702, G703.
3. Provide a breakdown of the Total Contract Amount in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Specifications table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Total Contract Amount.
   a. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Total Contract Amount and subcontract amount.

4. Round amounts to nearest whole dollar; total shall equal the Total Contract Amount.
   a. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
   b. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor’s option.

5. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders result in a change in the Total Contract
1.3 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Michigan Tech and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Michigan Tech and the Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Michigan Tech will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts of Change Orders issued before last day of construction period covered by application.

E. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Michigan Tech by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

F. Waivers of Lien: With each Application for Payment, submit waivers of lien as indicated in the Agreement.

G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Schedule of unit prices.
5. Submittal schedule (preliminary if not final).
6. List of Contractor's staff assignments.
7. List of Contractor's principal consultants.
10. Initial progress report.
12. Certificates of insurance and insurance policies.

H. Application for Payment at Substantial Completion: After Michigan Tech issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Total Contract Amount.

I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Total Contract Amount.
4. Completion of the Final Completion Checklist.
5. Evidence that claims have been settled.
6. Final liquidated damages settlement statement.

END OF SECTION 010002
TO OWNER: PROJECT: APPLICATION NO: Distribution to:

FROM CONTRACTOR: VIA ARCHITECT:

CONTRACT FOR:

CONTRACTOR'S APPLICATION FOR PAYMENT

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

1. ORIGINAL CONTRACT SUM $ 0.00
2. Net change by Change Orders $ 0.00
3. CONTRACT SUM TO DATE (Line 1 + 2) $ 0.00
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703) $ 0.00

5. RETAINAGE:
   a. 10% of Completed Work $ 0.00
      (Column D + E on G703)
   b. % of Stored Material $ 0.00
      (Column F on G703)

Total Retainage (Lines 5a + 5b or Column I of G703) $ 0.00

6. TOTAL EARNED LESS RETAINAGE (Line 4 Less Line 5 Total) $ 0.00

7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate) $ 0.00

8. CURRENT PAYMENT DUE $ 0.00

9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less 6) $ 0.00

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising the application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED $ 0.00

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By: ___________________________ Date: ___________________________

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.
AIA Document G703, APPLICATION AND CERTIFICATION FOR PAYMENT, containing Contractor's signed certification is attached.

In tabulations below, amounts are stated to the nearest dollar.

Use Column I on Contracts where variable retainage for line items may apply.

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<th>A</th>
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<td>ITEM NO.</td>
<td>DESCRIPTION OF WORK</td>
<td>SCHEDULED VALUE</td>
<td>WORK COMPLETED FROM PREVIOUS APPLICATION (D + E)</td>
<td>WORK COMPLETED THIS PERIOD</td>
<td>MATERIALS PRESENTLY STORED (NOT IN D OR E)</td>
<td>TOTAL COMPLETED AND STORED TO DATE (D+E+F)</td>
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**GRAND TOTALS**

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Users may obtain validation of this document by requesting of the license a completed AIA Document D401 - Certification of Document's Authenticity.
010008 Certificate of Substantial Completion

<table>
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<tr>
<th>Project: Dillman Hall Fire Alarm and Mass Notification</th>
<th>Owner: Michigan Technological University</th>
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<tr>
<td>Project Number: 14-16-01</td>
<td>1400 Townsend Drive</td>
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<tr>
<td>Contract for: Installation of Dillman Hall Fire Alarm and Mass Notification system</td>
<td>Contractor:</td>
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Substantial Completion Date and Final Completion Checklist:
The Work performed under this Contract as reviewed by the Contractor is substantially complete by the Contractor’s knowledge, information, and belief; the condition of the work is sufficiently complete per Contract Documents and the Owner can occupy for intended use.

The Contractor hereby requests that Michigan Tech issue Substantial Completion notification for the project noted above.

If necessary, any Remaining Items to be completed and/or corrected are included on the 010010 Final Completion Checklist. The list does not alter the responsibility of the Contractor to complete Work per Contract Documents.

By signing below, the Contractor acknowledges that they will complete and/or correct the Remaining Items as documented on the Final Completion Checklist by the date listed as Completion Date on the Agreement, or as modified by subsequent Change Orders.

__________________________  By  __________________________  Date __________________________
Contractor Signature

Owner’s Issuance of agreement for Substantial Agreement:
Michigan Technological University’s representative hereby agrees that the project is substantially completed, and that this date shall be the Date of Commencement of Warranties for all items as established by the Contract Documents, including any listed in the Final Completion Checklist.

__________________________  By  __________________________  Date __________________________
Owners Signature

CERTIFICATE OF FINAL COMPLETION
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General Items:

1. Provide specific product warranties as follows:
   a.
2. Provide extra material as follows:
   a.
3. Provided Guaranty (attached).
4. Provide Consent of Surety for final payment (attached).
5. Provide Sworn Statement (attached).
6. Provide Full Unconditional Waiver of Lien from Contractor and major suppliers (attached).

List of Remaining Items to be completed and/or corrected:

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The CONTRACTOR, as a condition precedent to final payment, shall execute this Guaranty to the OWNER, guaranteeing for one (1) year from the date of final payment, to keep in good order and repair any defect in all the work completed under the Agreement. This includes work which may develop during said period due to improper materials, defective equipment, improper materials workmanship, or arrangements and in any work which may be affected in correcting any repairs or defects. This Guaranty will be binding upon the CONTRACTOR, his subcontractors and/or material suppliers and will be without any expense to the OWNER.

OWNER: 

Print 

Signature 

Date 

CONTRACTOR: 

Print 

Signature 

Date
CONSENT OF SURETY TO FINAL PAYMENT

AIA Document G707

(Instructions on reverse side)

TO OWNER:

(Name and address)

ARCHITECTS PROJECT NO.:

CONTRACT FOR:

PROJECT:

(Name and address)

CONTRACT DATED:

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the

(insert name and address of Contractor)

SURETY,

on bond of

(insert name and address of Contractor)

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety of any of its obligations to

(insert name and address of Owner)

as set forth in said Surety’s bond.

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date:

(insert in writing the 11/11/11 to 11/1/12 and date of Owner)

(Surety)

Attest:

(Seal):
INSTRUCTION SHEET
FOR AIA DOCUMENT G707, CONSENT OF SURETY TO FINAL PAYMENT

A. GENERAL INFORMATION

1. Purpose
   This document is intended for use as a companion to AIA Document G706, Contractor's Affidavit of Payment of Debts and Claims, on construction project, where the Contractor is required to furnish a bond. By obtaining the Surety's approval of final payment to the Contractor and its agreement that final payment will not relieve the Surety of any of its obligations, the Owner may preserve its rights under the contract.

2. Related Documents
   This document may be used with most of the AIA's Owner-Contractor agreements and general conditions, such as A201 and its related family of documents. As noted above, this is a companion document to AIA Document G706.

3. Use of Current Documents
   Prior to using any AIA document, the user should consult the AIA, an AIA component chapter or a current AIA Document List to determine the current edition of each document.

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B. CHANGES FROM THE PREVIOUS EDITION
   Changes in the location of various items of information were made. Without revision to the: substantial use of the text.

C. COMPLETING THE G707 FORM
   GENERAL: The bond form is the usual source of required information such as the contractor's date and the names and addresses of the Surety, Owner, Contractor, and Project.
   ARCHITECT'S PROJECT NO.: This information is typically supplied by the Architect and entered on the form by the Contractor.
   CONTRACT FOR: This refers to the scope of the contract, such as "General Construction" or "Mechanical Work".

D. EXECUTION OF THE DOCUMENT
   The G707 requires both the Surety's seal and the signature of the Surety's authorized representative.
STATE OF MICHIGAN

County of ____________________________, ss.

____________________________________, being duly sworn, deposes and says:

That _________________________________ is the (contractor) (subcontractor) for an improvement to the following described real property situated in County, Michigan, described as follows: _____________________________________________________________

__________________________________________________________

(Insert legal description of property)

That the following is a statement of each subcontractor and supplier and laborer with whom the (contractor) (subcontractor) has (contracted) (subcontracted) for performance under the contract with the owner or lessee thereof, and that the amounts due to the persons as of the date hereof are correctly and fully set forth opposite their names, as follows:

<table>
<thead>
<tr>
<th>Name of subcontractor, supplier, or laborer</th>
<th>Type of improvement furnished</th>
<th>Total contract price</th>
<th>Amount already paid</th>
<th>Amount currently owing</th>
<th>Accrued fringe benefits contributions (if applicable)</th>
<th>Balance to complete</th>
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</table>

10/15/2015
That the contractor has not procured material from, or subcontracted with, any person other than those set forth on the reverse side and owes no money for the improvement other than the sums set forth on the reverse side.

Deponent further says that he or she makes the foregoing statement as the (contractor) (subcontractor) or as __________________________ of the (contractor) (subcontractor) for the purpose of representing to the owner or lessee of the premises described on the reverse side and his or her agents that the property described on the reverse side is free from claims of construction liens, or the possibility of construction liens, except as specifically set forth on the reverse side.

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

________________________________________  Deponent

Subscribed and sworn to before me this _______ day of ________________________________, 20 ___

________________________________________  Notary Public

_____________________________ County, Michigan

My Commission Expires: ___________________
010018 FULL UNCONDITIONAL WAIVER

My/our contract with ________________________________ to provide

(other contracting party)

general contractor for the improvement of the property described as

Dillman Hall Fire Alarm Replacement #DILLMAN HALL FIRE AND MASS NOTIFICATION SYSTEM-01, having been fully paid and satisfied, with respect to our rights under the Payment / Lien Bond covering said Project and all of our rights to pursue payment under the Payment/Lien Bond No. issued by <<<name of prime contractor>>> as principal and <<<name of payment bond surety>>> as surety, together with any rights, demands, or causes of action we may have against <<<name of prime contractor>>> or <<<name of payment bond surety>>>, by signing this waiver, all my/our construction lien rights against such property are hereby waived and released.

______________________________
(Printed Name of Lien Claimant)

______________________________
(Signature of lien claimant)

Signed on: ______________________ Address: ______________________

___________________________________________

Telephone: __________________________

DO NOT SIGN BLANK OR INCOMPLETE FORMS. RETAIN A COPY.

END OF SECTION 010018
010020 Certificate of Final Completion

Project: Dillman Hall Fire Alarm Replacement  
Owner: Michigan Technological University
1400 Townsend Drive  
Houghton, MI 49931

Project Number: DILLMAN HALL FIRE AND MASS NOTIFICATION SYSTEM
Contract for: Construction  
Contractor:  
Contract Date: TBD or Date of Notice to Proceed

Substantial Completion Date __________________________
Final Completion Checklist Date __________________________

The Contractor certifies that the Work and all other requirements have been completed in accordance with the Contract for Construction, including, but not limited to:
1. submission and approval of all remaining change order proposals, claims, and Applications for Payment
2. submission of “as-built” plans and specifications, shop drawings, and other record documents
3. completion of all discrepancies: List of Remaining Items noted on the Final Completion Checklist at the time of Substantial Completion:
   a. submission of all final closeout deliverables/document
   b. submission of Guaranty
   c. submission of Consent of Surety for Final Payment
   d. submission of Sworn Statement
   e. submission of Full Unconditional Waiver of Lien

The Contractor further certifies that:
4. no liens have been attached against the Project
5. no suits are pending by reason of Work on the Contract
6. all Workers’ compensation claims are covered by Workers’ Compensation Insurance as required by law
7. all insurance required of the Contractor beyond final payment, if any, is in effect and will not be cancelled or allowed to be expired without notice to the Owner
8. all public liability claims are adequately covered by insurance and that the Contractor shall save, protect, defend, indemnify, and hold the Owner harmless from and against any and all claims which arise as a direct or indirect result of any transaction, event occurrence, or omission related to performance of the Work contemplated under said Contract

CERTIFICATE OF FINAL COMPLETION
010020 - 1
10/15/2015
Upon execution below, this project will be considered complete. This consideration does not relieve the Contractor from its post-construction responsibilities, including correction of discrepancies noted during the first year after Substantial Completion, warranty issues, latent defects, and other requirements of the Contract or State law.

Name of Contractor: ________________________________  Notary Public: ________________________________

_______________________________  Personally appeared before me this day of known (or made known) to me to be the_____________________________ (title)

_______________________________  of_____________________________ (firm), who, being by me duly sworn, subscribed to the foregoing affidavit in my presence.

By: ______________________________  My Commission Expires: ______________________________

Authorized Representative

_______________________________ (date)

Owner __________________________  Owner Signature __________________________  Final Completion Date

End of Section 010020
# 010022 CONTRACT CHANGE ORDER

<table>
<thead>
<tr>
<th>CONTRACTOR:</th>
<th>CHANGE ORDER No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PROJECT: Dillman Hall Fire Alarm Replacement</td>
</tr>
<tr>
<td></td>
<td>PROJECT No.: 12-15-01</td>
</tr>
</tbody>
</table>

| OWNER: Michigan Technological University |
| 1400 Townsend Dr., Houghton, MI, 49931 |
| OWNER’S REPRESENTATIVE: |

<table>
<thead>
<tr>
<th>DATE OF ISSUE:</th>
<th>EFFECTIVE DATE:</th>
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<tbody>
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</table>

The Contractor is hereby directed to make the following changes in the Contract Documents.

**Description:**

**Reason for Change Order:**

**Attachments:** *(List documents supporting change and justifying cost and time)*

<table>
<thead>
<tr>
<th>CHANGE IN CONTRACT PRICE:</th>
<th>CHANGE IN CONTRACT TIMES:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original Contract Price: $</td>
<td>Original Contract Times: <em>(calendar days or dates)</em></td>
</tr>
<tr>
<td>Net changes from previous C. O.'s No. ______ to ______</td>
<td>Net changes from previous C. O.'s No. ______ to ______</td>
</tr>
<tr>
<td>$</td>
<td><em>(calendar days)</em></td>
</tr>
<tr>
<td>Contract Price Prior to this Change Order:</td>
<td>Contract Times prior to this Change Order:</td>
</tr>
<tr>
<td>$</td>
<td><em>(calendar days)</em></td>
</tr>
<tr>
<td>Net Increase (decrease) of this Change Order:</td>
<td>Net Increase (decrease) of this Change Order:</td>
</tr>
<tr>
<td>$</td>
<td><em>(calendar days)</em></td>
</tr>
<tr>
<td>Contract Price with all Approved Change Orders:</td>
<td>Contract Times with all Approved Change Orders:</td>
</tr>
<tr>
<td>$</td>
<td><em>(calendar days)</em></td>
</tr>
</tbody>
</table>

**RECOMMENDED:** *(Owner’s Representative)*

By: 
Date: 

**APPROVED:** *(Owner): Michigan Tech University*

By: 
Date: 

**ACCEPTED:** *(Contractor)*

By: 
Date: 

**REVIEWED:** *(Funding Agency)*

By: 
Date: 

CHANGE ORDER  
010022 - 1  
10/15/2015
PART 1 GENERAL

1.1 PROJECT 011000 SUMMARY OF WORK
A. Project Name: Dillman Hall - Fire Alarm and Mass Notification system
B. Owner's Name: Michigan Technological University.

2. The Project consists of the purchase and installation of a new fire alarm and mass notification system including, detectors, alarm devices, strobes and speakers. The system will be connected through University Telecom connections to MTU's Police and Public Safety Department.

2.1 CONTRACT DESCRIPTION
A. A single prime contract based on a Stipulated Price.

2.2 DESCRIPTION OF WORK
A. Install new fire pull stations, strobes, speakers, Install control panels and associated hardware.
B. Install smoke detectors water flow detectors and elevator smoke detectors and other initiating devices.
C. Provide and install primary and secondary 24V power with battery back-up
D. Provide and install NAC Power supply
E. Provide all connections to MTU Telecom system to connect with MTU Police and Public Safety
F. Start-up, test and commission the system. Provide all required certifications
G. Removal of all existing fire pulls and fire pull stations

1.5 ITEMS TO BE SALVAGED BY CONTRACTOR - None

1.4 WORK BY OWNER
A. Michigan Tech will install Data cabling with its in-house crew. This work will be coordinated with the contractor.

1.5 OWNER OCCUPANCY
A. Michigan Tech will occupy the adjacent areas during the entire construction period.
B. Cooperate with Michigan Tech to minimize conflict and to facilitate Michigan Tech's operations. Schedule noise producing work in the early mornings and/or evenings.
C.

1.6 CONTRACTOR USE OF SITE AND PREMISES
A. Construction Operations: Limited to actual construction area. Work in adjacent areas will be only as necessary for the project, and must be coordinate with Michigan Tech's project manager.
B. Arrange use of site and premises to:
   1. Limit use of the Corridor outside the work area.
   2. Limit use of the freight elevator on the west side of the building. Consolidate usage to extent possible.
3. Keep all areas outside of the construction area clean and protect existing finishes in the corridor and elevator. Contractor will be responsible for damages to these areas caused by construction activities.

4. Parking is limited, and parking permits will be required at the site (there will not be a charge for the permits). Limit the amount of vehicles and trailers to the extent possible, and coordinate with the Michigan Tech Project Manager.

C. Provide access to and from site as required by law and by Michigan Tech:
   1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
   2. Do not obstruct roadways, sidewalks, or other public ways without permit.

E. Time Restrictions:
   1. Limit conduct of especially noisy interior work to the hours of 7 am to 7 pm. Coordinate with Michigan Tech’s Project Manager for any work outside these hours.
   2. Tobacco Free site: The entire site is tobacco free. See the Michigan Tech website for specific details.

