LFD Modernization Project
PHASE 1

AUBURN SCHOOL DISTRICT #408

Project Manual – Bid Set

November 9, 2022

Hargis Engineers
1201 Third Avenue, Suite 600
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Department of Technology
Auburn School District #408
915 Fourth Street Northeast
Auburn, WA 98002

November 9, 2022

ADVERTISEMENT FOR BIDS

LFD Modernization Project Phase 1

BID OPENING – 3:00 P.M., THURSDAY, DECEMBER 1, 2022

NOTICE TO BIDDERS: Sealed bids will be received by the Auburn School District No. 408 at the James P. Fugate Administration Building, 915 Fourth Street NE, Auburn, WA 98002, until 3**:00 p.m., local time, Friday, December 1, 2022** for the Demolition of existing receptacles, as noted in project drawings, and extend circuit with new receptacle at LFD location. Provide extension box and blank faceplate at existing receptacle location, unless otherwise noted. Work will include installation of Owner-Furnished LFDS, mounts, and other tertiary technology. Bids received after the time fixed above for receiving bids cannot be considered.

BIDDING DOCUMENTS: Complete digital project bidding documents are available at https://www.auburn.wednet.edu/bidsandquotes or via email to jclouser@auburn.wednet.edu.

PRE-BID CONFERENCE: All interested bidder contractors and subcontractors are invited to attend a pre-bid conference with the Architect, Engineer and Owner at the James P. Fugate Administration Building, 915 Fourth Street NE, Auburn, WA at 3:00 p.m. local time, Monday, November 14, 2022.

BID SECURITY: A certified check, a bank cashier's check, or a bid bond executed by a State licensed surety company and payable to the Auburn School District #408 is required with each bid, in an amount equal to five percent (5%) of the Base Bid.

PREVAILING RATE OF WAGE: Pursuant to RCW 39.12, no worker, laborer, or mechanic employed in the performance of any part of this contract shall be paid less than the "Prevailing Rate of Wage" (in effect as of the date the bids are due) as determined by the Industrial Statistician of the Department of Labor and Industries.

REJECTION OF BIDS AND WAIVER OF IRREGULARITIES: The Owner shall have the right to reject any or all bids for any reason or for no reason, to reject a Bid not accompanied by required bid security or by other data required by the Bidding Documents, or to reject a Bid which is in any way incomplete or irregular. The Owner shall have the right to waive any informality or irregularity in any Bid or Bids received and to accept the Bid or Bids which, in its judgment, is in its own best interests.

SUBMISSION OF BIDS: The Bid, bid security, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope identified with the Project name and the Bidder's name and address. A bid may not be withdrawn after the stated time and date for opening thereof or before award of Contract, unless said award is delayed for a period exceeding 45 calendar days from the date of bid opening.

INSTRUCTIONS TO BIDDERS: Refer to the Instructions to Bidders included in the bidding documents for additional bid information and requirements.

By Order of Dr. Alan Spicciati, Superintendent
Auburn School District No. 408

INSTRUCTIONS TO BIDDERS

1. **BIDDING DOCUMENTS** - Bidding documents consist of several sections which include: Advertisement for Bids, Instructions to Bidders, Bid Form, Agreement and General Conditions, Prevailing Wage Rates, Specifications, Drawing Sheets G0.1 to E8.2, and any addenda issued prior to receipt of bids.

2. **FORM OF PROPOSAL** - Bid shall be made on the provided Bid Form with all blank spaces fully completed. The completed form shall be without interlineations, alteration, or recapitulation of work to be done. Erasures on the Bid Form must be initialed by the person signing the bid. Each bid must be signed in long hand in the name of the bidder with his/her usual signature. Bids by partnerships must be signed by one of the partners. The bidding firm's name and all requested data shall be filled in as more particularly called hereinafter. Oral, telephonic, and electronic bids will not be considered. The Bid, bid security, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope identified with the Project name and the Bidder's name and address. A bid may not be withdrawn after the stated time and date for opening thereof or before award of Contract, unless said award is delayed for a period exceeding 45 calendar days from the date of bid opening.

3. **REJECTION OF ANY OR ALL BIDS -** The Auburn School District Board of Directors reserves the right to reject any or all bids for any reason or for no reason, to reject a Bid not accompanied by required bid security or by other data required by the Bidding Documents, or to reject a Bid which is in any way incomplete or irregular. The Owner shall have the right to waive any informality or irregularity in any Bid or Bids received and to accept the Bid or Bids which, in its judgment, is in its own best interests.

4. **CONTRACT BOND -** The successful bidder shall provide an approved Public Works contract bond in the full amount of the contract including Washington State Sales Tax. Such bond from Contractor must be submitted to the Owner within ten (10) days of written Notice of Intent to Award Contract.

5. **MODIFICATIONS** - Changes in or additions to the bid documents, recapitulations of the work to be done, alternate proposals, or any other modification of the bid documents which are not specifically called for may result in the Owner's rejection of the bid as not being responsive to the Advertisement for Bids.

6. **INTENT OF THE BID DOCUMENTS** - The intent of the bid documents is to include all items necessary for the proper execution and completion of the work. The bid documents are complementary, and what is required by any one shall be as binding as if required by all. Work not covered in the bid documents will not be required unless it is consistent therewith and is reasonably inferable therefrom as being necessary to produce the intended results. Words and abbreviations which have well-known technical or trade meaning are used in the bid documents in accordance with such recognized meanings.

7. **INTERPRETATION OF BID DOCUMENTS** - Any person contemplating submitting a bid for the proposed contract who is in doubt as to the true meaning of any part of the bid documents, or finds discrepancies in or omissions from the bid documents, shall submit to the Architect a written request for interpretation or correction thereof.

8. **EXAMINATION OF BID DOCUMENTS** - All bidders shall thoroughly examine and be familiar with the bid documents. The failure or omission of a bidder to receive or examine any form, instruments, addendum, or other document or to visit the site, and acquaint themselves with conditions existing shall in no way relieve any bidder from obligations with respect to his/her bid or to the contract. The submission of a bid shall be taken as prima facile evidence of compliance with this section.

9. **WITHDRAWAL OF BID** - Any bidder may withdraw his/her bid, either personally or by written request, at any time PRIOR to the scheduled time of receipt of bids. AFTER scheduled receipt time, bids may not be withdrawn nor may any contract proffered based on this bid be refused within forty-five calendar days.

10. **TAXES** - Taxes to be paid include those imposed by Federal, State, County and City governments excepting only real estate taxes on the property, and such taxes as applicable shall be included in the proposal sums. The State retail sales tax is not permitted to be included in the proposal sums; the Owner will pay sales tax proportionately with each periodic and final payment request in addition to the amount allowed on the payment certificate and Contractor shall pay such taxes to the authority as required by law.

11. **SUBSTITUTIONS** - The contract is based on materials, equipment, and methods described in the bid documents. The Architect/Engineer will consider proposals for substitution of materials, equipment, and methods prior to receipt of bids only when such proposals are submitted seven (7) days prior to the date for receipt of bids and accompanied by full and complete technical data and all other information required by the Architect to evaluate the proposed substitution.

12. **OR PRE-APPROVED EQUAL CLAUSE** - Unless otherwise stated in the bid documents, whenever a process, equipment, or material is specified by giving a manufacturer's name, brand, or number, it is understood that the words "or pre-approved equal" follow thereafter. Where the phrase "or pre-approved equal" applies or occurs in the bid documents, do not assume that a process, equipment, or material is approved unless the item has been specifically approved for this work by the Architect. The decision of the Architect will be final.

13. **AVAILABILITY OF SPECIFIED ITEMS** - Verify prior to bidding that all specified items will be available in time for installation during orderly and timely process of the work. In the event specified items will not be so available, notify the Architect prior to the date specified for receipt of bids.

14. **TIME FOR COMPLETION** - If a specific time period is required for completion or delivery of the contract, it will be so stated in the bid documents. Date of delivery/completion stated in the bid documents shall become a part of this contract.

15. **LICENSED/REGISTERED CONTRACTORS** - Bids will be accepted only from contractors who are licensed or registered according to the laws of the State of Washington.

16. **AWARD OF CONTRACT** - A "Notice of Intent to Award Contract" and a draft Agreement will be sent within ten (10) business days after the date set for receipt of bids. Contract time shall commence with "Notice of Intent to Award Contract" and shall achieve 100% completion within contract time. Within ten (10) days of issuance of "Notice of Intent", Contractor shall submit properly executed certificates of insurance, contract bond, if applicable, and, contract acknowledgment/acceptance. Upon receipt of properly executed submittals, Owner will issue "Notice to Proceed." No on-site work will commence until Contractor receives "Notice to Proceed."

17. **FORM OF CONTRACT** - Any award based on this request for bids shall be on the Agreement Form bound in the Project Manual, properly executed by the Owner and Contractor.

18. **PRE-BID CONFERENCE** - All interested bidder contractors and subcontractors are invited to attend a pre-bid conference with the Architect, Engineer and Owner at the James P. Fugate Administration Building, 915 Fourth Street NE, Auburn, WA at 3:00 P.M. local time, Monday, November 14, 2022.

19. **ACCESS TO SITE** – Prospective Bidders and Subcontractors may schedule visits to the project site by calling the Auburn School District Capital Projects Department at 253-931-4826. Questions from prospective bidders regarding the project and the existing facilities shall be submitted to the Architect at least seven (7) days prior to the Bid Date. Prospective bidders shall not direct questions to staff that are present at the administration building.

James P. Fugate Administration Building is located at 915 Fourth Street NE, Auburn, WA 98002.

20. **QUESTIONS** - Questions regarding this bid shall be directed to the Engineer.

END OF INSTRUCTIONS TO BIDDERS

BID FORM

LFD Modernization Project Phase 1

DUE DATE AND TIME: 3:00 P.M., THURSDAY, DECEMBER 1, 2022

TO: Auburn School District No. 408, herein called "Owner".

FOR: LFD Modernization Project Phase 1

The undersigned agrees to fully perform the work in accordance with the bidding documents titled *LFD Modernization Project Phase 1*, including furnishing all labor, material and services required to complete the work for the following sum of money:

BASE BID: _____**dollars ($_____)**

(Do not include State and Local Sales Taxes in Base Bid)

ADD ALTERNATE No. 1: Enroll large format displays into Newline Display Management software system.

_____**dollars ($_____)**

(Do not include State and Local Sales Taxes in Base Bid)

BID SECURITY

The Undersigned agrees that the enclosed bid guarantee (bid bond, certified or cashier's check) in the amount of five percent (5%) of the Base Bid sum made payable to the Owner, shall be kept in escrow with the Owner; that its amount shall be a measure of liquidated damages Owner will sustain by failure of the Undersigned to execute the agreement and furnish the insurance and bond required by the Contract Documents. Should this Bid not be accepted within Forty-Five (45) calendar days after the date and time of Bid opening, or if the Undersigned executes Agreement and submits insurance and bond, the Bid Guarantee shall be returned.

The Owner reserves the right to reject any or all quotes.

ADDENDA ACKNOWLEDGMENT (TO BE COMPLETED ONLY IF ADDENDA ARE ISSUED)

Receipt of Addenda Number(s) _____is hereby acknowledged.

COMPLIANCE WITH MINIMUM WAGE LAWS

(PERSUANT TO RCW 39.04.350 AND RCW 39.26.160)

The undersigned states, in accordance with RCW 9A.72.085 and under penalty of perjury, that within the three year period immediately preceding the date of the bid solicitation, the company named above has not been determined by a final and binding citation and notice of assessment issued by the Department of Labor and Industries or through a civil judgement entered by a court of limited or general jurisdiction to have willfully violated, as defined by RCW 49.48.082, any provision of Chapter 49.46, 49.48, or 49.52 RCW.