F. Utility Outages and Shutdown:
   1. Limit disruption of utility services to hours the building is unoccupied.
   2. Prevent accidental disruption of utility services to other facilities.

1.7 WORK SEQUENCE
   A. Coordinate system tie-ins, service interruptions, communication system tests and signal tests with Michigan Tech Public Safety and Police Services

   B. Testing alarms and signaling devices shall be scheduled to avoid confusion with occupants of the building. These events shall be scheduled around class times from 8:00AM to 5:00PM, Monday to Friday.

END OF SECTION 011000
013300 SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY
A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

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

1.3 ACTION SUBMITTALS
A. Prior to ordering materials and construction, provide an Action Submittal for items specified throughout the contract documents that include the phrase 'as approved by Michigan Tech,' if the exact item as specified cannot be obtained and a similar item must be provided. This is not intended to be a substitution procedure, substitutions must follow requirements of section 012500.

1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS
A. Electronic copies of digital data files of the specified items can be provided by Michigan Tech for Contractor's use in preparing submittals.
B. Processing Time: Provide submittals within one week after award of contract to insure sufficient lead time for materials in time to meet the construction schedule. Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Michigan Tech's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
   1. Initial Review: Allow 7 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Michigan Tech will advise Contractor when a submittal being processed must be delayed for coordination.
   2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
   3. Resubmittal Review: Allow 7 days for review of each resubmittal.
C. Electronic Submittals (preferred method of transmittal): Identify and incorporate information in each electronic submittal file as follows:
   1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
   2. Name file with submittal number or other unique identifier, including revision identifier.
      a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).
   3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Michigan Tech.
containing the following information:

- Project name.
- Date.
- Name of General Contractor.
- Name of firm or entity that prepared submittal.
- Names of subcontractor, manufacturer, and supplier.
- Category and type of submittal.
- Submittal purpose and description.
- Specification Section number and title.

1. Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).

- Specification paragraph number or drawing designation and generic name for each of multiple items.
- Drawing number and detail references, as appropriate.
- Location(s) where product is to be installed, as appropriate.
- Related physical samples submitted directly.
- Indication of full or partial submittal.
- Transmittal number, numbered consecutively.
- Submittal and transmittal distribution record.
- Other necessary identification.
- Remarks.
- Signature of transmitter

D. Paper Submittals: Place a permanent label or title block on each submittal item for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Michigan Tech.
3. Include the following information for processing and recording action taken:

- Project name.
- Date.
- Name of General Contractor.
- Name of firm or entity that prepared submittal.
- Names of subcontractor, manufacturer, and supplier.
- Category and type of submittal.
- Submittal purpose and description.
- Specification Section number and title.

1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).

- Specification paragraph number or drawing designation and generic name for each of multiple items.
- Drawing number and detail references, as appropriate.
- Location(s) where product is to be installed, as appropriate.
- Related physical samples submitted directly.
- Indication of full or partial submittal.
- Transmittal number, numbered consecutively.
- Submittal and transmittal distribution record.
- Other necessary identification.
- Remarks.
- Signature of transmitter

r. Signature of transmitter
4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Michigan Tech observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

E. Options: Identify options requiring selection by Michigan Tech.

F. Deviations: Identify deviations from the Contract Documents on submittals.

G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
   1. Note date and content of previous submittal.
   2. Note date and content of revision in label or title block and clearly indicate extent of revision.
   3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Michigan Tech's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements:
   1. Submit electronic submittals via email as PDF electronic files.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
   1. Mark each copy of each submittal to show which products and options are applicable.
   2. Include the following information, as applicable:
      a. Manufacturer's catalog cuts.
      b. Manufacturer's product specifications.
      c. Standard color charts.
      d. Statement of compliance with specified referenced standards.
      e. Testing by recognized testing agency.
      f. Application of testing agency labels and seals.
      g. Notation of coordination requirements.
      h. Availability and delivery time information.
   3. Submit Product Data before or concurrent with Samples.
   4. Submit Product Data in the following format:
      a. PDF electronic file.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base
Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Architect’s digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents.
2. Include the following information, as applicable:
   a. Identification of products.
   b. Schedules.
   c. Compliance with specified standards.
   d. Notation of coordination requirements.
   e. Notation of dimensions established by field measurement.
   f. Relationship and attachment to adjoining construction clearly indicated.
   g. Seal and signature of professional engineer if specified.

3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
4. Submit Shop Drawings in the following format:
   a. PDF electronic file.
   b. Four opaque (bond) copies of each submittal. Michigan Tech will return two copy(ies).

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:
   a. Generic description of Sample.
   b. Product name and name of manufacturer.
   c. Sample source.
   d. Number and title of applicable Specification Section.

3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise designated as Owner’s property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer’s color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
   a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer’s product line. Michigan Tech will return submittal with options selected.
6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

   a. Number of Samples: Submit one sets of Samples. Michigan Tech will retain.
      1) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Application for Payment and Schedule of Values: Comply with requirements specified in Section 010001 Payment Procedures.

F. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017000 Closeout Procedures.

G. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

H. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

I. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

J. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

   1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Michigan Tech.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

   1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Michigan Technological University.

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017000 Closeout Procedures.

3.2 Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.3 MICHIGAN TECH'S ACTION

A. General: Michigan Tech will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Michigan Tech will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

C. Informational Submittals: Michigan Tech will review each submittal and will not return it, or will return it if it does not comply with requirements. Michigan Tech will forward each submittal to appropriate party.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300
SECTION 260500 - GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

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

1.02 SUMMARY
A. Section Includes:
   1. Electrical equipment coordination and installation.
   2. Common electrical installation requirements.

1.03 DEFINITIONS
A. EPDM: Ethylene-propylene-diene terpolymer rubber.
B. NBR: Acrylonitrile-butadiene rubber.

1.04 SUBMITTALS
A. Product Data: For sleeve seals.

1.05 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 and cables will be clear of obstructions and of the working and access space of other equipment.
PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1, NFPA 70 (National Electrical Code – 2008), and State of Michigan Part 8.

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 piping systems installed at a required slope.

F. Provide all interior & exterior electric wiring including, but not limited to:
   1. Service equipment, panelboards, bus ducts, and distribution panels as indicated on plans.
   2. Branch circuit wiring from the distribution and branch circuit panels for lighting, receptacles, motors, HVAC equipment, bus duct, and other detailed circuit wiring.
   3. Luminaires, exits signs, control switches, disconnect switches, receptacles, relays, supports, and other accessory items.

G. Obtain and pay for all electrical permits and inspections from the Authority Having Jurisdiction.

H. Any device boxes abandoned shall be provided with stainless steel blank covers.

I. All old wiring shall be removed. If not capable of being removed, the ends shall be tagged indicating date of abandonment and location of opposite end.

J. The contractor is to provide a detailed riser diagram and conductor routing diagram as part of the “as-built” documents upon project completion.

3.02 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly.

END OF SECTION 260500
SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

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

1.02 SUMMARY
A. This Section includes the following:
   1. Building wires and cables rated 600 V and less.
   2. Connectors, splices, and terminations rated 600 V and less.
   3. Sleeves and sleeve seals for cables.
   4. Division 26 Section “Control Voltage Electrical Power Cables” for cabling used for control circuits.

1.03 DEFINITIONS
A. EPDM: Ethylene-propylene-diene terpolymer rubber.
B. NBR: Acrylonitrile-butadiene rubber.

1.04 SUBMITTALS
A. Product Data: For each type of product indicated.
B. Qualification Data: For testing agency.
C. Field quality-control test reports.

1.05 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.

1.06 COORDINATION

A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

PART 2 - PRODUCTS

2.01 CONDUCTORS AND CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Alcan Products Corporation; Alcan Cable Division.
3. General Cable Corporation.
4. Senator Wire & Cable Company.
5. Southwire Company.
6. Other acceptable manufacturers as approved by the Engineer.

2.02 COPPER CONDUCTORS: Comply with NEMA WC 70. Do not use Aluminum conductors.

A. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN or XHHW.

2.03 CONNECTORS AND SPLICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.
6. Other acceptable manufacturers as approved by the Engineer.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.04 SLEEVES FOR CABLES

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-inch 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.

2.05 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.
5. Other acceptable manufacturers as approved by the Engineer.

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: Plastic. 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.

PART 3 - EXECUTION

3.01 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper; stranded.

B. Branch Circuits: Copper; stranded.

3.02 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type THHN-THWN or XHHW, single conductors in raceway.

B. Exposed Feeders: Type THHN-THWN or XHHW, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN-THWN or XHHW, single conductors in raceway.
D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN or XHHW, single conductors in raceway.

E. Exposed Branch Circuits, Including in Crawlspace: Type THHN-THWN or XHHW, single conductors in raceway.

F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN or XHHW, single conductors in raceway.

G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN or XHHW, single conductors in raceway.

H. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

I. Class 1 Control Circuits: Type THHN-THWN or XHHW, in raceway.

J. Class 2 Control Circuits: Type THHN-THWN or XHHW, in raceway or Power-limited tray cable, in raceway.

3.03 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal conduits within the main building in finished walls, ceilings, and floors, unless otherwise indicated. Exterior conduits shall be buried except around areas of concrete tanks.

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. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

3.04 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.
C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.05 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

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 rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
   2. For sleeve 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 wall surfaces.

G. Extend sleeves installed in floors 2 inches above finished floor level.

H. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and cable unless sleeve seal is to be installed.

I. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.

J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint according to Division 07 Section "Joint Sealants."

K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at cable penetrations. Install sleeves and seal with firestop materials according to Division 07 Section "Penetration Firestopping."

L. Roof-Penetration Sleeves: Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work.

M. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

N. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between cable and sleeve for installing mechanical sleeve seals.
3.06 SLEEVE-SEAL INSTALLATION

A. Install to seal underground exterior-wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for cable material and size. Position cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.07 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Penetration Firestopping."

3.08 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Perform tests and inspections and prepare test reports.

C. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test feeder conductors, and conductors feeding the following critical equipment and services for compliance with requirements.
   a. All exterior power and control circuits.


D. 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.

E. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 260519
PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.03 DEFINITIONS

A. EMT: Electrical metallic tubing.
B. ENT: Electrical nonmetallic tubing.
C. EPDM: Ethylene-propylene-diene terpolymer rubber.
D. FMC: Flexible metal conduit.
E. IMC: Intermediate metal conduit.
F. LFMC: Liquidtight flexible metal conduit.
G. LFN C: Liquidtight flexible nonmetallic conduit.
H. NBR: Acrylonitrile-butadiene rubber.
I. RNC: Rigid nonmetallic conduit.

1.04 SUBMITTALS

A. Product Data: For conduit, fittings, boxes, hinged-cover enclosures, and cabinets.
B. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.
   1. Custom enclosures and cabinets.
C. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
1. Structural members in the paths of conduit groups with common supports.
2. Process piping items and structural features in the paths of conduit groups with common supports.

D. Qualification Data: For professional engineer and testing agency.

E. Source quality-control test reports.

1.05 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.

PART 2 - PRODUCTS

2.01 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 & Conduit; a Tyco International Ltd. Co.
4. Anamet Electrical, Inc.; Anaconda Metal Hose.
5. Electri-Flex Co.
7. Maverick Tube Corporation.

B. Rigid Steel Conduit: ANSI C 80.1.

C. Aluminum Rigid Conduit: ANSI C 80.5.

D. IMC: ANSI C 80.6.

E. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit

1. Comply with NEMA RN 1.
2. Coating Thickness: 0.040-inch, minimum.

F. EMT: ANSI C 80.3.

G. FMC: Zinc-coated steel, Aluminum, Zinc-coated steel or aluminum.

H. LFMC: Flexible steel conduit with PVC jacket.
I. 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. 

2. Fittings for EMT: Steel, set-screw type.
3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040-inch, with overlapping sleeves protecting threaded joints.

J. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.02 NONMETALLIC CONDUIT AND TUBING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Anamet Electrical, Inc.; Anaconda Metal Hose.
3. Arnco Corporation.
4. CANTEX Inc.
7. ElecSYS, Inc.
8. Electri-Flex Co.
9. Lamson & Sessions; Carlon Electrical Products.
10. Manhattan/CDT/Cole-Flex.
11. RACO; a Hubbell Company.
12. Thomas & Betts Corporation.

B. RNC: NEMA TC 2, Type EPC-80-PVC, unless otherwise indicated.

C. Fittings for RNC: NEMA TC 3; match to conduit or tubing type and material.

2.03 COMMUNICATIONS CABLE RACEWAY AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Arnco Corporation.
2. Endot Industries Inc.
3. IPEX Inc.
4. Lamson & Sessions; Carlon Electrical Products.

B. Description: Comply with UL 2024; flexible type, approved for general-use installation.

2.04 METAL WIREWAYS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Cooper B-Line, Inc.
2. Hoffman.
3. Square D; Schneider Electric.

B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 3R, unless otherwise indicated.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Wireway Covers: As indicated.

E. Finish: Manufacturer's standard enamel finish.

2.05 SURFACE RACEWAYS

A. Surface Metal Raceways: Galvanized steel with snap-on covers. Prime coating, ready for field painting.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Thomas & Betts Corporation.
   c. Wiremold Company (The); Electrical Sales Division.

2.06 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
7. Raco; a Hubbell Company.
10. Spring City Electrical Manufacturing Company.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

D. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

E. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, galvanized, cast iron with gasketed cover.
F. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.
   1. Metal Enclosures: Steel, finished inside and out with manufacturer’s standard enamel.

G. Cabinets:
   1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer’s standard enamel.
   2. Hinged door in front cover with flush latch and concealed hinge.
   3. Key latch to match panelboards.
   4. Metal barriers to separate wiring of different systems and voltage.
   5. Accessory feet where required for freestanding equipment.

2.07 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. Description: Comply with SCTE 77.
   2. Configuration: Units shall be designed for flush burial and have closed bottom, unless otherwise indicated.
   3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
   4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
   5. Cover Legend: Molded lettering, “ELECTRIC.” as indicated for each service.
   6. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.

PART 3 - EXECUTION

3.01 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:
   1. Exposed Conduit: Use only PVC coated rigid galvanized steel conduit.
   2. Concealed Conduit, Aboveground: Use only PVC coated rigid galvanized steel conduit.
   3. Underground Conduit: Use only PVC coated rigid galvanized steel conduit, or RNC, Type EPC-80-PVC.
   4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
   5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R or 4.

B. Comply with the following indoor applications, unless otherwise indicated:
   1. Exposed, Not Subject to Physical Damage: EMT.
   2. Exposed, Not Subject to Severe Physical Damage: EMT.
3. Exposed and Subject to Severe Physical Damage: Rigid steel conduit or IMC.

4. Concealed in Ceilings and Interior Walls and Partitions: Rigid steel conduit, IMC, or EMT.

5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.

6. Damp or Wet Locations: PVC coated rigid steel conduit or IMC.

7. Corrosive environment (Chemical Feed Room): use only non-metallic boxes, raceways and fittings (PVC-80), with stainless fasteners.

8. Raceways for Concealed General Purpose Distribution of Optical Fiber or Communications Cable: EMT.

9. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel in damp or wet locations.

C. Minimum Raceway Size: 1/2-inch or 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.

2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.

E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.

F. Do not install aluminum conduits in contact with concrete.

3.02 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

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. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
H. 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.

I. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

J. 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.

K. Raceways for Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:
   1. 3/4-Inch Trade Size and Smaller: Install raceways in maximum lengths of 50 feet.
   2. 1-Inch Trade Size and Larger: Install raceways in maximum lengths of 75 feet.
   3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

L. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with 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 otherwise required by NFPA 70.

M. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 degree F, and that has straight-run length that exceeds 25 feet.
   1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:
      a. Outdoor Locations Not Exposed to Direct Sunlight: 125 degree F temperature change.
      b. Outdoor Locations Exposed to Direct Sunlight: 155 degree F temperature change.
      c. Indoor Spaces Connected with the Outdoors without Physical Separation: 125 degree F temperature change.
      d. Attics: 135 degree F temperature change.
   2. Install fitting(s) that provide expansion and contraction for at least 0.00041-inch per foot of length of straight run per degree F of temperature change.
   3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.

N. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for recessed and semirecessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
1. Use LFMC in damp or wet locations subject to severe physical damage.
2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

O. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

P. Set metal floor boxes level and flush with finished floor surface.

3.03 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:
   1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 31 Section "Earth Moving" for pipe less than 6 inches in nominal diameter.
   2. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 31 Section "Earth Moving."
   3. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
   4. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.
      a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
      b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.
   5. Warning Planks: Bury warning planks approximately 12 inches above direct-buried conduits, placing them 24 inches o.c. Align planks along the width and along the centerline of conduit.

3.04 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Coordinate sleeve selection and application with selection and application of firestopping.

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. 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.

E. Cut sleeves to length for mounting flush with both surfaces of walls.
F. Extend sleeves installed in floors 2 inches above finished floor level.

G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway unless sleeve seal is to be installed.

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 07 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 07 Section "Penetration Firestopping."

K. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

L. Underground, Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between raceway and sleeve for installing mechanical sleeve seals.

3.05 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 "Penetration Firestopping."

3.06 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.

END OF SECTION 260533
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Metal conduits, tubing, and fittings.
   2. Surface pathways.

B. Related Requirements:
   1. Section 260533 "Raceways and Boxes for Electrical Systems" for conduits, wireways, surface raceways, boxes, enclosures, cabinets, handholes, and faceplate adapters serving electrical systems.

1.2 ACTION SUBMITTALS

A. Product Data: For surface pathways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. Shop Drawings: For custom enclosures and cabinets.