SIGNATURE:_____

PRINTED NAME:_____

COMPANY NAME:_____

BUSINESS ADDRESS:_____

_____

TELEPHONE NUMBER:_____**FAX NUMBER:**_____

EMAIL ADDRESS:_____

CONTRACTOR'S LICENSE REGISTRATION NUMBER:_____

CONTRACTOR'S LICENSE REGISTRATION EXPIRATION DATE:_____

CONTRACTOR'S EXCISE TAX REGISTRATION NUMBER:_____

SIGNATURE:_____

PRINTED NAME:_____

TITLE:_____

SUBSTITUTION REQUEST FORM

TO: _____

PROJECT: _____

We hereby submit for consideration, the following product instead of specified item for above project:

Section: _____ Specified Item: _____

Proposed Substitution: _____

Attach complete technical data, including laboratory tests and samples, as applicable.

Detailed comparison of the significant qualities (size, weight, durability, performance and similar characteristics, and including visual effect where applicable) for the proposed substitution in comparison with the original requirements.

List completely, installation changes and changes to Drawings and Specifications required by proposed substitution.

Fill in Blanks Below:

A. Does substitution require change in Drawing dimensions? _____

_____

B. The Undersigned will pay for resulting building design changes including engineering and detailing costs.

C. What effect does substitution have on other trades? _____

_____

D. Differences between proposed substitution and specified item? _____

_____

E. Manufacturer's guarantee of proposed and specified items are: _____ Same _____ Different (Explain on attachment)

F. Name and address of 3 similar projects on which product was used, and date of installation:

_____

_____

_____

Undersigned attests function and quality equivalent or superior to specified item and waives his/her rights to additional payment and time which may subsequently be necessitated by failure of the substitution to perform adequately, and for the required work to make corrections thereof.

Submitted by:

_____
Signature

_____
Firm

_____
Address

_____

_____
Date

_____
Telephone

For use by Architect:

_____ Accepted _____ Accepted as Noted

_____ Not Accepted _____ Received Too Late

By: _____

Date: _____

Remarks: _____

_____

End of Form

CONTRACTOR'S CERTIFICATION REGARDING ASBESTOS

The undersigned Contractor states upon knowledge and belief that the following is true and correct:

A. The undersigned, a principal of the Contractor firm which constructed, added to, modernized or improved the school building located at _____ _____.

The building/project known as _____ _____.

The name of the Contractor firm is _____ _____.

B. The contract documents call for the construction of new building(s), addition(s) to existing building(s), and modernization and improvements to existing building(s) using all new materials.

C. To the best of my knowledge and belief, no materials containing asbestos were incorporated in the above construction project.

This statement is made for the sole use of the Auburn School District and for submission by Auburn School District to the Environmental Protection Agency for determination of whether or not further testing or investigation for the presence of asbestos is necessary as a result of the construction included in the above project. By its request for submission of this statement, the Auburn School District has assured and represented to the undersigned, that the Contractor, by making this certificate, undertakes no legal responsibility or liability to any person or entity and the Auburn School District accepts as its sole responsibility any use to which this certificate may be put.

Signed this _____ day of _____, 20 ____.

_____

(Signature)

_____

(Printed Name)

CONTRACTOR'S CERTIFICATION REGARDING LEAD

The undersigned Contractor states upon knowledge and belief that the following is true and correct:

A. The undersigned, a principal of the Contractor firm which constructed, added to, modernized or improved the school building located at _____ _____.

The building/project known as _____ _____.

The name of the Contractor firm is _____ _____.

B. The contract documents call for the construction of new building(s), addition(s) to existing building(s), and modernization and improvements to existing building(s) using all new materials.

C. To the best of my knowledge and belief, no materials containing lead were incorporated in the above construction project.

This statement is made for the sole use of the Auburn School District and for submission by Auburn School District to the Environmental Protection Agency for determination of whether or not further testing or investigation for the presence of lead is necessary as a result of the construction included in the above project. By its request for submission of this statement, the Auburn School District has assured and represented to the undersigned, that the Contractor, by making this certificate, undertakes no legal responsibility or liability to any person or entity and the Auburn School District accepts as its sole responsibility any use to which this certificate may be put.

Signed this _____ day of _____, 20 ____.

_____

(Signature)

_____

(Printed Name)

AGREEMENT BETWEEN
AUBURN SCHOOL DISTRICT
AND CONTRACTOR

The Effective Date of this Contract is:	
The Parties to the Contract are	
The "School District":	Auburn School District 915 Fourth St. NE, Auburn, WA 98002
The "Contractor":	
Name of the "Project":	LFD Modernization Project Phase 1
The "Architect":	Hargis Engineers
General Description of the "Work":	Work will include installation of Owner-Furnished LFDS, mounts, and other tertiary technology. Demolition of existing receptacles, as noted in project drawings, and extend circuit with new receptacle at LFD location. Provide extension box and blank faceplate at existing receptacle location, unless otherwise noted.
Alternates included in the Contract Sum:	
"Contract Sum" for the Work: *(not including sales tax)*	
Payments:	In accordance with the provisions of Article 13 of the General Conditions.
Date of Substantial Completion of the Work:	August 18, 2023
Date of Final Completion of the Work:	30 days after Substantial Completion is achieved.
Liquidated Damages:	None.
Unit Prices:	None.
Minimum Required Insurance	
Commercial General Liability:	At least $1,000,000 per occurrence; $1,000,000 general aggregate;
Commercial Auto Liability, Owned and Non-Owned Auto Liability	At least $1,000,000
Workers' compensation (industrial insurance):	State statutory amount
Employer's Liability:	At least $250,000/$500,000
Additional Insureds:	The School District, Hargis Engineers, & City of Auburn

The School District and Contractor agree as set forth below.

ARTICLE 1: THE WORK. The Contractor shall fully execute and complete the entire Work described in the Contract Documents, including Alternates listed above.

ARTICLE 2: COMMENCEMENT AND SUBSTANTIAL AND FINAL COMPLETION

2.1 The date of commencement of the Work is established in a Notice to Proceed issued by the School District. The Contract Time is measured from the date of commencement to the date of Substantial Completion specified above, as it may be adjusted under the Contract Documents.

2.2 The Contractor shall achieve Substantial Completion and Final Completion of the entire Work within the dates specified above, subject to adjustments of the Contract Time as provided in the Contract Documents.

ARTICLE 3: THE CONTRACT SUM. The School District shall pay the Contractor the Contract Sum on account of the Contractor's performance of the Contract, subject to additions and deductions as provided in the Contract Documents. Sales tax is not included in the Contract Sum.

ARTICLE 4: PAYMENT. The School District will pay the Contractor within *thirty (30) days* of receipt of an approved Application for Payment in accordance with this Contract and will make final payment after Final Completion, within *sixty (60) days* of receipt of a final Application for Payment, provided that an approved "Statement of Intent to Pay Prevailing Wages," an approved "Affidavit of Wages Paid," and all releases have been submitted. Retainage will be released in accordance with statutory requirements.

ARTICLE 5: PERMITS AND FEES

5.1 The Contractor will secure and pay for all plan review fees, for permit fees charged by the city, county and state, and for approvals, assessments and charges required for the use or occupancy of permanent structures or permanent changes in existing facilities.

5.2 The Contractor shall provide permit agencies all Contractor information required for issuance of permits and shall secure and pay all other permit and governmental fees, licenses and inspections.

ARTICLE 6: ENUMERATION OF CONTRACT DOCUMENTS.

6.1 The Contract Documents for the Contract. The Contract represents the entire and integrated agreement between the Parties and supersedes prior negotiations, representations, purchase orders, or agreements, either written or oral. The Contract Documents shall not be construed to create a contractual relationship of any kind between the School District and a Subcontractor of any tier, between the Architect and the Contractor, or between any persons or entities other than the Owner and the Contractor.

6.2 The Contract Documents are enumerated as follows and, in the event of conflict or discrepancy among or in the Contract Documents, interpretation shall be governed in the following order of priority:

1. Agreement
2. Supplemental Conditions
3. Prevailing wage rates set by L&I as of the bid date for King County (available at *http://www.lin.wa.gov/TradesLicensing/PrevWage/WageRates/default.asp*)
4. General Conditions
5. Specifications
6. Drawings
7. Material and Systems Schedules
8. _____

AUBURN SCHOOL DISTRICT # 408

By _____
(Signature)
Cindi R. Blansfield, Assistant Superintendent
(Printed name and title)

(CONTRACTOR NAME)

By _____
(Signature)
_____
(Printed name and title)

GENERAL CONDITIONS

ARTICLE 7
THE CONTRACT DOCUMENTS

7.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contractor's performance shall be consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results.

7.2 "Work" means the construction and services required by the Contract Documents and includes all labor, materials, equipment and services to be provided by the Contractor to fulfill the Contractor's obligations.

7.3 If the Contractor finds a conflict, error or discrepancy in the Contract Documents, the Contractor shall report it to the School District in writing at once. The Contractor shall not proceed with the affected Work until it receives a written interpretation or clarification from the School District.

ARTICLE 8
ADMINISTRATION OF THE CONTRACT

8.1 The School District will provide administration of the Contract. Its representatives may include an Architect. If an Architect is also involved, its duties beyond those addressed in these General Conditions will be described in an attachment to this Contract.

8.2 Authority. The School District must approve in writing all changes in the Contract Sum or Contract Time as well as all Change Orders, Construction Change Directives, Construction Change Authorizations, and payments to the Contractor. School District representatives are not authorized to revoke, alter, relax or release any requirements of the Contract Documents, to issue instructions contrary to the Contract Documents, or to approve or accept any portion of the Work not executed in accordance with the Contract Documents.

8.3 Stopping, Rejecting and Minor Changes in the Work. The School District may reject Work that, in its opinion, does not conform to the Contract Documents and may approve minor modifications of the Contract Documents or minor changes in the Work that do not involve changes in the Contract Time or Contract Sum. If the Contractor fails to correct Work that is not in accordance with the Contract Documents or fails to carry out the Work in accordance with the Contract Documents, the School District may order the Contractor in writing to stop the Work, or any portion thereof, until the cause for that order has been eliminated; however, the right of the School District to stop the Work shall not give rise to a duty on the part of the School District to exercise this right.

8.4 Site Access. The School District and its representatives may visit the site at intervals it considers appropriate to the stage of the Work to become generally familiar with the progress and quality of the completed Work, but the School District will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work.

8.5 Submittals. The Contractor shall review, approve and submit to the School District with reasonable promptness shop drawings, product data, samples and similar submittals required by the Contract Documents. The School District will review and approve or take other appropriate action upon the Contractor's submittals for the limited purpose of checking for conformance with information given and the design concept expressed by the Contract Documents. The Work shall be in accordance with approved submittals. The School District's review and approval does not relieve the Contractor of responsibility for compliance with the Contract Documents. The Contractor shall submit to the School District any proposed change to or deviation from previously approved documents or submittals.

ARTICLE 9
THE CONTRACTOR

9.1 Using its best skill and attention, the Contractor shall perform, supervise and direct the Work. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, procedures and personnel, for safety, and for coordinating all portions of the Work under this Contract. The Contractor shall provide and pay for all labor, materials, equipment, tools and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work..

9.2 Subcontractors. A "Subcontractor" is a person or entity that has a direct contract with the Contractor to perform a portion of the Work at the site or to supply materials or equipment. A "Subcontractor of any tier" includes Subcontractors and lower-level subcontractors and suppliers.

9.2.1 Identification. As soon as practicable and no later than *fourteen (14) days* after award of this Contract, the Contractor shall confirm to the School District in writing the names of the Subcontractors for each portion of the Work.

9.2.2 Subcontracts. Contracts between the Contractor and Subcontractors shall require each Subcontractor to be bound to the Contractor by the terms of the Contract Documents for the Work to be performed by the Subcontractor and to assume toward the Contractor all the obligations and responsibilities that the Contractor, by the Contract Documents, assumes toward the School District.