1.3 INFORMATIONAL SUBMITTALS

A. Seismic Qualification Certificates: For pathway racks, enclosures, cabinets, and equipment racks and their mounting provisions, including those for internal components, from manufacturer.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

A. General Requirements for Metal Conduits and Fittings:
   1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   2. Comply with TIA-569-B.

B. GRC: Comply with ANSI C80.1 and UL 6.

C. ARC: Comply with ANSI C80.5 and UL 6A.
D. EMT: Comply with ANSI C80.3 and UL 797.

E. FMC: Comply with UL 1; zinc-coated steel.

F. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
2. Fittings for EMT:
   a. Material: Steel.
   b. Type: compression.

3. Expansion Fittings: PVC or steel to match conduit type, complying with UL-467, rated for environmental conditions where installed, and including flexible external bonding jumper.

G. Joint Compound for GRC or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 SURFACE PATHWAYS

A. General Requirements for Surface Pathways:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Comply with TIA-569-B.

B. Surface Metal Pathways: Galvanized steel with snap-on covers complying with UL 5. Manufacturer’s standard enamel finish.
   a. Color to match space raceway is used in. Multiple colors will be required on the project.

2.3 BOXES, ENCLOSURES, AND CABINETS

A. General Requirements for Boxes, Enclosures, and Cabinets:

1. Comply with TIA-569-B.
2. Boxes, enclosures and cabinets installed in wet locations shall be listed for use in wet locations.

B. Sheet-Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

D. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

E. Metal Floor Boxes:
1. Material: Cast or sheet metal.
2. Type: Fully adjustable.
3. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

F. Small Sheet Metal Pull and Junction Boxes: NEMA O S 1.

G. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, galvanized, cast iron with gasketed cover.

H. Device Box Dimensions: 4 inches by 2-1/8 inches by 2-1/8 inches deep.

I. Gangable boxes are prohibited.

J. Nonmetallic Outlet and Device Boxes: Comply with NEMA O S 2 and UL 514C.

K. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer’s standard enamel.
2. Interior Panels: Steel; all sides finished with manufacturer’s standard enamel.

L. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer’s standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.
6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 3 - EXECUTION

3.1 PATHWAY APPLICATION

A. Outdoors: Apply pathway products as specified below unless otherwise indicated:

1. Exposed Conduit: RNC, Type EPC-80-PVC.
2. Underground Conduit: RNC, Type EPC-80-PVC.
3. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

B. Indoors: Apply pathway products as specified below unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT or surface raceway.
2. Exposed, Not Subject to Severe Physical Damage: EMT or surface raceway.
3. Exposed and Subject to Severe Physical Damage: GRC.
4. Concealed in Interior Walls and Partitions: EMT.
5. Concealed above ceilings: J-hooks, installed to meet the requirements of NFPA 70 and NFPA 72. Conductors shall be run parallel to building members and bundled and restrained as required.
6. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric-Solenoid, or Motor-Driven Equipment): FMC.
7. Damp or Wet Locations: GRC.
8. Boxes and Enclosures: NEMA 250 Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.

C. Minimum Pathway Size: 3/4-inch trade size. Minimum size for optical-fiber cables is 1 inch.

D. Pathway Fittings: Compatible with pathways and suitable for use and location.

1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

F. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

3.2 INSTALLATION

A. Comply with NECA 1, NECA 101, and TIA-569-B for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum pathways. Comply with NFPA 70 limitations for types of pathways allowed in specific occupancies and number of floors.

B. Keep pathways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal pathway runs above water and steam piping.

C. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.

D. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications wiring conduits for which only two 90-degree bends are allowed. Support within 12 inches of changes in direction.

E. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

F. Pathways Embedded in Slabs:

1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure pathways to reinforcement at maximum 10-foot intervals.
2. Arrange pathways to cross building expansion joints at right angles with expansion fittings.
3. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.

G. Stub-ups to Above Recessed Ceilings:
   1. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

H. Coat field-cut threads on PVC-coated pathway with a corrosion-preventing conductive compound prior to assembly.

I. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install insulated bushings on conduits terminated with locknuts.

J. Install pathways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

K. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to conduit assembly to assure a continuous ground path.

L. Spare Pathways: Install pull wires in empty pathways. Cap underground pathways designated as spare above grade alongside pathways in use.

M. Surface Pathways:
   1. Install surface pathways within rooms and limited to only as necessary in corridors.
      a. In general, each device shall be stubbed up above the ceiling. Surface raceway shall not be run horizontally along a wall.

2. 3/4-Inch Trade Size and Smaller: Install pathways in maximum lengths of 50 feet.
3. 1-Inch Trade Size and Larger: Install pathways in maximum lengths of 75 feet.
4. Install with a maximum of two 90-degree bends or equivalent for each length of pathway unless Drawings show stricter requirements.

N. Install pathway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound.

O. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all pathways at the following points:
   1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
   2. Where an underground service pathway enters a building or structure.
   3. Where otherwise required by NFPA 70.

P. Mount boxes at heights indicated on Drawings according to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.

Q. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Section 312000 “Earth Moving” for pipe less than 6 inches in nominal diameter.
2. Install backfill as specified in Section 312000 “Earth Moving.”
3. After installing conduit, backfill and compact. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Section 312000 “Earth Moving.”
4. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
   a. Couple steel conduits to ducts with adapters designed for this purpose.
   b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
5. Underground Warning Tape: Comply with requirements in Section 260553 “Identification for Electrical Systems.”

3.4 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRONIC SAFETY AND SECURITY PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 “Sleeves and Sleeve Seals for Electronic Safety and Security Pathways and Cabling.”

B. Install sleeves at all penetrations of interior partitions.

3.5 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies.

3.6 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

END OF SECTION 280528
SECTION 280544 - SLEEVES AND SLEEVE SEALS FOR ELECTRONIC SAFETY AND SECURITY PATHWAYS AND CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Sleeves for pathway and cable penetration of non-fire-rated construction walls and floors.
   2. Sleeve-seal systems.
   5. Silicone sealants.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Wall Sleeves:
   2. Cast-Iron Pipe Sleeves: Cast or fabricated “wall pipe,” equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

C. Sleeves for Rectangular Openings:
   2. Minimum Metal Thickness:
      a. For sleeve cross-section rectangle perimeter less than 50 inches and with no side larger than 16 inches, thickness shall be 0.052 inch.
      b. For sleeve cross-section rectangle perimeter 50 inches or more and one or more sides larger than 16 inches, thickness shall be 0.138 inch.
2.2 **GROUT**

A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.


C. Design Mix: 5000-psi, 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

2.3 **SILICONE SEALANTS**

A. 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 that are not fire rated.

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**PART 3 - EXECUTION**

3.1 **SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENTRATIONS**

A. Comply with NECA 1.

B. Comply with NEMA VE 2 for cable tray and cable penetrations.

C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:

1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
   a. Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint.
   b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.

2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

3. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and pathway or cable unless sleeve seal is to be installed.

4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.

5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches above finished floor level. Install sleeves during erection of floors.
D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:
   1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
   2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.

E. Roof-Penetration Sleeves: Seal penetration of individual pathways and cables with flexible boot-type flashing units applied in coordination with roofing work.

F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between pathway or cable and sleeve for installing sleeve-seal system.

END OF SECTION 280544
SECTION 283111 – FIRE DETECTION and MASS NOTIFICATION SYSTEM

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.

B. A project addendum may be supplied with this document which details any project-specific additions or deletions to this general specification document.

1.2 SYSTEM DESCRIPTION

A. Michigan Tech has an existing EST workstation Center located at the Department of Public Safety and Police Services (DPSPS) that will be expanded to monitor and control new EST3 systems with voice communications. The workstation at DPSPS is connected to each building by a dedicated data network connection, and/or fiber optics, and/or an IP network connection.

B. All system additions/deletions will require any necessary updates to be done at the EST workstation located at DPSPS. At a minimum, all system points and graphics need to be updated and tested.

C. The workstation at DPSPS will transmit via VOIP to the EST3 network voice messages and manual paging announcements.

D. EST3 fire alarm control panels with Intelligent Addressable initiating devices and one-way voice communications system with audio paging speakers will be installed. The main control panel shall be located in a secure location with remote annunciators with microphone located at primary and secondary entrances.

E. Provide connection from the EST3 main control panel to the nearest IP Switch. Coordinate with Michigan Tech’s Telecommunications Department for location and final connections.

F. The mass notification system will consist of one-way audio paging speakers located throughout the facility and tapped at lower wattage, with numerous speakers. Visual notification shall be CLEAR Lens strobe imprinted with the word FIRE for Fire Evacuation and AMBER Lens strobe imprinted with the work ALERT for Mass Notification Events. Visual notification devices shall be WHITE.

G. The System supplied under this specification shall utilize node to node, direct wired, multi priority peer-to-peer network operations. The system shall utilize independently addressed, input/output modules, audio amplifiers, and voice communications as described in this specification. The peer-to-peer network shall contain multiple nodes consisting of the command center, main controller, remote control panels, and LCD panels. Each panel shall be an equal, active functional member.
of the network, which is capable of making all local decisions and generating network tasks to other panels in the event of panel failure or communications failure between panels. Master/slave system configurations shall not be considered as equals.

1.3 BUILDING CODES and STANDARDS

A. National Fire Protection Association (NFPA):
1. NFPA-70 National Electrical Code (NEC)
2. NFPA-72 National Fire Alarm Code
   a. Chapter 12 - Emergency Communications
4. IBC International Building Code
5. IFC International Fire Code
6. IMC International Mechanical Code
7. State of Michigan Building Codes and Amendments

B. National Electrical Manufacture’s Association (NEMA)

C. Underwriters Laboratories, Inc. (UL)
1. UL-864 Control Units for Fire Protective Signaling Systems (9th Edition)
2. UL-2572 Control Units for Mass Notification System
3. UL-268 Smoke Detector for Fire Protective Signaling Systems
4. UL-217 Smoke Detectors for Single and Multiple Station
5. UL-521 Heat Detectors for Fire Protective Signaling Systems
6. UL-464 Audible Signaling Appliances
7. UL-1971 Visual Signaling Appliances
8. UL-38 Manually Actuated Signaling Boxes
9. UL-1481 Power Supplies for Fire Protective Signaling Systems

1.4 SUBMITTALS

A. The Contractor shall purchase no equipment for the system specified herein until the Owner has approved the project submittals in their entirety and has returned them to the contractor. It is the responsibility of the contractor to meet the entire intent and functional performance detailed in these specifications. Approved submittals shall only allow the contractor to proceed with the installation and shall not be construed to mean that the contractor has satisfied the requirements of these specifications. The Contractor shall submit documentation electronically within 30 calendar days after award of purchase order.

B. Each submittal shall include a cover letter providing a list of each variation that the submittal may have from the requirements of the Contract Documents. In addition, the Contractor shall provide specific notation on each Shop Drawing, sample, catalog cut, data sheet, installation manual, etc. submitted for review and approval, of each such variation.

1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to the Architect.
2. Shop Drawings shall be prepared by persons with the following qualifications:

SYSTEM REQUIREMENTS
283111-2
10/15/2015
MICHIGAN TECHNOLOGICAL UNIVERSITY
DILLMAN HALL FIRE ALARM AND MASS NOTIFICATION SYSTEM

14-16-01

SYSTEM REQUIREMENTS

283111-3
10/15/2015

a. Trained and certified by manufacturer in fire-alarm system design.
b. NICET-certified fire-alarm technician, Level II minimum or Michigan registered Professional Engineer.

C. Product Data: Product Data sheets with the printed logo or trademark of the manufacturer of all equipment. Indicated in the documentation shall be the type, size, rating, style, and catalog number for all items proposed to meet the system performance detailed in this specification. The proposed equipment shall be subject to the approval of the Owner.

D. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

2. Include voltage drop calculations for notification appliance circuits.
3. Include battery-size calculations.
4. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
5. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale and coordinating installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
6. Include voice/alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
7. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.

E. Operation and Maintenance Data: For fire-alarm systems and components to be included in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data, include the following:

1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA72.
2. Provide "Record of Completion Documents" according to NFPA72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
3. Record copy of site-specific software database file, hardcopy print-out and CD, with password for delivery to the owner. Proprietary system/service companies will not be acceptable.
4. Provide "Maintenance, Inspection and Testing Records" according to NFPA72 article of the same name and include the following:

   a. Frequency of testing of installed components.
   b. Frequency of inspection of installed components.
   c. Requirements and recommendations related to results of maintenance.
   d. Manufacturer's user training manuals (hardcopy) and electronic on CD.

5. Manufacturer's required maintenance related to system warranty requirements.
6. Abbreviated operating instructions for mounting at fire-alarm control unit.
7. Copy of NFPA72.

F. Software and Firmware Operational Documentation:
   1. CD of site-specific software database file with password, all product data sheets and
      AutoCAD files. Provide hard copy print-out of the software program. Proprietary
      system/service companies will not be acceptable.
   2. Provide a list of global system settings
   3. Provide a list of the contents of each system cabinet and their settings
   4. Provide a list of all addressable devices with their addresses and settings

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation
   of units required for this Project.

B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level
   IV technician.

C. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single
   source from single manufacturer. Components shall be compatible with, and operate as, an
   extension of existing system.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA70, by
   a qualified testing agency, and marked for intended location and application.

E. NFPA Certification: Obtain certification according to NFPA72 in the form of a placard by an
   approved alarm company.

1.6 WARRANTY and SOFTWARE SERVICE AGREEMENT

A. The contractor shall warranty all materials, installation and workmanship for five (5) years from
   date of acceptance, unless otherwise specified. A copy of the manufacturers’ warranty shall be
   provided with closeout documentation and included with the operation and installation manuals.

B. The System Supplier shall maintain a service organization with adequate spare parts stocked
   within 75 miles of the installation. Any defects that render the system inoperative shall be repaired
   within 24 hours of the Owner notifying the contractor.

C. Technical Support: Beginning with Substantial Completion, provide software support for five (5)
   years, shall be included in this project.

D. Detector Sensitivity Testing: During the warranty period, each year the contractor is to perform
   detector sensitivity testing and provide report to the Owner unless the system is UL Listed to
   perform automatic sensitivity testing without any manual intervention and should detector fall
   outside of sensitivity window, the system will automatically indicate a device’s trouble. A copy of
   UL letter is to be provided as proof of system operation.
E. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within **five (5) years** from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.

1. Provide 30 days notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

1.7 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Provide quantity equal to 2% percent of amount of each type installed, but no fewer than 2 unit of each type.
   a. Smoke Detectors, heat detectors, manual pull stations, duct smoke detector, monitor modules and control modules:
   b. Notification appliances; speakers, speaker-strobes and strobes.

2. Keys: Ten extra sets for access to locked and tamper-proof components.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling fire alarm system. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system.

B. The Contractor shall provide, from the acceptable manufacturer's current product lines, equipment and components, which comply with the requirements of these Specifications. Equipment or components, which do not provide the performance and features, required by these specifications are not acceptable, regardless of manufacturer.

C. Strict conformance to this specification is required to ensure that the installed and programmed system will function as designed, and will accommodate the future requirements and operations of the building Owner. All specified operational features must be met without exception.

D. All control panel assemblies and connected (new) field appliances shall be provided by the same System Supplier, and shall be designed and tested to ensure that the system operates as specified. All equipment and components shall be installed in strict compliance with the manufacturer's recommendations.

E. That equipment proposed to be supplied will be considered only if it meets all sections of the performance specification. Any deviations of system performance outlined in this specification will only be considered when the following requirements have been met:

1. A complete description of proposed alternate system performance methods with three (3) copies of working drawings thereof for approval by the Owner, not less than ten (10) calendar days prior to the scheduled date for submission of bids.

2. The supplier of alternate equipment shall furnish evidence that the proposed alternate system performance is equal to or superior than the system operation stated in the specification. Such evidence shall be submitted to the Owner, not less than ten (10) calendar days prior to the scheduled date for submission of bids.

3. The supplier shall submit a point-by-point statement of compliance for all sections in this specification. The statement of compliance shall consist of a list of all paragraphs within these sections. Where the proposed system complies fully with the paragraph as written, placing the word "comply" opposite the paragraph number shall indicate such. Where the proposed system does not comply with the paragraph, as written, and the supplier feels the proposed system will accomplish the intent of the paragraph, a full description of the function as well as a full narrative description of how its proposal will meet its intent shall be provided. Any submission that does not include a point-by-point statement of compliance as described herein shall be disqualified. Where a full description is not provided, it shall be assumed that the proposed system does not comply.

4. The supplier of alternate equipment shall submit a list from the alternate manufacturer on the manufacturer's letterhead indicating the names and addresses of all authorized suppliers in the area. Proprietary products will not be considered.
5. The acceptability of any alternate proposed system shall be the sole decision of the Owner or his authorized representative.

F. Approved Products: All panels and peripheral devices shall be of the standard product of single manufacturer and shall display the manufacturer's name of each component. The catalog numbers specified under this section are those of EST, A UTC Fire & Security Company and shall constitute the type, product quality, material and desired operating features.

2.2 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire-alarm signal initiation shall be by one or more of the following devices:

2. Heat detectors.
3. Flame detectors.
4. Smoke detectors.
5. Duct smoke detectors.
6. Verified automatic alarm operation of smoke detectors.
7. Automatic sprinkler system water flow.
8. Heat detectors in elevator shaft and pit.
10. Fire standpipe system.

B. Fire-alarm signal shall initiate the following actions:

1. Activate multiple channel pre-recorded voice messages followed by temporal tone.
2. Continuously operate the visual notification appliances.
3. Identify alarm at fire-alarm control unit and remote annunciators.
4. Transmit an alarm signal to the remote alarm receiving station.
5. Unlock electric door locks in designated egress paths.
6. Release fire and smoke doors held open by magnetic door holders.
7. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
8. Activate stairwell and elevator-shaft pressurization systems.
9. Close smoke dampers in air ducts of designated air-conditioning duct systems.
10. Recall elevators to primary or alternate recall floors.
11. Activate emergency shutoffs for gas and fuel supplies.
12. Record events in the system memory.
13. Record events by the system printer.

C. Supervisory signal initiation shall be by one or more of the following devices and actions:

1. Valve supervisory switch.
2. Low-air-pressure switch of a dry-pipe sprinkler system.
3. Elevator shunt-trip supervision.

D. System trouble signal initiation shall be by one or more of the following devices and actions:

1. Open circuits, shorts, and grounds in designated circuits.
2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
3. Loss of primary power at fire-alarm control unit.
4. Ground or a single break in fire-alarm control unit internal circuits.
5. Abnormal ac voltage at fire-alarm control unit.
7. Failure of battery charging.
8. Abnormal position of any switch at fire-alarm control unit or annunciator.
9. Fire-pump power failure, including a dead-phase or phase-reversal condition.
10. Low-air-pressure switch operation on a dry-pipe or pre-action sprinkler system.

E. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire-alarm control unit and remote annunciators. Record the event on system printer.

2.3 GLOBAL EVENT GRAPHICAL WORKSTATION

A. The existing Global Event Graphical Workstation (GEGW) is located at the campus Public Safety and Police Services Building (DPSPS). All new systems shall be connected to the GEGW and shall include all necessary programming to update the system. The system updates shall include all system points, and Node Annunciation.

B. Provide VOIP communications from the GEGW to the EST3 network being installed as part of the scope of work.

C. The GEGW shall have a built-in paging microphone to selectively communicate to any building network or level within a building network or multiple selective combination or All Call. This voice paging shall be accomplished by Voice Over IP communications to each network. All manual voice pages from GEGW shall automatically be voice-recorded in a history file and be available for replay.

1. Graphical screens shall be provided to select the manual paging virtual switch panel.

D. Graphical Maps shall be imported from any of the following formats: DXF, DWG, JPEG, RLE, TIF, BMP, and WMF. The main screen shall be Aerial Photo of the Building or Campus, followed by Photo of the Building Profile, floor plan architectural drawing, and multiple zoom fields on the floor plan.

1. Drawing display shall allow for zoom out to full floor view or zoom in to individual device location. It shall be possible for the operator to manually zoom down to any portion of a vector-based graphic without aliasing, artifacting, or pixilation of the image. Preset zoom levels shall not be considered equal. Include floor plan Legend to identify location on floor plan key view.

2. There shall be a toggle button on screen for all drawing levels that allow instant migration to the floor above or the floor below the floor currently being displayed on screen.

3. Floor plans shall have the minimum:
   a. 32 Zoom field views on drawing.
   b. Door swings.
   c. Window locations.
   d. Room number and designation of occupancy.
   e. All initiating and notification device locations.
2.4 IP CAMPUS NETWORK

A. Provide connectively to campus Emergency Communications Ethernet IP Network. The TCP/IP network switches shall be industrial grade auto-negotiating switching hubs. Switch shall be UL864 listed, shall provide four (4) 10/100 Mbps shielded RJ-45 connectors for twisted pair (ethernet) connections and two 100 Mbps fiber ports. The switches shall operate on a nominal 24 VDC supplied from a battery backed up fire alarm control panel or booster power supply to insure power to the switch is always available. Switches shall provide LED indicators for data rate, activity/link integrity, power and loop detection. Shall interface into existing campus Ethernet with 10/100 Mbps RJ-45 connector.
1. Shall be EST Model Number: NETSW-EIS6M Network Interface

Switch/Hubs shall be: (if required and as specified by Michigan Tech Telecommunications)

FW-LANMM Fiber Network Switch - Multi mode, standard distance
FW-LANSM1 Fiber Network Switch - Single mode, standard distance
FW-LANSM2 Fiber Network Switch - Single mode, medium distance
FW-LANSM3 Fiber Network Switch - Single mode, long distance
FW-LANW1 Wireless Network Switch - Wireless, short range
FW-LANW2 Wireless Network Switch - Wireless, long range

B. Each fire alarm control panel to LAN/WAN network interface shall be an industrial grade 10/100BASE T Ethernet® device server. The interface shall have diagnostic LEDs on the front of the unit make it easy to determine its status, and incorporate flash ROM memory facilitating upgrading the operating firmware. Power shall be supplied directly from the FACP, ensuring a reliable and monitored power source.
1. Shall be EST, model NETCOM-1S.

C. Each control panel audio source shall be connected to the LAN/WAN network interface shall be Network audio connectivity shall consist of a supervised audio decoder capable of decoding MP3, WMA, G.711 and PCM data streams in either HTTP, UDP, or RTP format. Audio decoder shall operate on filtered-regulated 24 VDC power derived from the panel power supply. Power shall be supplied directly from the FACP, ensuring a reliable and monitored power source.
1. Audio decoder shall be equipped with:
a. A RCA jack line-level audio output.
b. RJ45 10/100BASE T Mbit Automatic Ethernet port.
c. Backlit LCD display
d. RS232 DB9 male interface capable of 115,200 baud communication.
e. Normally open relay contact rated at 500 mA @ 24 VDC.
f. Reset button.
g. Aluminum case.
h. Shall be EST, mode FVOIP-EX.X
2.5 FIRE-ALARM CONTROL UNIT

A. The main control panel or remote control panel(s) shall be a multi-processor based networked system designed specifically for detection, and one-way emergency audio communications applications. The control panel(s) shall be listed and approved for the application under the standard(s) as listed. The control panel shall be model EST3.

B. The control panel(s) shall include all required hardware, software and site-specific system programming to provide a complete and operational system. The control panel(s) shall be designed such that interactions between any application can be configured, and modified using software provided by a single supplier. The control panel operational priority shall assure that life safety takes precedence among the activities coordinated by the control panel.

C. The network of control panels shall include the following features.

1. Ability to download all network applications and firmware from the configuration computer on the network or at any control panel (network node) location.

2. Each control panel (network node) shall have an LCD display with common controls. The display shall be configurable to display the status of any and all combinations of alarm, supervisory, trouble, monitor, or group event messages.

3. From each LCD display on the system shall be capable of being programmed for control functions of any node or the entire network. The LCD display shall reside on the network as a node and continue to operate with fault on the network. An LCD can be programmed to be only operation when a node is operational in stand-alone mode, with a network fault.

4. The system program shall have a minimum of 100 system definable Service Groups to facilitate the testing of installed system based on the physical layout of the system. Service groups that disable entire circuits serving multiple floors or fire zones shall not be considered as equal.

5. Advanced Windows based programming with Program Version Reporting to document any and all changes made during system start-up or system commissioning. Time and date stamps of all modifications made to the program must be included to allow full retention of all previous program version data. The operator display shall clearly identify unacknowledged and acknowledged alarm, supervisory, trouble, and monitor status messages. The system shall provide the ability to download data from the analog/addressable detectors to a PC while the system is on-line and operational in the protected premises. The downloaded data may then be analyzed in a diagnostic program supplied by the system manufacturer.

6. Provide system reports that list a detailed description of the status of system parameters for corrective action or for preventive maintenance. Reports shall be displayed on the operator interface or be capable of being sent to a printer.

7. Provide an authorized operator with the ability to operate or modify system functions such as system time, date, passwords, holiday dates, restart the system and clear the control panel event history file.

8. Provide an authorized operator the ability to perform test functions within the installed system.

9. Supervision of system components, wiring, initiating devices and software shall be provided by the control panel. Failure or fault of system component or wiring shall be indicated by type and location on the LCD display. Software and processor operation shall be independently monitored for failure. The system shall provide fail-safe operation, with multiple-levels of system operation.
D. Each network control panel shall be capable of:
   1. Supporting up to 2500 intelligent analog/addressable points.
   2. Supporting up to ten (10) intelligent addressable loops, each loop supporting 125 detectors and 125 modules, total of 250 points.
   3. Supporting network connections up to 63 other control panels and annunciators.
   5. Supporting up to ten network digital dialers with Contact ID or SIA format and TAP Pager protocol.
   7. Supporting up to 1740 chronological history events.
   8. Total network response shall not exceed 3 seconds.

E. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, monitor, trouble and component status messages and control menu.
   1. The common control switches and with corresponding LEDs provided as minimum will be; Reset Alarm Silence, Panel Silence, and Drill. It shall be able to add additional switches/LEDs as required.
   2. The main control panel shall have display that is 24 lines by 40 character graphic LCD and backlit when active.
   3. Each point shall have custom event message of up to 40 charters, for total of 80 charters. In addition to instructional text message support a maximum of 2,000 characters each.
   4. Provide 8 simultaneous events to be displayed. The first seven (7) highest priority events in addition to the most recent event. The events shall be automatically placed in event types (Alarm, Supervisory, Monitor & Trouble) for easy access and shall be possible to view the specific event type separately. Having to scroll through a mixed list of event types is not acceptable.
   5. Provide an internal audible signal with different programmable patterns to distinguish between alarm, supervisory, trouble and monitor conditions.
   6. This display shall be an EST 3-LCDXL1.
   7. Systems not capable of such a display on the main panel faceplate shall include a CRT/Monitor display meeting the above requirements and battery stand-by.

F. Audio One-Way Voice Communications
   1. The voice communication system shall be eight (8) channel audio evacuation systems, to allow the ability to have eight simultaneous announcements/paging. The audio channels shall be designed as such:
      a. Mass Notification Message (HIGHEST PRIORITY)
      b. Fire Message
      c. Alert Message
      d. Stand-by Message
      e. Elevator Message
      f. Stairwell Message
      g. Security/Weather Threat
      h. Manual Paging

   2. The system custom digital voice message shall provide a minimum of 100 minutes and be created as a .wav file format. All messages shall be able to be created on-site without any special tools or burning of chips. Provide as minimum one twenty (20) watt supervised
audio amplifier per paging zone. The system software shall be capable of selecting the
required audio source signal for amplification. To enhance system survivability, each audio
amplifier shall automatically provide an internally generated local 3-3-3, 1000 Hz temporal
pattern output upon loss of the audio signal from the one-way emergency audio control
unit, during an alarm condition.

3. Audio amplifiers shall be power limited and protected from short circuits conditions on the
audio circuit wiring. Each amplifier output shall be a supervised, dedicated, selectable
25/70 Vrms output.

4. Provide a standby audio amplifier, per node that will automatically sense the failure of any
primary amplifier installed in the same panel and replace the function of the failed amplifier.

G. Provide an Emergency Voice Communication System with the following design features:
   1. An audio control unit with Microphone for Paging.
   2. Provide 3-position switch for each evacuation signaling zone and “All-Call”, with “Page
      FIRE”, “Auto” and “Page ALERT” positions identified and two LED status indicators for
each audio visual evacuation signaling “zone”, one red and one yellow.
   3. These LED’s shall illuminate to indicate respectively:
      a. Evacuation signals activated (red),
      b. Trouble in audio (speaker) or visual (strobe) circuit(s) (yellow).

H. Provide 2-position switch for manually activate pre-recorded voice messages, with “Message
   Name” positions identified and one LED status indicators, one red. Provide minimum of 12
   selector switches.
   1. These LED's shall illuminate to indicate respectively:
      a. Message activated (red)

I. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass
   cover in a stainless steel or aluminum frame. Include interpretation and describe appropriate
   response for displays and signals. Briefly describe the functional operation of the system under
   normal, alarm, and trouble conditions

J. Circuits Requirements:
   1. Signaling Line Circuits for Network Communications:
      a. Class A, Style 7.
   2. Signaling Line Circuits for Intelligent Analog Addressable Loop:
      b. No more than 100 detectors or 100 modules installed on a loop.
   3. Initiating Device Circuit:
      a. Class B, Style B
   4. Notification Appliance Circuits:
      a. Class B, Style Y.
      b. Maximum circuit loading to 2 amps for visuals.
   5. Activation of alarm notification appliances, smoke control, elevator recall and other
      functions shall occur within 3 seconds after the activation of an initiating device.

K. Smoke-Alarm Verification:
   1. Initiate an audible and visible indication of an “alarm-verification” signal at fire-alarm control
      unit.
2. Activate an NRTL-listed and -approved "alarm-verification" sequence at fire-alarm control unit and detector.
3. Record events by the system printer.
4. Sound general alarm if the alarm is verified.
5. Cancel fire-alarm control unit indication and system reset if the alarm is not verified.

L. Elevator Recall:
1. Smoke detectors at the following locations shall initiate automatic elevator recall. Alarm-initiating devices, except those listed, shall not start elevator recall.
   a. Elevator lobby detectors except the lobby detector on the designated floor.
   b. Smoke detector in elevator machine room.
   c. Smoke detectors in elevator hoistway.
2. Elevator lobby detectors located on the designated recall floors shall be programmed to move the cars to the alternate recall floor.
3. Water-flow alarm connected to sprinkler in an elevator shaft and elevator machine room shall shut down elevators associated with the location without time delay.
   a. Water-flow switch associated with the sprinkler in the elevator pit may have a delay to allow elevators to move to the designated floor.

M. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke barrier walls shall be connected to fire-alarm system.

N. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change to alternate settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and print out the final adjusted values on system printer.

O. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, shall be powered by nominal 24-V dc source.

P. Secondary Power: Shall provide 24 hours supervisory and 15 minutes of alarm with batteries, automatic battery charger, and automatic transfer switch.

2.6 REMOTE ANNUNCIATOR

A. Annunciator shall match those of fire-alarm control unit LCD display functions for alarm, supervisory, monitor and trouble indications and common system controls including; acknowledging, silencing, resetting, and testing. See section 2.3 E for specific requirements.
1. This display shall be EST, model 3-LCDXL1 or 3-LCDANN.
2.7 NAC Power Supply:

A. The NAC power supply shall be independent unit that will provide power to visual strobe notification appliances. It shall be possible to configure the NAC’s to follow the main panel's NAC or activate from intelligent synchronized modules. The booster NAC’s must be configurable to operate independently at any one of the following rates: continuous synchronized, or 3-3-3 temporal. Fault conditions on the power supply shall not impede alarm activation of host NAC circuits or other power supplies. The NAC power supply must be able to provide concurrent power for notification devices, security devices, access control equipment and auxiliary devices such as door holders. All the NAC Power Supplies shall be synchronized. The power supply shall support up to 24 amp hour batteries.

1. Power supply shall be minimum of 10 amps and UL 864 Listed.
2. Four independent 3amp NAC circuits. Each being configurable as auxiliary power.
3. All circuits shall be synchronized.
4. Shall be EST, model BPS10A

2.8 INTELLIGENT ANALOG SYSTEM SMOKE DETECTORS

A. General Requirements for Intelligent Analog Detectors

1. Integral Microprocessor: All decision are made at the detector determining if the device is in the alarm or trouble condition.
2. Non-Volatile Memory: Permanently stores serial number and type of device. Automatically updates historic information including hours of operation, last maintenance date, number of alarms and troubles, time of last alarm, and analog signal patterns for each sensing element just before last alarm.
3. Electronic Addressing: Permanently stores programmable system address. It shall be possible to address each intelligent module without the use of DIP or rotary switches. Devices using switches for addressing shall not be acceptable.
4. Automatic Device Mapping: Each detector transmits wiring information regarding its location with respect to other devices on the circuit, creating an As-Built wiring diagram. This will also provide enhanced supervision of the device physical location and the device message shall reside with the location and not the device address. Devices installed in the wrong location will always report the correct message of the physical location.
5. Sensitivity Range: Each analog addressable smoke detector's sensitivity shall be capable of being programmed individually as: most sensitive, more sensitive, normal, less sensitive or least sensitive. It shall be possible to automatically change the sensitivity of individual analog/addressable detectors for the day and night periods. It shall be possible to program control panel activity to each level.
6. Pre-Alarm: Detector stores 20 pre-alarm sensitivity values to alert local personnel prior to the sensor reaching full evacuation sensitivity. Sensitivity values can be set in 5% increments.
7. Environmental Compensation: The detector's sensing element reference point shall automatically adjust, compensating for background environmental conditions such as dust, temperature, and pressure. Periodically, the sensing element real-time analog value shall be compared against its reference value. The detector shall provide a maintenance alert signal when the detector reaches 75% (Dirty) to 99% (More Dirty) compensation has been used. The detector shall provide a dirty fault signal when 100% or greater compensation has been used.
8. Twin Status LEDs: Flashing Green LED shows normal; flashing RED shows alarm state; steady RED and steady GREEN show alarm state in stand-alone mode, visible from any direction.

9. UL Sensitivity Testing: The detector shall utilize a supervised microprocessor that is capable of monitoring the sensitivity of the detector. If the detector sensitivity shifts outside of the UL limits, a trouble signal is sent to the panel.

10. Device Replacement: The system shall allow for changing of detector types for service replacement purposes without the need to reprogram the system. The replacement detector type shall automatically continue to operate with the same programmed sensitivity levels and functions as the detector it replaced. System shall display an off-normal condition until the proper detector type has been installed or change in the application program profile has been made.