9.2.3 Payment. The Contractor shall promptly pay (and secure the discharge of any liens asserted by) all persons properly furnishing labor, equipment, materials or other items in

connection with the performance of the Work for which the School District has paid (including, but not limited to, workers and Subcontractors). The Contractor shall furnish to the School District releases of liens and claims and other documents that the School District requests from time to time to evidence such payment (and discharge). Nothing in the Contract Documents shall obligate the School District to pay or to cause the payment of any moneys due to any Subcontractor of any tier or other person or entity, except as may otherwise be required by law or regulation.

9.3 Compliance with Law. The Contractor, its employees, Subcontractors of any tier and representatives shall comply with all applicable laws, ordinances, statutes, rules and regulations, federal and state, county and municipal, and particularly those relating to wages, hours, fair employment practices, non-discrimination, safety and working conditions.

9.3.1 Prevailing Wages. The Contractor shall comply with all applicable provisions of RCW 39.12, including but not limited to submission of approved "Statements of Intent to Pay Prevailing Wage," payment of all Labor & Industries' fees, submission and posting of approved "Statements of Intent to Pay Prevailing Wages" and payment of prevailing wages. The applicable prevailing wages are determined as of the bid date for the county in which the Project is located and are available at *http://www.lin.wa.gov/ TradesLicensing/ PrevWage/ Wage Rates/ default.asp*. A copy is available for viewing at the School District's office, and a hard copy will be mailed upon request. The Contractor shall keep a paper copy at the Project site.

9.3.2 Hours of Labor. The Contractor shall comply with all applicable provisions of RCW 49.28.

9.3.3 Workers' Right to Know. The Contractor shall comply with RCW 49.70 and WAC 296-62-054 regarding workplace surveys and material safety data sheets for "hazardous" chemicals at the Site.

9.4 Workers. The Contractor shall enforce strict discipline and good order among persons carrying out the Work and shall not permit employment of unfit persons or persons not skilled in tasks assigned to them. At no change to the Contract Sum or Contract Time, the School District may provide written notice requiring the Contractor to remove from the Work any employee or other person carrying out the Work that the School District considers objectionable. A person shall be unfit and removed from the Work who has been found guilty of any felony crime as specified in RCW 28A.400.330, generally regarding crimes against children.

9.5 Warranty. The Contractor warrants that materials and equipment furnished under the Contract will be of good quality and new, that the Work will be performed in a workmanlike manner, free from defects not inherent in the quality required, and that the Work will conform with the requirements of the Contract Documents.

9.6 Submittals. The Contractor shall review, approve and submit to the School District with reasonable promptness Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents. The Work shall be in accordance with approved submittals.

9.7 Progress Schedule. Within *fourteen (14) days* of execution of this Contract, the Contractor shall submit a schedule of the Work to the School District. The Contractor shall be responsible for planning, scheduling, managing, and reporting the progress of the Work in accordance with all of the specific methods and submittals described in the Contract Documents. The Contractor shall use the Progress Schedule (as updated) to plan, coordinate, and prosecute the Work in an orderly and expeditious manner.

9.8 Clean-Up. The Contractor shall keep the site and surrounding area free from accumulation of waste materials caused by operations under the Contract.

9.9 Indemnification.

9.9.1 Subject to the following, and to the extent of the Contractor's negligence, and to the extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the School District and its Board members, officials, employees, consultants, agents, successors and assigns (together, the "Indemnified Parties") from and against all claims, damages, losses and expenses, direct and indirect, or consequential, including but not limited to costs and attorneys' fees incurred on such claims and in proving the right to indemnification, arising out of or resulting from the performance of the Work or any act or omission of the Contractor, its agents, Subcontractors of any tier, and anyone directly or indirectly employed by them (together, the "Indemnitor"). The Contractor shall fully indemnify and defend the Indemnified Parties for the sole negligence of the Indemnitor. The Contractor shall indemnify and defend the Indemnified Parties for the concurrent negligence of the Indemnitor only to the extent of the Indemnitor's negligence. The Contractor agrees to being added by the Owner as a party to any mediation, arbitration or litigation with third parties in which the Owner alleges indemnification or contribution from the Indemnitor. The Contractor agrees that all of its Subcontractors of any tier will similarly stipulate in their subcontracts. To the extent a court or mediator strikes any portion of this indemnification provision for any reason, all remaining provisions shall retain their vitality and effect.

9.9.2 After mutual negotiation of the parties and by bidding on and executing this Contract, it is agreed that the above indemnification obligation shall not be limited by the amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts in claims by an employee of the Contractor or a Subcontractor of any tier against any person or entity indemnified under this Paragraph 9.9. For the sole purpose of effecting indemnification obligations under this Contract and not for the benefit of any third parties unrelated to the School District, the Contractor specifically and expressively waives any immunity that may be granted it under Title 51 RCW, "Industrial Insurance."

9.10 Records. The Contractor shall maintain and preserve books, ledgers, records, estimates, correspondence, logs, schedules, electronic data and other documents relating or pertaining to the costs and/or performance of the Contract ("records"). Within *seven (7) days* of the School District's request, the Contractor shall make available at the Contractor's office all records for inspection, audit and reproduction (including electronic reproduction) by the School District's representatives. These requirements apply to each Subcontractor of any tier. The Contractor agrees, on behalf of itself and Subcontractors of any tier, that the invocation of any rights under RCW 42.56 shall initiate an equivalent right to disclosures from the Contractor and Subcontractors of any tier for the benefit of the School District.

ARTICLE 10
CONSTRUCTION NOT BY THE CONTRACTOR

10.1 The School District may perform construction or operations related to the Project with its own forces and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under contractual conditions consistent with those of the Contract Documents.

10.2 The Contractor shall afford the School District and separate contractors reasonable opportunity for the introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations.