B. Intelligent 4D Multi-sensor Detector (Photo/Ion/Thermal and Time)
   1. Provide intelligent analog addressable 4D multi-sensor smoke detectors at the locations shown on the drawings. The 4D Intelligent detector gathers analog information from each of its three fire sensing elements and converts it into digital signals. The detector’s on-board microprocessor measures and analyzes these signals separately with respect to a fourth element – Time. It compares the information to historical readings, time patterns and known fire characteristics to make an alarm decision. Digital filters remove signal patterns that are not typical of fires.
   2. Separately mounted combinations of photoelectric detectors, ionization detectors and heat detectors in the same location, clustered at the manufacturer's listed spacing is an acceptable alternative.
   3. Provide EST, model SIGA-IPHS.

C. Intelligent 3D Multi-sensor Detector (Photo/Thermal and Time)
   1. Provide intelligent analog addressable 3D multi-sensor smoke detectors at the locations shown on the drawings. The 3D Intelligent detector gathers analog information from each of its two fire sensing elements and converts it into digital signals. The detector’s on-board microprocessor measures and analyzes these signals separately with respect to a third element – Time. It compares the information to historical readings, time patterns and known fire characteristics to make an alarm decision. Digital filters remove signal patterns that are not typical of fires.
   2. Provide EST, model SIGA-PHS.

D. Intelligent Photoelectric Detector
   1. Provide intelligent analog addressable photoelectric smoke detectors at the locations shown on the drawings.
   2. Provide EST, model SIGA-PS.

E. Intelligent 135 Degree Fixed Temperature / Rate of Rise Heat Detector
   1. Provide intelligent combination fixed temperature/rate-of-rise heat detectors at the locations shown on the drawings. The heat detector shall have a low mass thermistor heat sensor and operate at a fixed temperature and at a temperature rate-of-rise. It shall continually monitor the temperature of the air in its surroundings to minimize thermal lag to the time required to process an alarm. The integral microprocessor shall determine if an alarm condition exists and initiate an alarm based on the analysis of the data.
using central intelligence for alarm decisions shall not be acceptable. The intelligent heat
detector shall have a nominal fixed temperature alarm point rating of 135°F (57°C) and a
rate-of-rise alarm point of 15°F (9°C) per minute. The heat detector shall be rated for ceiling
installation at a minimum of 70 ft (21.3m) centers and be suitable for wall mount
applications.

2. Provide EST, model SIGA-HRS.

F. Fixed Temperature Heat Detector
1. Provide intelligent fixed temperature heat detectors at the locations shown on the drawings.
The heat detector shall have a low mass thermistor heat sensor and operate at a fixed
temperature. It shall continually monitor the temperature of the air in its surroundings to
minimize thermal lag to the time required to process an alarm. The integral microprocessor
shall determine if an alarm condition exists and initiate an alarm based on the analysis of
the data. Systems using central intelligence for alarm decisions shall not be acceptable.
The heat detector shall have a nominal alarm point rating of 135°F (57°C). The heat
detector shall be rated for ceiling installation at a minimum of 70 ft (21.3m) centers and be
suitable for wall mount applications.

2. Provide EST, model SIGA-HFS.

G. Detector Base Types
1. Provide standard detector mounting bases suitable for mounting on 1-gang, or 4inch
octagon box and 4 inch square box. The base shall, contain no electronics and support all
series detector types. Bases with electronics or dip-switches are not acceptable.
a. Provide EST, model SIGA-SB or SB4.
2. Provide relay detector mounting bases suitable for mounting on 1-gang, or 4" octagon box
and 4” square box. The relay base shall support all Signature Series detector types and
have the following minimum requirements:
a. The relay shall be a bi-stable type and selectable for normally open or normally
closed operation.
b. The position of the contact shall be supervised.
c. The relay shall automatically de-energize when a detector is removed.
d. The operation of the relay base shall be controlled by its respective detector
processor or under program control as required by the application. Detector relays
not capable of operational programming independent of the detector shall not be
considered equal. Form "C" Relay contacts shall have a minimum rating of 1 amp
@ 30 Vdc and be listed for "pilot duty".
e. Removal of the respective detector shall not affect communications with other
detectors.
f. Provide EST, model SIGA-RB or RB4
3. Provide audible detector mounting bases suitable for mounting on 4” x 4” octagonal
concrete ring (mud box) and 4” square x 2-1/8” (54 mm) deep box.
a. The base shall support all Signature Series detector types and be capable of single
or group operation. The audible base shall emit a temporal alarm tone and be
selectable for low or high output.
b. The operation of the audible base shall be controlled by its respective detector
processor or under program control as required by the application. Detector audible
base not capable of operational programming independent of the detector shall not
be considered equal.
c. The audible bases shall be UL268 and UL464 Listed, and provide a reverberant room sound output per UL464 of 81 dBA at 10 ft (3m). and an average anechoic sound output of 90 dBA at 10 ft (3m).

d. Provide EST, model SIGA-AB4G.

H. Intelligent Duct Smoke Detector - Photoelectric
1. Provide intelligent photoelectric duct smoke detector at the locations shown on the drawings.
   a. One form C auxiliary alarm relay rated at 2amps @ 30Vdc.
   b. The operating range shall be 100ft/min to 4,000ft/min air velocity and temperature range of –20 to 158F.
   c. Sample tube can be installed with or without the cover place and be rotated in 45-degree increments to ensure proper alignment with duct airflow.
   d. Local magnet-activated test switch.
   e. Provide EST, model SIGA-SD
2. Provide remote test station with Alarm LED and Key Switch.
   a. Provide EST, model SD-TRK.
   a. Provide EST, model SIGA-CR.

I. Beam Smoke Detectors
1. Provide reflective beam type smoke detectors at the locations shown on the drawings. This detector shall consist of a integrated transmitter and receiver capable of being powered separately or together.
2. The detector shall operate in either a short range of 15 to 160 ft. or a long range of 160 to 330 ft. The detector shall feature a bank of alignment LEDs on both the receiver and transmitter to ensure proper alignment without the use of special tools.
3. The detector shall utilize an automatic gain control to compensate for gradual signal deterioration from dirt accumulation on lenses. The beam smoke detectors shall be powered from the system control panel. Testing shall be carried out using calibrated test filters.
4. Provide a remote key activated remote test station.
   a. Provide Beam Smoke Detector, model EC-50R or EC-100R with EC-LLT Test Station.

2.9 INTELLIGENT MODULES

A. It shall be possible to address each intelligent module without the use of DIP or rotary switches. Devices using switches for addressing shall not be acceptable. The personality of multifunction modules shall be programmable at site to suit conditions and may be changed at any time using a personality code downloaded from the Analog Loop Controller.
1. Integral Microprocessor: All decisions are made at the module determining if the device is alarm or trouble condition.
2. Non-Volatile Memory: Permanently stores serial number, and type of device. Automatically updates historic information including hours of operation, number of alarms and troubles, time of last alarm.
3. Automatic Device Mapping: Each detector transmits wiring information regarding its location with respect to other devices on the circuit, creating an As-Built wiring diagram. This will also provide enhanced supervision of the device physical location. The device message shall reside with the location and not the device address. Devices installed in the wrong location will always report the correct message of the physical location.

4. Twin Status LEDs: The modules shall have a minimum of 2 diagnostic LEDs mounted behind a finished cover plate. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status.

5. Input and output circuit wiring shall be supervised for open and ground faults.

6. Two styles of modules shall be available, those designed for gang box mounting, and where multiple modules are required in a single location, plug in modules shall be provided with a Universal Input/Output motherboard.

B. Intelligent Input Module. The Input Module shall provide one or two supervised Class B input circuit capable of a minimum of 4 personalities, each with a distinct operation. The module shall be suitable for mounting on North American 2 ½” (64mm) deep 1-gang boxes and 1 ½” (38mm) deep 4” square boxes with 1-gang covers. The single input module shall support the following circuit types:

- Normally-Open Alarm Latching (Manual Stations, Heat Detectors, etc.)
- Normally-Open Alarm Delayed Latching (Waterflow Switches)
- Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.)
- Normally-Open Active Latching (Supervisory, Tamper Switches)

1. Provide EST model SIGA-CT1 or CT2 or SIGA-MCT2

C. Intelligent Relay Module. Provide addressable control relay circuit modules shall provide one (1) form C dry relay contacts rated at 24Vdc @ 2 amps (pilot duty) to control external appliances or equipment. The position of the relay contact shall be confirmed by the system firmware. The module shall be suitable for mounting on North American 2 ½” (64mm) deep 1-gang boxes and 1 ½” (38mm) deep 4” square boxes with 1-gang covers.

1. Provide EST, model SIGA-CR or SIGA-MCR.

D. NAC Control Module: Provide intelligent NAC control module shall provide one (1) supervised Class B output circuit capable of a minimum of 2 personalities, each with a distinct operation. The gang box -mounted version shall be suitable for mounting in North American 2 ½” (64mm) deep 2-gang boxes and 1 ½” (38mm) deep 4” square boxes with 2-gang covers, or European 100mm square boxes. The plug-in version shall plug into a universal multi-module motherboard. The NAC control module shall support the following operations:

- 24volt NAC circuit
- Audio notification circuit 25v or 70v
- Telephone Power Selector with Ring Tone (Firefighter's Telephone)
- Visual Synchronized Output to Genesis appliances or to NAC Power Supply.

1. Provide EST, model SIGA-CC1 or –CC1S or SIGA-MCC1 or MCC1S.

E. FA Elevator Interface Cabinet

1. Provide red metal cabinet enclosure with word FIRE in white letters on the cover. Inside will be four intelligent relays (Primary Recall, Alternate Recall, Fire Hat and Shunt Trip), one monitor input (Shunt Trip AC Power Supervision) and 120vac relay (Shunt Trip AC Power Supv).

2. Label all the relays and input modules for the function.

SYSTEM REQUIREMENTS

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2.10 MANUAL FIRE-ALARM BOXES

A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
   1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
   2. The manual pull station will have an intelligent module integral of the unit.
   3. Station Reset: key operated switch shall match the control panel key.
   4. Manual pull stations that initiated an alarm condition by opening the unit are not acceptable.
   5. Provide EST, model SIGA-278.

B. Indoor Protective Shield: Factory-fabricated clear plastic enclosure. Hinged at the top to permit lifting for access to initiate alarm. Lifting the cover actuates an integral battery powered audible horn (when noted on the drawings) intended to discourage false-alarm operation.

C. Weatherproof manual pull station shall be provided of red metal construction with special weatherproof gasket metal red box.
   2. Station Reset: key operated switch shall match the control panel key.
   3. The intelligent monitor module will be located within the building and not with the station
   4. Provide EST, model MPSR1.

2.11 NOTIFICATION APPLIANCES

A. All appliances shall be of the same manufacturer as the Fire Alarm Control Panel specified to insure absolute compatibility between the appliances and the control panels, and to insure that the application of the appliances are done in accordance with the single manufacturers’ instructions.

B. Any appliances, which do not meet the above requirements, and are submitted, for use must show written proof of their compatibility for the purpose intended. Such proof shall be in the form of documentation from all manufacturers which clearly states that their equipment (as submitted) are 100% compatible with each other for the purposes intended. All appliances shall be UL listed Fire Protective Service. and shall be UL 1971.

C. Notification Appliances – Visual (Fire – Evacuation)
   1. Provide wall or ceiling mounted clear lens strobes with white body and "FIRE" markings. Strobes shall provide a smooth light distribution pattern field selectable candela 15 cd, 30 cd, 75 cd, and 110 cd flash output rating, UL1971 listed with in-out screw terminals shall be provided for wiring. The strobe (15, 30, 75, 110) candela rating shall be view from the side window to verify the setting. All strobes shall be synchronized to within 10 milliseconds.
for an indefinite period shall not require the use of separately installed remote synch modules. The strobes shall mount to one-gang electrical box.

2. The device shall have plastic protective cover for during installation.
3. The actual candela setting on the visual shall be marked on the appliance.
4. Provide EST, model Genesis Series devices.

D. Notification Appliances – Visual (ALERT – Mass Notification)
1. Provide wall or ceiling mounted amber colored lens strobe with white body and “ALERT” markings. Amber strobe shall provide a smooth light distribution pattern field selectable candela 15 cd, 30 cd, 75 cd, and 110 cd flash output rating UL1638 listed, with in-out screw terminals shall be provided for wiring. The strobe (A, B, C, D) candela rating shall be viewable from the side window to verify the setting. All strobes shall be synchronized to within 10 milliseconds for an indefinite period shall not require the use of separately installed remote synch modules. The strobes shall mount to electrical box.
2. Provide Amber Strobe adapter plate that will allow G4 Speaker-Strobe. The amber strobe shall be located directly below the Fire clear lens strobe.
3. The device shall have plastic protective cover for during installation.
4. Provide EST, model Genesis Series devices.

E. Notification Appliance - 4" Cone Speaker
1. Speakers shall have a 4" mylar cone, paper cones shall not accept as equal. The rear of the speakers shall be completely sealed protecting the cone during and after installation. In and out screw terminals shall be provided for wiring. Speakers shall provide 1/4w, 1/2w, 1w, and 2w power taps for use with 70V systems. The actual speaker wattage & strobe candela setting shall be viewable from the device window to verify the wattage setting without removing the device. To make any changes to the speaker wattage will only require the removal of the cover plate.
2. At the 2-watt setting, the speaker shall provide a 90 dBA sound output over a frequency range of 400-4000 Hz. as measured in reverberation room per UL-1480.
3. Combination speaker strobes shall meet both sections of above.
4. The device shall have plastic protective cover for during installation.
5. The actual wattage setting on the speaker shall be marked on the face of the appliance.

F. Notification Appliance - Re-entrant Speakers
1. Provide 4"white flush re-entrant speakers at loud ambient locations or for outdoor weatherproof installation. Weatherproof boxes shall be provided for outdoor mounting. Speakers shall provide 2w, 4w, 8w, and 15w power taps. The re-entrant speakers shall utilize a high-efficiency compression driver. Cone type drivers are not acceptable. At the 15 watt setting, the speaker shall provide a 102 dBA sound output over a frequency range of 400-4000 Hz. when measured in reverberation room per UL-1480.
2. Combination speaker strobes shall meet both sections of above.
3. Provide EST, model 757 Series devices.

G. Notification Appliance - 8" Cone Speaker
1. Speakers shall have a 8" cone with 5.32oz ceramic magnet. In and out screw terminals shall be provided for wiring. Speakers shall provide 1/2w, 1w, 2w and 4w power taps for use with 70V systems. With response from 100Hz - 8KHz +/- 5dB.
2. At the 2-watt setting, the speaker shall provide an 85 dBA sound output over a frequency range of 100-8KHz, as measured in reverberation room per UL-1480.
3. The baffle shall be steel, baked epoxy powder coat finish - White.
4. Combination speaker strobes shall meet both sections of above.
5. Provide EST, model 965 Series devices.

2.12 GUARDS FOR PHYSICAL PROTECTION

A. Provide welded mesh of size and shape for the manual pull stations, smoke detectors, notification appliances at location noted on the drawings.

2.13 MAGNETIC DOOR HOLDERS

A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.
   1. Electromagnet: Requires no more than 3 W to develop 25-lbf holding force.
   2. Wall-Mounted Units: Flush mounted unless otherwise indicated.
   3. Rating: 120-V ac, 24-V ac or dc.
   4. Provide EST, model 1500 series or DH Series.

2.14 WIRE AND CABLE

A. Signaling Line Circuits – Network Data: Twisted pair, not less than No. 18Awg or as recommended by the manufacturer.

B. Signaling Line Circuits – Intelligent Loop: Non-Twisted pair, not less than No. 16Awg or as recommended by the manufacturer.
   1. Circuit Integrity Cable: Provide as required to meet NFPA or Local Code requirements.
   2. CI Cable shall meet article 760, power limited fire alarm service.

C. Notification Appliance Circuits –
   1. Audio: Twisted pair, not less than No. 16Awg or as recommended by the manufacturer.
   2. Visual: Twisted pair, not less than No. 14Awg or as recommended by the manufacturer.
PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Comply with NFPA72 for installation of fire-alarm equipment.

B. Equipment Mounting: Install fire-alarm control unit on finished floor with tops of cabinets not more than 72 inches above the finished floor.

C. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.
   1. Connect new equipment to existing control panel in existing part of the building.
   2. Connect new equipment to existing monitoring equipment at the supervising station.
   3. Expand, modify, and supplement existing control / monitoring equipment as necessary to extend existing control / monitoring functions to the new points. New components shall be capable of merging with existing configuration without degrading the performance of either system.

D. Smoke- or Heat-Detector Spacing:
   3. Smooth ceiling spacing shall not exceed 30 feet.
   4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix A or Appendix B in NFPA 72.
   5. HVAC: Locate detectors not closer than 5 feet from air-supply diffuser or return-air opening.
   6. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture.

E. Duct Smoke Detectors: Comply with NFPA72 and NFPA90A. Install sampling tubes so they extend the full width of duct.

F. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.

G. Single-Station Smoke Detectors: Where more than one smoke alarm is installed within a dwelling or suite, they shall be connected so that the operation of any smoke alarm causes the alarm in all smoke alarms to sound.

H. Notification Appliance Devices: Install between 80 and 96 inches on the wall.

I. Fire-Alarm Control Unit: Surface mounted, with tops of cabinets not more than 72 inches above the finished floor.
J. Annunciator: Install with top of panel not more than 56 inches above the finished floor.

3.2 CONNECTIONS

A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Division 8 Section "Door Hardware." Connect hardware and devices to fire-alarm system.

1. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this Section before making connections.

B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.

1. Alarm-initiating connection to smoke-control system (smoke management) at firefighter smoke-control system panel.
2. Alarm-initiating connection to stairwell and elevator-shaft pressurization systems.
3. Smoke dampers in air ducts of designated air-conditioning duct systems.
4. Alarm-initiating connection to elevator recall system and components.
5. Alarm-initiating connection to activate emergency lighting control.
6. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
7. Supervisory connections at valve supervisory switches.
8. Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.
10. Supervisory connections at fire-pump power failure including a dead-phase or phase-reversal condition.
11. Supervisory connections at fire-pump engine control panel.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 16 Section "Electrical Identification."

B. Install framed instructions in a location visible from fire-alarm control unit.

C. All initiating devices shall have bar code label installed visibly on the device. This bar code shall be used for digital inspection of the fire alarm system using Building-Reports.Com.

3.4 GROUNDING

A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.
MICHIGAN TECHNOLOGICAL UNIVERSITY
DILLMAN HALL FIRE ALARM AND MASS NOTIFICATION SYSTEM
14-16-01

3.5 FIELD QUALITY CONTROL

A. Field tests shall be witnessed by Architect, Engineer and authorities having jurisdiction.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.
   1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:
   1. Visual Inspection: Conduct visual inspection prior to testing.
      a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
      b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA72; retain the "Initial/Reacceptance" column and list only the installed components.
   3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
   4. Test audible appliances for the private operating mode according to manufacturer's written instructions.
   5. Test visible appliances for the public operating mode according to manufacturer's written instructions.

E. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

F. Fire-alarm system will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports.

H. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

SYSTEM REQUIREMENTS
283111-24
10/15/2015
I. Annual Test and Inspection: During the warranty period, each year test fire-alarm system complying with visual and testing inspection requirements in NFPA72. Use forms developed for initial tests and inspections.

J. Detector Sensitivity Testing: During the warranty period, each year the contractor is to perform detector sensitivity testing and provide report to the Owner. Unless, the system is UL Listed to perform automatic sensitivity testing without any manual intervention and should detector fall outside of sensitivity window, the system will automatically indicated a devices trouble. A copy of UL letter is to be provided as proof of system operation.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner’s maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION 28311
REQUIREMENTS OF THE PREVAILING WAGES ON STATE PROJECTS ACT, PUBLIC ACT 166 OF 1965

The State of Michigan determines prevailing rates pursuant to the Prevailing Wages on State Projects Act, Public Act 166 of 1965, as amended. The purpose of establishing prevailing rates is to provide minimum rates of pay that must be paid to workers on construction projects for which the state or a school district is the contracting agent and which is financed or financially supported by the state. By law, prevailing rates are compiled from the rates contained in collectively bargained agreements which cover the locations of the state projects. The official prevailing rate schedule provides an hourly rate which includes wage and fringe benefit totals for designated construction mechanic classifications. The overtime rates also include wage and fringe benefit totals. Please pay special attention to the overtime and premium pay requirements. Prevailing wage is satisfied when wages plus fringe benefits paid to a worker are equal to or greater than the required rate.

State of Michigan responsibilities under the law:

- The department establishes the prevailing rate for each classification of construction mechanic requested by a contracting agent prior to contracts being let out for bid on a state project.

Contracting agent responsibilities under the law:

- If a contract is not awarded or construction does not start within 90 days of the date of the issuance of rates, a re-determination of rates must be requested by the contracting agent.
- Rates for classifications needed but not provided on the Prevailing Rate Schedule, must be obtained prior to contracts being let out for bid on a state project.
- The contracting agent, by written notice to the contractor and the sureties of the contractor known to the contracting agent, may terminate the contractor's right to proceed with that part of the contract, for which less than the prevailing rates have been or will be paid, and may proceed to complete the contract by separate agreement with another contractor or otherwise, and the original contractor and his sureties shall be liable to the contracting agent for any excess costs occasioned thereby.

Contractor responsibilities under the law:

- Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing rates prescribed in a contract.
- Every contractor and subcontractor shall keep an accurate record showing the name and occupation of and the actual wages and benefits paid to each construction mechanic employed by him in connection including certified payroll, as used in the industry, with said contract. This record shall be available for reasonable inspection by the contracting agent or the department.
- Each contractor or subcontractor is separately liable for the payment of the prevailing rate to its employees.
- The prime contractor is responsible for advising all subcontractors of the requirement to pay the prevailing rate prior to commencement of work.
- The prime contractor is secondarily liable for payment of prevailing rates that are not paid by a subcontractor.
- A construction mechanic shall only be paid the apprentice rate if registered with the United States Department of Labor, Bureau of Apprenticeship and Training and the rate is included in the contract.

Enforcement:

A person who has information of an alleged prevailing wage violation on a state project may file a complaint with the State of Michigan. The department will investigate and attempt to resolve the complaint informally. During the course of an investigation, if the requested records and posting certification are not made available in compliance with Section 5 of Act 166, the investigation will be concluded and a referral to the Office of Attorney General for civil action will be made. The Office of Attorney General will pursue costs and fees associated with a lawsuit if filing is necessary to obtain records.
General Information Regarding Fringe Benefits

Certain fringe benefits may be credited toward the payment of the Prevailing Wage Rate:

- If a fringe benefit is paid directly to a construction mechanic
- If a fringe benefit contribution or payment is made on behalf of a construction mechanic
- If a fringe benefit, which may be provided to a construction mechanic, is pursuant to a written contract or policy
- If a fringe benefit is paid into a fund, for a construction mechanic

When a fringe benefit is not paid by an hourly rate, the hourly credit will be calculated based on the annual value of the fringe benefit divided by 2080 hours per year (52 weeks @ 40 hours per week).

The following is an example of the types of fringe benefits allowed and how an hourly credit is calculated:

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<tr>
<th>Benefit</th>
<th>Calculation</th>
<th>Hourly Credit</th>
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<tr>
<td>Vacation</td>
<td>40 hours X $14.00 per hour = $560/2080 =</td>
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<td>Dental insurance</td>
<td>$31.07 monthly premium X 12 mos. = $372.84 /2080 =</td>
<td>$.18</td>
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<td>Vision insurance</td>
<td>$5.38 monthly premium X 12 mos. = $64.56/2080 =</td>
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<td>Health insurance</td>
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<td>$27.04 monthly premium X 12 mos. = $324.48/2080 =</td>
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<td>Tuition</td>
<td>$500.00 annual cost/2080 =</td>
<td>$.24</td>
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<tr>
<td>Bonus</td>
<td>4 quarterly bonus/year x $250 = $1000.00/2080 =</td>
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<tr>
<td>401k Employer Contribution</td>
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<td><strong>Total Hourly Credit</strong></td>
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<td><strong>$3.65</strong></td>
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</table>

Other examples of the types of fringe benefits allowed:
- Sick pay
- Holiday pay
- Accidental Death & Dismemberment insurance premiums

The following are examples of items that will not be credited toward the payment of the Prevailing Wage Rate:

- Legally required payments, such as:
  - Unemployment Insurance payments
  - Workers’ Compensation Insurance payments
  - FICA (Social Security contributions, Medicare contributions)

- Reimbursable expenses, such as:
  - Clothing allowance or reimbursement
  - Uniform allowance or reimbursement
  - Gas allowance or reimbursement
  - Travel time or payment
  - Meals or lodging allowance or reimbursement
  - Per diem allowance or payment

- Other payments to or on behalf of a construction mechanic that are not wages or fringe benefits, such as:
  - Industry advancement funds
  - Financial or material loans
OVERTIME PROVISIONS for MICHIGAN PREVAILING WAGE RATE COMMERCIAL SCHEDULE

1. Overtime is represented as a nine character code. Each character represents a certain period of time after the first 8 hours Monday thru Friday.

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<th>Saturday</th>
<th>Sunday &amp; Holidays</th>
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<tr>
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Overtime for Monday thru Friday after 8 hours:
- the 1st character is for time worked in the 9th hour (8.1 - 9 hours)
- the 2nd character is for time worked in the 10th hour (9.1 - 10 hours)
- the 3rd character is for time worked beyond the 10th hour (10.1 and beyond)

Overtime on Saturday:
- the 4th character is for time worked in the first 8 hours on Saturday (0 - 8 hours)
- the 5th character is for time worked in the 9th hour on Saturday (8.1 - 9 hours)
- the 6th character is for time worked in the 10th hour (9.1 - 10 hours)
- the 7th character is for time worked beyond the 10th hour (10.01 and beyond)

Overtime on Sundays & Holidays
- The 8th character is for time worked on Sunday or on a holiday

Four Ten Hour Days
- The 9th character indicates if an optional 4-day 10-hour per day workweek can be worked between Monday and Friday without paying overtime after 8 hours worked, unless otherwise noted in the rate schedule. To utilize a 4 ten workweek, notice is required from the employer to employee prior to the start of work on the project.

2. Overtime Indicators Used in the Overtime Provision:
- H: means TIME AND ONE-HALF due
- X: means TIME AND ONE-HALF due after 40 HOURS worked
- D: means DOUBLE PAY due
- Y: means YES an optional 4-day 10-hour per day workweek can be worked without paying overtime after 8 hours worked
- N: means NO an optional 4-day 10-hour per day workweek cannot be worked without paying overtime after 8 hours worked

3. EXAMPLES:
   HHHHHHHHDN - This example shows that the 1½ rate must be used for time worked after 8 hours Monday thru Friday (characters 1 - 3); for all hours worked on Saturday, 1½ rate is due (characters 4 - 7). Work done on Sundays or holidays must be paid double time (character 8). The N (character 9) indicates that 4 ten-hour days is not an acceptable workweek at regular pay.

   XXXHHHHHDY - This example shows that the 1½ rate must be used for time worked after 40 hours are worked Monday thru Friday (characters 1-3); for hours worked on Saturday, 1½ rate is due (characters 4 – 7). Work done on Sundays or holidays must be paid double time (character 8). The Y (character 9) indicates that 4 ten-hour days is an acceptable alternative workweek.

LARA is an equal opportunity employer.
Auxiliary aids, services and other reasonable accommodations are available upon request to individuals with disabilities.
<table>
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<tr>
<th><strong>ENGINEERS - CLASSES OF EQUIPMENT LIST</strong></th>
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</thead>
</table>

### UNDERGROUND ENGINEERS

**CLASS I**
Backfiller Tamper, Backhoe, Batch Plant Operator, Clam-Shell, Concrete Paver (2 drums or larger), Conveyor Loader (Euclid type), Crane (crawler, truck type or pile driving), Dozer, Dragline, Elevating Grader, End Loader, Gradall (and similar type machine), Grader, Power Shovel, Roller (asphalt), Scraper (self propelled or tractor drawn), Side Broom Tractor (type D-4 or larger), Slope Paver, Trencher (over 8’ digging capacity), Well Drilling Rig, Mechanic, Slip Form Paver, Hydro Excavator.

**CLASS II**
Boom Truck (power swing type boom), Crusher, Hoist, Pump (1 or more 6” discharge or larger gas or diesel powered by generator of 300 amps or more, inclusive of generator), Side Boom Tractor (smaller than type D-4 or equivalent), Tractor (pneu-tired, other than backhoe or front end loader), Trencher (8’ digging capacity and smaller), Vac Truck.

**CLASS III**
Air Compressors (600 cfm or larger), Air Compressors (2 or more less than 600 cfm), Boom Truck (non-swinging, non-powered type boom), Concrete Breaker (self-propelled or truck mounted, includes compressor), Concrete Paver (1 drum, ½ yard or larger), Elevator (other than passenger), Maintenance Man, Mechanic Helper, Pump (2 or more 4” up to 6” discharge, gas or diesel powered, excluding submersible pump), Pumpcrete Machine (and similar equipment), Wagon Drill Machine, Welding Machine or Generator (2 or more 300 amp or larger, gas or diesel powered).

**CLASS IV**
Boiler, Concrete Saw (40HP or over), Curing Machine (self-propelled), Farm Tractor (w/attachment), Finishing Machine (concrete), Firemen, Hydraulic Pipe Pushing Machine, Mulching Equipment, Oiler (2 or more up to 4”, exclude submersible), Pumps (2 or more up to 4” discharge if used 3 hrs or more a day-gas or diesel powered, excluding submersible pumps), Roller (other than asphalt), Stump Remover, Vibrating Compaction Equipment (6’ wide or over), Trencher (service) Sweeper (Wayne type and similar equipment), Water Wagon, Extend-a-Boom Forklift.

<table>
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<th><strong>HAZARDOUS WASTE ABATEMENT ENGINEERS</strong></th>
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**CLASS I**
Backhoe, Batch Plant Operator, Clamshell, Concrete Breaker when attached to hoe, Concrete Cleaning Decontamination Machine Operator, Concrete Pump, Concrete Paver, Crusher, Dozer, Elevating Grader, Endloader, Farm Tractor (90 h.p. and higher), Gradall, Grader, Heavy Equipment Robotics Operator, Hydro Excavator, Loader, Pug Mill, Pumpcrete Machines, Pump Trucks, Roller, Scraper (self-propelled or tractor drawn), Side Boom Tractor, Slip Form Paver, Slope Paver, Trencher, Ultra High Pressure Waterjet Cutting Tool System Operator, Vactors, Vacuum Blasting Machine Operator, Vertical Lifting Hoist, Vibrating Compaction Equipment (self-propelled), and Well Drilling Rig.

**CLASS II**
Air Compressor, Concrete Breaker when not attached to hoe, Elevator, End Dumps, Equipment Decontamination Operator, Farm Tractor (less than 90 h.p.), Forklift, Generator, Heater, Mulcher, Pigs (Portable Reagent Storage Tanks), Power Screens, Pumps (water), Stationary Compressed Air Plant, Sweeper, Water Wagon and Welding Machine.
## ER/CA Failure to provide records

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State of Michigan
WHPWRequest@michigan.gov

Official Request #: 1220
Requestor: Michigan Technological University
Project Description: Dillman Hall Fire alarms and Mass Notification System
Project Number: 14-16-01 Dillman Hall

Houghton County
Official 2015 Prevailing Wage Rates for State Funded Projects
Issue Date: 10/12/2015
Contract must be awarded by: 1/10/2016
Page 1 of 25

<table>
<thead>
<tr>
<th>Classification</th>
<th>Name</th>
<th>Description</th>
<th>Last Updated</th>
<th>Straight Hourly</th>
<th>Time and Half</th>
<th>Double Time</th>
<th>Overtime Provision</th>
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<td>Asbestos &amp; Lead Abatement Laborer</td>
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<td>Monday-Saturday, must be consecutive</td>
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<td>4 ten hour days @ straight time allowed</td>
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<td>Monday-Saturday, must be consecutive</td>
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<td>Boilermaker</td>
<td>BO169</td>
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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 | $46.83 | $72.50 | $96.36 |
7th 6 months | $49.32 | $73.01 | $96.69 |
8th 6 months | $51.58 | $76.40 | $101.21 |

Official Request #: 1220
Requestor: Michigan Technological University
Project Description: Dillman Hall Fire alarms and Mass Notification System
Project Number: 14-16-01 Dillman Hall
County: Houghton

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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<th>Double Time</th>
<th>Overtime Provision</th>
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<td>Marble, Tile and Terrazzo Finisher</td>
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<td>$36.55</td>
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<td>Bricklayer, stone mason, mosaic worker, plasterer, tuck pointer, pointer, caulker &amp; cleaner</td>
<td>BR6-2</td>
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<td>$55.03</td>
<td>$67.35</td>
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<td>All time over 12 hours per day - double</td>
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<td>750 - 1499 hours</td>
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<td>$42.10</td>
<td>$50.11</td>
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<td>1500 - 2249 hours</td>
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<td>$43.95</td>
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<tr>
<td></td>
<td>2250 - 2999 hours</td>
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<td>3000 - 3749 hours</td>
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<td>3750 - 4499 hours</td>
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<td>4500 - 5249 hours</td>
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<td>5250 - 6000 hours</td>
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<td>$64.89</td>
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<td>BR6TL</td>
<td>6/2/2014</td>
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<td>$67.35</td>
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<td>Make up days: Friday &amp; Saturday.</td>
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### Official 2015 Prevailing Wage Rates for State Funded Projects

**Issue Date:** 10/12/2015  
**Contract must be awarded by:** 1/10/2016  

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<th>Name Description</th>
<th>Last Updated</th>
<th>Straight Hourly</th>
<th>Time and Half Hourly</th>
<th>Double Overtime</th>
<th>Overtime Provision</th>
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<tbody>
<tr>
<td>Carpenter</td>
<td>Carpenter, Drywall Taper &amp; Finisher, &amp; Floor</td>
<td>CA1510-C</td>
<td>10/14/2013</td>
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<td>$63.44</td>
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<td>Make up day allowed</td>
<td>comment</td>
<td>Saturday</td>
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</tbody>
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#### Apprentice Rates:

1st 6 months: $31.35, $38.22, $45.10
2nd 6 months: $32.50, $39.95, $47.40
3rd 6 months: $33.64, $41.66, $49.68
4th 6 months: $34.79, $43.38, $51.98
5th 6 months: $35.94, $45.11, $54.28
6th 6 months: $37.08, $46.82, $56.56
7th 6 months: $38.23, $48.54, $58.86
8th 6 months: $39.37, $50.26, $61.14

| Piledriver  |  | CA1510-P  | 10/14/2013 | $40.72 | $52.28 | $63.84 | X | X | H | X | H | D | Y |
|  |  |  |  | X | X | H | X | H | D | Y |
|  |  | Make up day allowed  | comment  | Saturday  |  |

#### Apprentice Rates:

1st 6 months: $31.47, $38.40, $45.34
2nd 6 months: $32.63, $40.14, $47.66
3rd 6 months: $33.78, $41.87, $49.96
4th 6 months: $34.94, $43.61, $52.28
5th 6 months: $36.10, $45.35, $54.60
6th 6 months: $37.25, $47.08, $56.90
7th 6 months: $38.41, $48.82, $59.22
8th 6 months: $39.56, $50.54, $61.52

---

**Official Request #: 1220**  
**Requestor: Michigan Technological University**  
**Project Description: Dillman Hall Fire alarms and Mass Notification System**  
**Project Number: 14-16-01 Dillman Hall**  
**County: Houghton**  

**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 3 of 25
## Classification: Cement Mason

<table>
<thead>
<tr>
<th>Name</th>
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<th>Straight Hourly</th>
<th>Time and Half Hourly</th>
<th>Double Time</th>
<th>Overtime Provision</th>
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<tbody>
<tr>
<td>Cement Mason</td>
<td>BR6-CM</td>
<td>6/2/2014</td>
<td>$42.71</td>
<td>$55.03</td>
<td>$67.35 H H D X H D D Y</td>
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</tbody>
</table>

*Make up day allowed*

Make up days: Friday and Saturday.