ARTICLE 11
CHANGES IN THE WORK

11.1 The School District, without invalidating the Contract, may order changes in the Work consisting of additions, deletions or modifications ("Changes"), and the Contract Sum and Contract Time will be adjusted accordingly. Changes in the Work, the Contract Sum and/or the Contract Time shall be authorized only in writing, through a Change Order or a Construction Change Authorization or Directive.

11.1.1 Change Orders. A Change Order is a written instrument signed by the School District and the Contractor stating their agreement upon a Change in the Work; the amount of any adjustment in the Contract Sum and the extent of any adjustment in the Contract Time.

11.1.2 Construction Change Authorizations and Construction Change Directives. A Construction Change Authorization ("CCA") is a written order prepared and signed by the School District that authorizes a Change in the Work. A Construction Change Directive ("CCD") is a written order prepared and signed by the School District that directs a Change in the Work. Both a CCA and a CCD will state a proposed basis for any adjustment in the Contract Sum and/or Contract Time. A CCA or a CCD is used in the absence of total agreement on the terms of a Change Order. As soon as possible, and within *seven (7) days* of receipt of a CCA or CCD, the Contractor shall advise the School District in writing of the Contractor's agreement or disagreement with the cost or the method, if any, provided in the CCA or CCD for determining the proposed adjustment in the Contract Sum or Contract Time. If the Contractor agrees with the cost or method, the CCA or CCD becomes an agreed Change Order. If the Contractor disagrees, it shall nonetheless promptly proceed with a CCD but the Contractor is not obliged to proceed with a CCA.

11.2 Costs of Changes and Claims. If the parties cannot agree on the cost or credit to the School District from a Change in the Work, the Contractor and all affected Subcontractors of any tier shall keep and present an itemized accounting with supporting data. The total cost of any Change or Claim shall be limited to the reasonable value of the direct labor costs, material costs, construction equipment usage costs for the actual time equipment appropriate for the Work is used solely on the Change in the Work, the cost of any change in insurance. Subcontractor costs, and a Fee for all combined overhead and profit, including impact costs of any kind limited to twelve percent (12%) of the cost for any materials or work performed by a Contractor's or Subcontractor's own forces, and eight percent (8%) of amounts due to lower-tier Subcontractors

11.3 Claims for Concealed or Unknown Conditions. If conditions unknown to the Contractor are encountered at the site that are (1) concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found and generally recognized as inherent in activities of the character provided for in the Contract Documents, then the Contractor shall give written notice to the School District promptly before conditions are disturbed and in no event later than *seven (7) days* after the first observance of the conditions. The Contractor shall make any Claim arising from such condition in accordance with the dispute resolution procedures of Article 19.

ARTICLE 12
TIME

12.1 Delay.

12.1.1 Time. If, through no fault of the Contractor or a Subcontractor of any tier, the Work is delayed by changes ordered in the Work, unanticipated general labor disputes, fire, unforeseeable delay in deliveries, abnormal adverse weather conditions not reasonably anticipatable, unavoidable casualties or any other causes beyond the Contractor's control, then the Contract Time shall be extended by Change Order to the extent the critical path is affected.

12.1.2 Damages. The Contractor and Subcontractors shall be entitled to damages for delay only where the School District's actions or inactions were the actual, substantial cause of the delay and where the Contractor could not have reasonably avoided the delay by the exercise of due diligence.

12.1.3 Contractor Delay. If a delay was caused by the Contractor, a Subcontractor or any tier, or anyone acting on

behalf of any of them, the Contractor is not entitled to an increase in the Contract Time or Contract Sum.

12.2 Completion and Liquidated Damages. The timely completion of this Project is essential to the School District. The School District will incur serious and substantial damages if Substantial Completion of the Work does not occur within the Contract Time. The Contractor is responsible for actual damages for delay unless an amount is inserted on the cover page for liquidated damages, in which case the liquidated damage amount shall apply. Liquidated damages shall not be affected by partial completion, occupancy, or beneficial occupancy.

ARTICLE 13
PAYMENTS AND COMPLETION

13.1 Payments. Progress payments will be made monthly for Work duly approved and performed during the calendar month preceding Application for Payment. The Contractor shall submit a payment request in the agreed-upon amount, in the form of a notarized, itemized Application for Payment, the form of which has been approved by the School District. Among other things, the Application shall state that prevailing wages have been paid in accordance with the prefiled statement(s) of intent to pay prevailing wages on file with the School District and that all payments due Subcontractors from School District's prior payments have been made. THE SUBMISSIONS OF THIS APPLICATION CONSTITUTES A CERTIFICATION THAT THE WORK IS CURRENT ON THE PROGRESS SCHEDULE, unless otherwise noted on the Application. No payment request shall include amounts the Contractor does not intend to pay to a Subcontractor. Pursuant to RCW 60.28, the School District will reserve five percent (5%) from the moneys the Contractor earns on estimates during the progress of the Work, and the Contractor may retain payment of not more than five percent (5%) from the moneys earned by any Subcontractor, provided that the Contractor pays interest to the Subcontractor at the same interest rate it receives from its reserved funds.

13.2 Withheld Payment. The School District may withhold payment in whole or in part, or it may nullify the whole or part of a payment previously issued, on account of (1) defective Work not remedied, (2) claims or liens filed by third parties, (3) failure of the Contractor to make payments due to Subcontractors or for labor, materials or equipment, (4) damage to the School District or another contractor, (5) reasonable evidence that the work cannot be completed for the unpaid balance of the Contract Sum, (6) reasonable evidence that the unpaid balance would not be adequate to cover delay damages for which the Contractor is responsible, (7) failure to carry out the Work in accordance with the Contract Documents, or (8) liquidated damages. The School District will provide the Contractor with written notice of its intent to implement this provision and provide details supporting the School District's intention. The Contractor will be afforded reasonable time following receipt of such notice to respond to or correct the circumstances provoking this action by the School District.

13.3 Substantial Completion.

13.3.1 When the Contractor believes that the Work has achieved Substantial Completion, it shall notify the School District in writing. When the School District agrees, it will issue a Certificate of Substantial Completion.