### Apprentice Rates:

- 0 - 749 hours: $34.09 / $42.10 / $50.11
- 750 - 1499 hours: $35.32 / $43.95 / $52.57
- 1500 - 2249 hours: $36.55 / $45.79 / $55.03
- 2250 - 2999 hours: $37.78 / $47.63 / $57.49
- 3000 - 3749 hours: $39.01 / $49.48 / $59.95
- 3750 - 4500 hours: $40.25 / $51.34 / $62.43

Cement Mason

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<thead>
<tr>
<th>Name</th>
<th>Description</th>
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<th>Double Time</th>
<th>Overtime Provision</th>
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<td>Cement Mason</td>
<td>PL16-16</td>
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<td>$30.30</td>
<td>$40.39</td>
<td>$50.47 H H H H H D Y</td>
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*Make up day allowed*

Four 10s allowed Monday-Thursday with Friday or Saturday inclement weather make up days. Saturday hours for inclement weather make up shall be paid straight rate unless over 40 hours worked.

### Apprentice Rates:

- 1st year: $23.24 / $29.79 / $36.35
- 2nd year: $25.26 / $32.83 / $40.39
- 3rd year: $27.27 / $35.84 / $44.41

---

**Official Request #: 1220**

**Requestor:** Michigan Technological University

**Project Description:** Dillman Hall Fire alarms and Mass Notification System

**Project Number:** 14-16-01 Dillman Hall

**County:** Houghton
<table>
<thead>
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<th>Classification</th>
<th>Name Description</th>
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<th>Straight Time</th>
<th>Overtime Provision</th>
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<tr>
<td>Electrician</td>
<td>Sound and Communications Installer/Technician</td>
<td>3/12/2013</td>
<td>$33.43 $43.97 $54.51</td>
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A 4 day 10 hour day schedule is allowed.

**Apprentice Rates:**

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<th>Period</th>
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<td>1st</td>
<td>$25.00 $31.32 $37.65</td>
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<tr>
<td>2nd</td>
<td>$27.11 $34.49 $41.87</td>
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<tr>
<td>3rd</td>
<td>$28.16 $36.07 $43.97</td>
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<td>4th</td>
<td>$29.22 $37.66 $46.09</td>
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<tr>
<td>5th</td>
<td>$30.27 $39.23 $48.19</td>
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<tr>
<td>6th</td>
<td>$31.33 $40.83 $50.31</td>
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*Inside wireman for work above $180,000 total value.*

A 4 ten schedule may be worked if 4 consecutive days, M-Th or Tues-F. *Make up day allowed*

**Apprentice Rates:**

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<tr>
<th>Hours</th>
<th>Rate</th>
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<tr>
<td>6,500-8,000 hours</td>
<td>$37.17 $50.94 $64.70</td>
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<td>0-1,000 hours</td>
<td>$23.41 $30.29 $37.17</td>
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<td>1,000-2,000 hours</td>
<td>$24.94 $32.58 $40.22</td>
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<td>2,000-3,500 hours</td>
<td>$28.01 $37.19 $48.36</td>
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<tr>
<td>3,500-5,000 hours</td>
<td>$31.07 $41.77 $52.48</td>
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<tr>
<td>5,000-6,500 hours</td>
<td>$34.13 $46.37 $58.60</td>
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</table>
Inside wireman for work below $180,000 total value.

A 4 ten schedule may be worked if 4 consecutive days, M-Th or Tues-F.

Make up day allowed

Apprentice Rates:

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<tr>
<th>Hours</th>
<th>0-1,000 hours</th>
<th>1,000-2,000 hours</th>
<th>2,000-3,500 hours</th>
<th>3,500-5,000 hours</th>
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Elevator Constructor

Apprentice Rates:

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Official Request #: 1220
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<td>Ironworker</td>
<td>For work over $10 million: Structural, Ornamental, Machinery Rigger &amp; Reinforcing Ironworker; installation of sheet metal siding</td>
<td>IR-8-A</td>
<td>9/29/2014</td>
<td>$50.07</td>
<td>$69.76</td>
<td>$89.45</td>
<td>H H D D Y D D Y</td>
</tr>
<tr>
<td></td>
<td>For work under $10 Million: Structural, Ornamental, Machinery Rigger &amp; Reinforcing Ironworker; pre-engineered metal buildings</td>
<td>IR-8-B</td>
<td>9/29/2014</td>
<td>$46.73</td>
<td>$64.76</td>
<td>$82.79</td>
<td>H H D D D D Y</td>
</tr>
<tr>
<td></td>
<td>A 4-10 work week allowed Monday thru Thursday. Friday may be used as a make-up day. Hours in excess of 40 must be paid time and one half.</td>
<td></td>
<td></td>
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</tbody>
</table>

**Apprentice Rates:**

<table>
<thead>
<tr>
<th>Hours Range</th>
<th>IR-8-</th>
<th>9/29/2014</th>
<th>Straight Time</th>
<th>Half Time</th>
<th>Double Time</th>
<th>Overtime Provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 1,000 hours</td>
<td>$25.39 $37.75 $50.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,001 - 2,000 hours</td>
<td>$37.71 $51.22 $64.73</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,001 - 3,000 hours</td>
<td>$39.01 $53.17 $67.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3,001 - 4,000 hours</td>
<td>$40.31 $55.12 $69.93</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4,001 - 5,000 hours</td>
<td>$41.61 $57.07 $72.53</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5,001 - 6,000 hours</td>
<td>$42.92 $59.04 $75.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6,001 - 7,000 hours</td>
<td>$44.22 $60.98 $77.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Official Request #: 1220
Requestor: Michigan Technological University
Project Description: Dillman Hall Fire alarms and Mass Notification System
Project Number: 14-16-01 Dillman Hall
County: Houghton

**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.
<table>
<thead>
<tr>
<th>Classification</th>
<th>Name Description</th>
<th>Last Updated</th>
<th>Straight Time</th>
<th>Half Time</th>
<th>Double Time</th>
<th>Overtime Provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laborer Class A</td>
<td>Laborer - construction laborer on building and heavy construction work, storm, and sanitary sewers on all construction sites and streets which are not included in the road builder rates, tool crib attendant, civil engineer helper, rodman, oxi-gun operator, propane or acetylene cutting torch operator, motor driven buggies, chipping hammers, tamping machines, green cutting, sand blasters, mason tenders, mortar mixers, material mixers, vibrator operators, concrete mixers, laborers with concrete crew, mixer to pour, including pour time from trucks.</td>
<td>L1329-B-A</td>
<td>$33.09</td>
<td>$43.05</td>
<td>$53.00</td>
<td>X X X X X X X D Y</td>
</tr>
<tr>
<td>Laborer Class B</td>
<td>Cement gun nozzleman, blasters, miners, drillers, buster operators, layers of all non-metallic pipe</td>
<td>L1329-B-B</td>
<td>$33.50</td>
<td>$43.66</td>
<td>$53.82</td>
<td>X X X X X X X D Y</td>
</tr>
<tr>
<td>Laborer Class C</td>
<td>Caisson worker &amp; airtrack</td>
<td>L1329-B-C</td>
<td>$33.85</td>
<td>$44.19</td>
<td>$54.52</td>
<td>X X X X X X D Y</td>
</tr>
<tr>
<td>Laborer Class E</td>
<td>Digester, tanks &amp; kilns</td>
<td>L1329-B-D</td>
<td>$35.17</td>
<td>$46.17</td>
<td>$57.16</td>
<td>X X X X X X D Y</td>
</tr>
</tbody>
</table>

Apprentice Rates:

- 0 - 1,000 hours: $28.11, $35.58, $43.04
- 1,001 - 2,000 hours: $29.11, $37.08, $45.04
- 2,001 - 3,000 hours: $30.10, $38.56, $47.02
- 3,001 - 4,000 hours: $32.09, $41.54, $51.00

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<th>Time and</th>
<th>Double</th>
<th>Overtime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laborer - Hazardous</td>
<td>LHAZ-Z11-A</td>
<td>11/7/2014</td>
<td>$32.91</td>
<td>$46.37</td>
<td>$59.82</td>
<td>H H H H H H H D Y</td>
</tr>
</tbody>
</table>

- 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.

Make up day allowed comment
4 10s allowed M-Th or T-F; inclement weather makeup day Friday

Apprentice Rates:

- 0-1,000 work hours: $27.93, $38.90, $49.86
- 1,001-2,000 work hours: $28.93, $40.40, $51.86
- 2,001-3,000 work hours: $29.92, $41.88, $53.84
- 3,001-4,000 work hours: $31.91, $44.86, $57.82

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.

Make up day allowed comment
4 10s allowed M-Th or T-F; inclement weather makeup day Friday

Apprentice Rates:

- 0-1,000 work hours: $28.68, $40.02, $51.36
- 1,001-2,000 work hours: $29.73, $41.60, $53.46
- 2,001-3,000 work hours: $30.77, $43.16, $55.54
- 3,001-4,000 work hours: $32.86, $46.29, $59.72

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<th>Double Time Hourly</th>
<th>Overtime Provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laborer Underground - Tunnel, Shaft &amp; Caisson</td>
<td>Class I - Tunnel, shaft and caisson laborer, dump man, shanty man, hog house tender, testing man (on gas), and watchman.</td>
<td>10/30/2014</td>
<td>$35.67</td>
<td>$47.07</td>
<td>$58.47</td>
<td>X X X X X X D Y</td>
</tr>
<tr>
<td></td>
<td>Apprentice Rates:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0-1,000 work hours</td>
<td></td>
<td>$30.52</td>
<td>$39.35</td>
<td>$48.17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,001-2,000 work hours</td>
<td></td>
<td>$31.55</td>
<td>$40.90</td>
<td>$50.23</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2,001-3,000 work hours</td>
<td></td>
<td>$32.58</td>
<td>$42.44</td>
<td>$52.29</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3,001-4,000 work hours</td>
<td></td>
<td>$34.64</td>
<td>$45.53</td>
<td>$56.41</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Class II - Manhole, headwall, catch basin builder, bricklayer tender, mortar man, material mixer, fence erector, and guard rail builder</td>
<td>10/30/2014</td>
<td>$35.76</td>
<td>$47.21</td>
<td>$58.65</td>
<td>X X X X X X D Y</td>
</tr>
<tr>
<td></td>
<td>Apprentice Rates:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0-1,000 work hours</td>
<td></td>
<td>$30.58</td>
<td>$39.44</td>
<td>$48.29</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,001-2,000 work hours</td>
<td></td>
<td>$31.62</td>
<td>$41.00</td>
<td>$50.37</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2,001-3,000 work hours</td>
<td></td>
<td>$32.66</td>
<td>$42.56</td>
<td>$52.45</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3,001-4,000 work hours</td>
<td></td>
<td>$34.72</td>
<td>$45.65</td>
<td>$56.57</td>
<td></td>
</tr>
</tbody>
</table>
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, conveyer 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.).

### Apprentice Rates:

<table>
<thead>
<tr>
<th>Work Hours</th>
<th>Hourly</th>
<th>Half Hourly</th>
<th>Double Time</th>
<th>Overtime Provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1,000</td>
<td>$30.66</td>
<td>$39.56</td>
<td>$48.45</td>
<td></td>
</tr>
<tr>
<td>1,001-2,000</td>
<td>$31.70</td>
<td>$41.12</td>
<td>$50.53</td>
<td></td>
</tr>
<tr>
<td>2,001-3,000</td>
<td>$32.74</td>
<td>$42.68</td>
<td>$52.61</td>
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<tr>
<td>3,001-4,000</td>
<td>$34.82</td>
<td>$45.80</td>
<td>$56.77</td>
<td></td>
</tr>
</tbody>
</table>

Class IV - Tunnel, shaft and caisson mucker, bracer man, liner plate man, long haul dinky driver and well point man.

### Apprentice Rates:

<table>
<thead>
<tr>
<th>Work Hours</th>
<th>Hourly</th>
<th>Half Hourly</th>
<th>Double Time</th>
<th>Overtime Provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1,000</td>
<td>$30.78</td>
<td>$39.74</td>
<td>$48.69</td>
<td></td>
</tr>
<tr>
<td>1,001-2,000</td>
<td>$31.83</td>
<td>$41.32</td>
<td>$50.79</td>
<td></td>
</tr>
<tr>
<td>2,001-3,000</td>
<td>$32.88</td>
<td>$42.89</td>
<td>$52.89</td>
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</tr>
<tr>
<td>3,001-4,000</td>
<td>$34.97</td>
<td>$46.02</td>
<td>$57.07</td>
<td></td>
</tr>
</tbody>
</table>
### Official 2015 Prevailing Wage Rates for State Funded Projects

**Issue Date:** 10/12/2015

**Contract must be awarded by:** 1/10/2016

**Page 13 of 25**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Name</th>
<th>Description</th>
<th>Last Updated</th>
<th>Straight Hourly</th>
<th>Straight Half Hourly</th>
<th>Double Time</th>
<th>Overtime Provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>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)</td>
<td>LAUCT-Z2-5</td>
<td>10/30/2014</td>
<td>$36.28</td>
<td>$47.99</td>
<td>$59.69</td>
<td>X X X X X X D Y</td>
<td></td>
</tr>
<tr>
<td>Apprentice Rates:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-1,000 work hours</td>
<td>$30.98</td>
<td>$40.04</td>
<td>$49.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,001-2,000 work hours</td>
<td>$32.04</td>
<td>$41.63</td>
<td>$51.21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,001-3,000 work hours</td>
<td>$33.10</td>
<td>$43.22</td>
<td>$53.33</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3,001-4,000 work hours</td>
<td>$35.22</td>
<td>$46.40</td>
<td>$57.57</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Class VI - Dynamite man and powder man.

| LAUCT-Z2-6 | 10/30/2014 | $36.59 | $48.45 | $60.31 | X X X X X X D Y |
| Apprentice Rates: | | | | | | |
| 0-1,000 work hours | $31.21 | $40.38 | $49.55 | |
| 1,001-2,000 work hours | $32.28 | $41.99 | $51.69 | |
| 2,001-3,000 work hours | $33.36 | $43.61 | $53.85 | |
| 3,001-4,000 work hours | $35.51 | $46.84 | $58.15 | |

### 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-Z2-7 | 10/30/2014 | $28.86 | $36.86 | $44.85 | X X X X X X D Y |
| Apprentice Rates: | | | | | | |
| 0-1,000 work hours | $25.41 | $31.68 | $37.95 | |
| 1,001-2,000 work hours | $26.10 | $32.72 | $39.33 | |
| 2,001-3,000 work hours | $26.79 | $33.76 | $40.71 | |
| 3,001-4,000 work hours | $28.17 | $35.82 | $43.47 | |

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**Official Request #:** 1220

Requestor: Michigan Technological University

Project Description: Dillman Hall Fire alarms and Mass Notification System

Project Number: 14-16-01 Dillman Hall

County: Houghton

**Official Rate Schedule**

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<thead>
<tr>
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<th>Straight Hourly</th>
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<th>Double Time Hourly</th>
<th>Overtime Provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscape Laborer</td>
<td>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. Sundays paid at time &amp; one half. Holidays paid at double time.</td>
<td>6/26/2014</td>
<td>$27.85</td>
<td>$38.49</td>
<td>$49.12</td>
<td>X X X X X H D Y</td>
</tr>
<tr>
<td>Skilled Landscape Laborer</td>
<td>small power tool operator, lawn sprinkler installers' tender, material mover, truck driver on when seeding, sodding, planting, cutting, trimming, backfilling, rough grading or maintaining of landscape projects occurs. Sundays paid at time &amp; one half. Holidays paid at double time.</td>
<td>6/26/2014</td>
<td>$23.65</td>
<td>$31.06</td>
<td>$38.47</td>
<td>X X X X X H D Y</td>
</tr>
<tr>
<td>Operating Engineer - DIVER</td>
<td>Diver/Wet Tender/Tender/Rov Pilot/Rov Tender</td>
<td>4/2/2014</td>
<td>$52.80</td>
<td>$79.20</td>
<td>$105.60</td>
<td>H H H H H H D N</td>
</tr>
<tr>
<td>Operating Engineer - Marine Construction</td>
<td>Diver/Wet Tender, Engineer (hydraulic dredge)</td>
<td>2/12/2014</td>
<td>$65.00</td>
<td>$84.85</td>
<td>$104.70</td>
<td>X X H H H H D Y</td>
</tr>
</tbody>
</table>

Make up day allowed

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

Holiday pay = $120.80 per hour, wages & Make up day allowed

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

Official Request #: 1220
Requestor: Michigan Technological University
Project Description: Dillman Hall Fire alarms and Mass Notification System
Project Number: 14-16-01 Dillman Hall
County: Statewide