13.3.2 Substantial Completion is the stage in the progress of the Work when the construction is sufficiently complete, in accordance with the Contract Documents, so the School District can fully utilize the Work (or a designated portion) for its intended use. All Work other than incidental corrective or punchlist work and final cleaning shall have been completed. The Work is not Substantially Complete if all systems and parts affected by the Work are not usable, any required occupancy or use permit has not been issued, or if utilities affected by the Work are not connected and operating normally. The fact that the School District may use or occupy some or all of the Work does not indicate that the Work is Substantially Complete, nor does it toll or change any liquidated damages due the School District.

13.3.3 Immediately before any occupancy, the School District will schedule a review of the area to be occupied. Representatives of the School District and the Contractor will jointly tour the area and record items still remaining to be finished and/or corrected. The Contractor shall promptly supply and install any such items as well as items missed by the inspection but required or necessary for Final Completion as a part of the Contract Sum.

13.4 Final Completion. After the Contractor has notified the School District that the Work has been concluded, and the Contractor has submitted the items listed below as may be required at the discretion of the School District, the School District will determine in writing that Final Completion has occurred.

.1 A final Application for Payment.

.2 An affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the School District or its property might in any way be responsible or encumbered, have been paid or otherwise satisfied.

.3 Consent of surety to final payment.

.4 A certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be cancelled or allowed to expire until at least *thirty (30) days'* prior written notice has been given to the School District.

.5 A written statement that the Contractor knows of no substantial reason why the insurance will not be renewable to cover the period required by the Contract Documents.

.6 Other data establishing payment or satisfaction of or protection (satisfactory to the School District) against all obligations, such as receipts, releases and waivers of liens and claims.

.7 Pursuant to RCW 39.12.040, an "Affidavit of Wages Paid" from the Contractor and from each Subcontractor certified by the Industrial Statistician of the Department of Labor and Industries, with the fees paid by the Contractor or Subcontractor.

.8 A certified statement that the Contractor has closed all necessary permits or otherwise met the requirements of all governing jurisdictions related to the Project.

.9 Pursuant to RCW 60.28.020, certificates from the Department Revenue and the Department of Labor and Industries.

.10 Pursuant to RCW 50.24, a certificate from the Department of Employment Security.

.11 All deliverables required by the Contract Documents.

.12 A certification that the materials in the Work are "lead-fee" and "asbestos-free".

.13 A legible hard copy of the as-built drawings.

13.5 Final Acceptance and Final Payment.

13.5.1 Neither Final Payment not any retained percentage shall become due until the School District's Board of Directors has formally accepted the Project ("Final Acceptance"). Pursuant to RCW 60.28, completion of the Contract Work shall occur at Final Acceptance.

13.5.2 If any Subcontractor of any tier refuses to furnish a release or waiver required by the School District, the School District may retain such amount as to defray the cost of foreclosing the liens of such claims and to pay attorneys' fees, the total of which shall be no less than 150% of the claimed amount. If any such lien remains unsatisfied after all payments are made, the Contractor shall refund to the School District all moneys that the later may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

13.6 Waivers.

13.6.1 Final Payment by School District. The making of final payment constitutes a waiver of claims by the School District except those arising from (1) liens, claims, security interests, or encumbrances arising out of the Contract and unsettled; (2) failure of the Work to comply with the requirements of the Contract Documents; (3) Work subsequently found to be substandard and/or deficient; or (4) terms of warranties required by the Contract Documents or law.

13.6.2 Final Payment to Contractor. Acceptance of final payment by the Contractor shall constitute a waiver of Claims except those previously made in writing and specifically identified as unsettled on the final Application for Payment.

13.6.3 Change Orders. The execution of a Change Order constitutes a waiver of Claims by the Contractor arising out of the Work to be performed or deleted pursuant to the Change Order, except as specifically described in the Change Order.

13.6.4 Reservation of Rights. If the Contractor adds to a Change Order, a Construction Change Directive, or any other document a reservation of rights that has not been initialed by the School District, any amounts previously agreed shall be considered disputed and not yet payable unless the costs are re-negotiated or the reservation is withdrawn or changed in a manner satisfactory to and initialed by the School District.

13.6.5 Failure to Exercise. The School District's failure to exercise any of its rights under this Contract shall not constitute a waiver of any past, present or future right or remedy. Any waiver by the School District of any right or remedy under this Contract must be in writing and shall apply only to the right or remedy specified.

13.7 Warranty of Title. The Contractor warrants and guarantees that title to the Work, materials and equipment covered by an Application for Payment, whether or not incorporated in the Project, will pass to the School District no later than the time of payment, free and clear of liens.

ARTICLE 14
PROTECTION OF PERSONS AND PROPERTY

14.1 The Contractor shall be solely responsible, and the School District shall not have responsibility, for all aspects of safety. The Contractor shall take reasonable precautions for safety on site, and shall provide reasonable protection to prevent damage, injury or loss to persons or property.

14.2 The Contractor shall not be required to perform without consent Work relating to asbestos or polychlorinated biphenyl ("PCB"), unless identified as such in the Contract Documents.

ARTICLE 15
INSURANCE AND BONDS

15.1 Contractor's Liability Insurance. The Contractor shall purchase and maintain an occurrence-based Commercial General Liability Insurance Policy with limits of liability insurance not less than those described herein and shall name the School District as an additional insured. The Contractor's policy shall be primary, and any School District policies excess. Before commencing the Work or exposure to loss can occur, the Contractor shall furnish the School District with a signed Certificate of Insurance in a form reasonably acceptable to the School District as evidence of all insurance required by the Contract Documents. Coverage shall be maintained without

interruption from the date of commencement of the Work until no earlier than the date of Final Acceptance.