Official Rate Schedule
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## Official 2015 Prevailing Wage Rates for State Funded Projects

**Issue Date:** 10/12/2015  
**Contract must be awarded by:** 1/10/2016

### Classification Table

<table>
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<tr>
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<th>Double Time</th>
<th>Overtime Provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friction, Lattice Boom or Crane License Certification</td>
<td>GLF-2B</td>
<td>2/12/2014</td>
<td>$64.50</td>
<td>$84.10</td>
<td>$103.70</td>
<td>X X H H H D Y</td>
</tr>
<tr>
<td>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</td>
<td>GLF-3</td>
<td>2/12/2014</td>
<td>$59.30</td>
<td>$76.30</td>
<td>$93.30</td>
<td>X X H H H D Y</td>
</tr>
<tr>
<td>Deck Equipment Operator, (Machineryman/Fireman), (4 equipment units or more), Off Road Trucks, Deck Hand, Tug Engineer, &amp; Crane Maintenance 50 ton capacity and under or Backhoe 115,000 lbs or less, Assistant Tug Operator</td>
<td>GLF-4</td>
<td>2/12/2014</td>
<td>$53.60</td>
<td>$67.75</td>
<td>$81.90</td>
<td>X X H H H D Y</td>
</tr>
</tbody>
</table>

**Holiday pay = $110.30 per hour, wages &
Make up day allowed**

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

**Operating Engineer General Construction & Underground**

- **Crane 120' boom & jib**  
  EN-324UP-120GU | 7/12/2015 | $50.70 | $64.98 | $79.26 | X H H H H D  
  **comment** | Double time after 12 hours Mon-Sat

- **Crane 140' boom & jib**  
  EN-324UP-140GU | 7/12/2015 | $50.95 | $65.36 | $79.76 | X H H H H D  
  **comment** | Double time after 12 hours Mon-Sat

- **Crane with 300' or longer main boom & jib**  
  EN-324UP-300GU | 7/8/2015 | $52.93 | $68.33 | $83.72 | X H H H H D  
  **comment** | Double time after 12 hours Mon-Sat

---

**Official Request #:** 1220  
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**Project Description:** Dillman Hall Fire alarms and Mass Notification System  
**Project Number:** 14-16-01 Dillman Hall  
**County:** Houghton

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### Official 2015 Prevailing Wage Rates for State Funded Projects

#### Issue Date: 10/12/2015

#### Contract must be awarded by: 1/10/2016

#### Page 16 of 25

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<th>Double Time</th>
<th>Overtime Provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crane with 400' or longer main boom &amp; jib crane</td>
<td>EN-324UP-400GU</td>
<td>7/8/2015</td>
<td>$54.65</td>
<td>$70.91</td>
<td>$87.16</td>
<td>X</td>
<td>H</td>
</tr>
<tr>
<td>Class A- Regular equipment operator, crane, dozer, front end loader, pumpcrete, squeeze crete, job mechanic, welder, concrete pump, excavator, milling &amp; pulverizing machines, &amp; scraper (self-propelled &amp; tractor drawn).</td>
<td>EN-324UP-AGU7/1/2015</td>
<td>$50.20</td>
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<td>Class B- Air-Trac Drill, boom truck (non-swing), concrete mixers, material hoist and tugger, pumps 6&quot; and over, beltcrete, sweeping machine, trencher, head grease man, winches, well points and freeze systems</td>
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<td>$46.95</td>
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<td>Class C- Fork Truck, air compressor, conveyer, concrete saw, farm tractor(without attachments), generator, guard post driver, mulching machines, pumps under 6&quot;, welding machines</td>
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<td>Class D- Oilier, fireman, heater operator, brock concrete breaker, elevators (other than passenger), end dump &amp; skid steer</td>
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**Official Request #: 1220**
- **Requestor:** Michigan Technological University
- **Project Description:** Dillman Hall Fire alarms and Mass Notification System
- **Project Number:** 14-16-01 Dillman Hall
- **County:** Houghton

**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.
<table>
<thead>
<tr>
<th>Classification</th>
<th>Name Description</th>
<th>Last Updated</th>
<th>Straight Time and a Half</th>
<th>Double Time</th>
<th>Overtime Provision</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crane 220' boom &amp; jib EN-324UP-GU 7/1/2015</td>
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<td>Operating Engineer Steel Work</td>
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<td>Mechanic w/ truck &amp; tools EN-324UP-MS 7/8/2015</td>
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<td>Description</td>
<td>Last Updated</td>
<td>Straight Hourly</td>
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<td>7th 1000 hours</td>
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Official Request #: 1220
Requestor: Michigan Technological University
Project Description: Dillman Hall Fire alarms and Mass Notification System
Project Number: 14-16-01 Dillman Hall
County: Houghton

Official Rate Schedule
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<th>Name Description</th>
<th>Last Updated</th>
<th>Straight Hourly</th>
<th>Time and Half Hourly</th>
<th>Double Overtime Hourly</th>
<th>Overtime Provision</th>
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<td>Bridge Painter (under 30 feet)</td>
<td>PT-1011B</td>
<td>8/28/2015</td>
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<td></td>
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<tr>
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<td></td>
<td>$26.23</td>
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<td>Drywall Finisher, Soundproofing, &amp; Plural Component Applicator</td>
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<tr>
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<td>6th 1,000 hours</td>
<td></td>
<td></td>
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<td>$44.80</td>
<td>$55.82</td>
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<td>7th 1,000 hours</td>
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<td></td>
<td>$35.08</td>
<td>$46.75</td>
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<td>8th 1,000 hours</td>
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<td></td>
<td>$36.37</td>
<td>$48.68</td>
<td>$61.00</td>
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<tr>
<td>Pipe and Manhole Rehab</td>
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</tr>
<tr>
<td>General Laborer for rehab work or normal cleaning and cctv work-top man, scaffold man, CCTV assistant, jetter-vac assistant</td>
<td>TM247</td>
<td>4/17/2015</td>
<td>$28.20</td>
<td>$38.20</td>
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<tr>
<td>Tap cutter/CCTV Tech/Grout Equipment Operator: unit driver and operator of CCTV; grouting equipment and tap cutting equipment</td>
<td>TM247-2</td>
<td>4/17/2015</td>
<td>$32.70</td>
<td>$44.95</td>
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Official Request #: 1220
Requestor: Michigan Technological University
Project Description: Dillman Hall Fire alarms and Mass Notification System
Project Number: 14-16-01 Dillman Hall
County: Statewide

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## Official 2015 Prevailing Wage Rates for State Funded Projects

### Issue Date:
10/12/2015

### Contract must be awarded by:
1/10/2016

<table>
<thead>
<tr>
<th>Classification Name</th>
<th>Description</th>
<th>Updated Hourly</th>
<th>Half Time Provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCTV Technician/Combo Unit Operator</td>
<td>unit driver and operator of cctv unit or combo unit in connection with normal cleaning and televising work</td>
<td>$31.45</td>
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<td>Boiler Operator</td>
<td>unit driver and operator of steam/water heater units and all ancillary equipment associated</td>
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<td>Combo Unit driver &amp; Jetter-Vac Operator</td>
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<tr>
<td>Pipe Bursting &amp; Slip-lining Equipment Operator</td>
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### Apprentice Rates:

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<th>Hourly</th>
<th>Half Time</th>
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<tbody>
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<td>2nd year</td>
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<tr>
<td>3rd year</td>
<td>$34.84</td>
<td>$45.82</td>
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### Official 2015 Prevailing Wage Rates for State Funded Projects

**Issue Date:** 10/12/2015  
**Contract must be awarded by:** 1/10/2016  

**Page 21 of 25**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Name</th>
<th>Description</th>
<th>Updated</th>
<th>Last Hourly</th>
<th>Straight Time and Half Hourly</th>
<th>a Double Time Provision</th>
<th>Overtime Provision</th>
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<tbody>
<tr>
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<td>Plumber &amp; Pipefitter</td>
<td>PL-111 7/30/2009</td>
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<td>Roofer</td>
<td>Commercial Roofer</td>
<td>RO-149-UP 4/17/2015</td>
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<tr>
<td>Sewer Relining</td>
<td>Class I-Operator of audio visual CCTV system including remote in-ground cutter and other equipment used in conjunction with CCTV</td>
<td>SR-I 11/3/2014</td>
<td>$42.76</td>
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**Apprentice Rates:**

- **1st 6 months**: $23.96, $35.94, $47.92
- **2nd 6 months**: $25.44, $38.16, $50.88
- **3rd 6 months**: $35.32, $52.98, $70.64
- **4th 6 months**: $36.65, $54.98, $73.30
- **5th 6 months**: $37.99, $56.98, $75.98
- **6th 6 months**: $39.47, $59.20, $78.94
- **7th 6 months**: $40.80, $61.20, $81.60
- **8th 6 months**: $42.13, $63.20, $84.26
- **9th 6 months**: $43.46, $65.19, $86.92

**Apprentice Rates:**

- **Apprentice 1**: $20.84, $25.96, $31.08
- **Apprentice 2**: $21.67, $27.17, $32.67
- **Apprentice 3**: $22.48, $28.37, $34.26
- **Apprentice 4**: $23.29, $29.56, $35.82
- **Apprentice 5**: $24.09, $30.72, $37.36
- **Apprentice 6**: $24.90, $31.91, $38.93

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**Project Number:** 14-16-01 Dillman Hall  
**County:** Statewide  

**Official Rate Schedule**

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### Classification Last Updated Straight Time and a Half Double Time Overtime Provision

<table>
<thead>
<tr>
<th>Classification</th>
<th>Name</th>
<th>Description</th>
<th>Last Updated</th>
<th>Straight Hourly</th>
<th>Time and a Half</th>
<th>Double Time</th>
<th>Overtime Provision</th>
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<tbody>
<tr>
<td>Class II-Operator of hot water heaters and circulation system; water jetters; and vacuum and mechanical debris removal systems and those assisting.</td>
<td>SR-II</td>
<td>11/3/2014</td>
<td>$41.23</td>
<td>$55.46</td>
<td>$69.68</td>
<td>H H H H H H D N</td>
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</tr>
<tr>
<td>Sheet Metal Worker</td>
<td>Sheet Metal Worker</td>
<td>SHM-7-5</td>
<td>9/25/2014</td>
<td>$50.84</td>
<td>$64.86</td>
<td>$78.88</td>
<td>H H H D D D Y</td>
</tr>
<tr>
<td>Sprinkler Fitter</td>
<td>Sprinkler Fitter</td>
<td>SP 669</td>
<td>9/17/2009</td>
<td>$46.51</td>
<td>$61.99</td>
<td>$77.47</td>
<td>H H H H H H D Y</td>
</tr>
</tbody>
</table>

#### Apprentice Rates:

- **Class 1 & 2**: $23.44 $31.31 $39.17
- **Class 3**: $29.35 $37.75 $46.15
- **Class 4**: $30.93 $40.12 $49.31
- **Class 5**: $35.50 $45.47 $55.45
- **Class 6**: $37.07 $47.83 $58.59
- **Class 7**: $38.65 $50.20 $61.75
- **Class 8**: $40.22 $52.55 $64.89
- **Class 9**: $41.79 $54.91 $68.03
- **Class 10**: $43.36 $57.27 $71.17

Official Request #: 1220  
Requestor: Michigan Technological University  
Project Description: Dillman Hall Fire alarms and Mass Notification System  
Project Number: 14-16-01 Dillman Hall  
County: Houghton

**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.
### Truck Driver

- **Description:** of all trucks of 8 cubic yd capacity or over
- **Update:** 8/8/2013
- **Hourly Rate:** $41.92
- **Overtime Rate:** $37.85

### Underground Laborer Open Cut, Class I

- **Description:** Construction Laborer
- **Update:** 10/30/2014
- **Hourly Rates:** $32.75, $42.68, $52.61

#### Apprentice Rates:

- **0-1,000 work hours:** $28.35
- **1,001-2,000 work hours:** $29.23
- **2,001-3,000 work hours:** $30.11
- **3,001-4,000 work hours:** $31.87

### Underground Laborer Open Cut, Class II

- **Description:** Mortar and material mixer, concrete form man, signal man, well point man, manhole, headwall and catch basin builder, guard rail builders, headwall, seawall, breakwall, dock builder and fence erector.
- **Update:** 10/30/2014
- **Hourly Rates:** $32.89, $42.89, $52.89

#### Apprentice Rates:

- **0-1,000 work hours:** $28.46
- **1,001-2,000 work hours:** $29.34
- **2,001-3,000 work hours:** $30.23
- **3,001-4,000 work hours:** $32.00

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**Official Request #: 1220**

- **Requestor:** Michigan Technological University
- **Project Description:** Dillman Hall Fire alarms and Mass Notification System

**Project Number:** 14-16-01 Dillman Hall

**County:** Houghton

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**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.
<table>
<thead>
<tr>
<th>Classification</th>
<th>Name Description</th>
<th>Last Updated</th>
<th>Straight Time</th>
<th>Half Time</th>
<th>Double</th>
<th>Overtime Provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underground Laborer Open Cut, Class III</td>
<td>Air, gasoline and electric tool operator, vibrator operator, drillers, pump man, tar kettle operator, bracers, rodder, 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.</td>
<td>LAUC-Z5-3 10/30/2014</td>
<td>$33.02</td>
<td>$43.09</td>
<td>$53.15</td>
<td>X X X X X X D Y</td>
</tr>
<tr>
<td>Apprentice Rates:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-1,000 work hours</td>
<td>$28.56</td>
<td>$36.40</td>
<td>$44.23</td>
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</tr>
<tr>
<td>1,001-2,000 work hours</td>
<td>$29.45</td>
<td>$37.74</td>
<td>$46.01</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2,001-3,000 work hours</td>
<td>$30.34</td>
<td>$39.07</td>
<td>$47.79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3,001-4,000 work hours</td>
<td>$32.13</td>
<td>$41.76</td>
<td>$51.37</td>
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<td></td>
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</tr>
<tr>
<td>Underground Laborer Open Cut, Class IV</td>
<td>Trench or excavating grade man.</td>
<td>LAUC-Z5-4 10/30/2014</td>
<td>$33.07</td>
<td>$43.16</td>
<td>$53.25</td>
<td>X X X X X D Y</td>
</tr>
<tr>
<td>Apprentice Rates:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-1,000 work hours</td>
<td>$28.59</td>
<td>$36.44</td>
<td>$44.29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,001-2,000 work hours</td>
<td>$29.49</td>
<td>$37.80</td>
<td>$46.09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,001-3,000 work hours</td>
<td>$30.38</td>
<td>$39.13</td>
<td>$47.87</td>
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</tr>
<tr>
<td>3,001-4,000 work hours</td>
<td>$32.17</td>
<td>$41.82</td>
<td>$51.45</td>
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<tr>
<td>Underground Laborer Open Cut, Class V</td>
<td>Pipe Layer</td>
<td>LAUC-Z5-5 10/30/2014</td>
<td>$33.12</td>
<td>$43.24</td>
<td>$53.35</td>
<td>X X X X X D Y</td>
</tr>
<tr>
<td>Apprentice Rates:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-1,000 work hours</td>
<td>$28.63</td>
<td>$36.50</td>
<td>$44.37</td>
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<tr>
<td>1,001-2,000 work hours</td>
<td>$29.53</td>
<td>$37.86</td>
<td>$46.17</td>
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<tr>
<td>2,001-3,000 work hours</td>
<td>$30.43</td>
<td>$39.20</td>
<td>$47.97</td>
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<td></td>
<td></td>
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<tr>
<td>3,001-4,000 work hours</td>
<td>$32.22</td>
<td>$41.89</td>
<td>$51.55</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 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 & the installation and repair of water service pipe and appurtenances.

**Apprentice Rates:**

<table>
<thead>
<tr>
<th>Work Hours Range</th>
<th>Straight</th>
<th>Time and Half</th>
<th>Double Time</th>
<th>Overtime Provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1,000 work hours</td>
<td>$26.66</td>
<td>$33.55</td>
<td>$40.43</td>
<td></td>
</tr>
<tr>
<td>1,001-2,000 work hours</td>
<td>$27.43</td>
<td>$34.70</td>
<td>$41.97</td>
<td></td>
</tr>
<tr>
<td>2,001-3,000 work hours</td>
<td>$28.20</td>
<td>$35.86</td>
<td>$43.51</td>
<td></td>
</tr>
<tr>
<td>3,001-4,000 work hours</td>
<td>$29.73</td>
<td>$38.16</td>
<td>$46.57</td>
<td></td>
</tr>
</tbody>
</table>

### Underground Laborer Open Cut, 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, flagstones etc.

**Apprentice Rates:**

<table>
<thead>
<tr>
<th>Work Hours Range</th>
<th>Straight</th>
<th>Time and Half</th>
<th>Double Time</th>
<th>Overtime Provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1,000 work hours</td>
<td>$25.25</td>
<td>$31.44</td>
<td>$37.61</td>
<td></td>
</tr>
<tr>
<td>1,001-2,000 work hours</td>
<td>$25.92</td>
<td>$32.44</td>
<td>$38.95</td>
<td></td>
</tr>
<tr>
<td>2,001-3,000 work hours</td>
<td>$26.59</td>
<td>$33.44</td>
<td>$40.29</td>
<td></td>
</tr>
<tr>
<td>3,001-4,000 work hours</td>
<td>$27.94</td>
<td>$35.47</td>
<td>$42.99</td>
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</tr>
</tbody>
</table>