15.2 Property Insurance. The School District shall insure the property in the amount of its insurable replacement cost, including additions and alterations, against "all risks" of physical loss. The policies shall inure to the benefit of the School District only. Upon the occurrence of an insured loss, the School District shall have the power to adjust and settle any loss with the insurers. The Contractor shall bear the risk of any loss, damage or destruction to its own property to the extent that it will not be incorporated in the Work, including but not limited to loss from theft or vandalism. Any insurance provided by the School District will not cover any such loss, damage or destruction.

15.3 Minimum Coverages. The School District's specification or approval of the insurance in this Contract or of its amount shall not relieve or decrease the liability of the Contractor under the Contract Documents or otherwise. Coverages are the minimum to be provided and are not limitations on liability under the Contract, indemnification, or applicable law provisions. The Contractor may, at its expense, purchase larger coverage amounts or additional insurance.

15.4 Waiver of Rights. The School District and Contractor waive all rights against each other for losses and damages caused by any of the perils covered by the policies of insurance provided in response to Paragraph 15.2 and any other property insurance applicable to the Work, and also waive such rights against the Subcontractors, Architect and consultants and other parties named as insureds in such policies for losses and damages so caused. Each subcontract shall contain similar waiver provisions by the Subcontractor in favor of the School District, Contractor, Architect, consultants and all other parties named as insureds. None of the above waivers shall extend to the rights that any of the insured parties may have to the proceeds of insurance held by the School District as Trustee or otherwise payable under any policy so issued.

15.5 Additional Insureds. The School District shall be named as an additional insured on the Contractor's policies other than Workers' Compensation. The Contractor's policies shall contain a provision that the School District shall be given *thirty (30) days'* written notice by certified mail before cancellation of any insurance or reduction of the amount thereof, or any alteration, modification or restriction thereof.

15.6 Payment and Performance Bond. The Contractor shall secure and deliver to the School District a payment and performance bond in the amount of the Contract Sum within *fourteen (14) days* of issuance of the Notice of Intent to Award Contract. The bond shall be in a form complying with RCW 39.08 and with a surety approved by the School District. When the Contract Sum is $35,000 or less, at the option of the Contractor, the School District may, in lieu of a bond, retain fifty percent (50%) of the Contract Sum for a period of *sixty (60) days* after the date of Final Acceptance, or until receipt of all necessary releases, whichever is later.

ARTICLE 16
CORRECTION OF WORK

16.1 The Contractor shall promptly correct Work rejected or failing to conform to the requirements of the Contract Documents at any time through a period of one (1) year from the date of Substantial Completion of the Contract or by terms of a longer manufacturer's warranty or an applicable special warranty required by the Contract Documents.

16.2 If the Contractor fails to carry out or correct Work that is not in accordance with the Contract Documents, the School District may, by written order, require the Contractor to stop the Work or any portions thereof until the cause for the order has been eliminated, and the School District may take over and correct some or all of the non-conforming Work at the Contractor's cost..

16.3 Nothing in this Article shall be construed to establish a period of limitation with respect to other obligations that the Contractor might have under the Contract Documents.

ARTICLE 17
MISCELLANEOUS PROVISIONS

17.1 Applicable Law. This Contract shall be governed by the internal law of the State of Washington, without regard to its choice-of-law provisions.

17.2 Compliance with Law. The Contractor shall give notices and comply with applicable laws, rules, regulations and orders of public authorities, including but not limited to RCW 39.06 and RCW 18.27 (Registration), RCW 49.60 (Discrimination), RCW 70.92 (Aged and Handicapped Persons), WAC 296-155 (Safety Standards), RCW 50.24 (Unemployment Compensation), RCW 51 (Industrial Insurance); RCW 82 (State Excise Tax Registration), RCW 39.12.065(3) (prevailing wage violations), Drug-Free Workplace Act of 1988 (Drug-Free Workplace), RCW 9.41.280 (Weapons), and RCW 49.26 (any asbestos removal). Smoking or use of any kind of lighted smoking equipment, material or smokeless tobacco products is prohibited on all School District property.

17.3 Assignment. The Contractor shall not let, assign or transfer this Contract, or any interest in it or part of it, without the written consent of the School District.

17.4 School District Site Rules. The Contractor shall comply with the School District's site and conduct rules.

17.5 Survival of Clauses. The warranty, dispute resolution, and indemnification provisions of this Contract shall survive the termination, cancellation or expiration of this Contract.

17.6 Writing Required. No addition to or modification of this Contract or waiver of any provisions of this Contract shall be binding on either Party unless explicitly made in writing and executed by the Contractor and the School District.

ARTICLE 18
TERMINATION OF THE CONTRACT

18.1 Termination for Cause by the Contractor. If the School District fails to make payment of undisputed amounts for a period of *sixty (60) days* through no fault of the Contractor, the Contractor may, upon *seven (7) additional days'* written notice (during which time the School District has the right to cure), terminate the Agreement and recover from the School District payment for all Work executed in accordance with the Contract Documents.

18.2 Termination for Cause by School District. The School District may, upon *seven (7) days'* written notice to the Contractor, terminate without prejudice the whole or any portion of the Work for cause, including but not limited to the Contractor's material breach of this Contract; failure to prosecute the Work or any portion thereof with sufficient diligence to ensure the Substantial Completion of the Work within the Contract Time; failure to supply a sufficient number of properly skilled workers or proper materials; material disregard of laws, ordinances, rules, regulations or orders of any public authority having jurisdiction; being adjudged bankrupt, making a general assignment for the benefit of its creditors, or having a receiver being appointed on account of the Contractor's insolvency; or failure to comply with RCW 28A.400.330 (generally, worker having contact with children who has been found guilty of a felony crime involving children).

18.3 Termination for Convenience by the School District. The School District may, at any time upon *seven (7) days'* written notice to the Contractor, terminate (without prejudice to any right or remedy of the School District) the whole or any portion of the Work for the convenience of the School District. The School District shall be liable to Contractor only for (1) the amount reasonably incurred to date and due under this Contract for the performance of the Work terminated and (2) other pre-approved costs, consistent with Paragraph 11.2, necessary and reasonably incurred in connection with the termination.

18.4 Effects of Termination.

18.4.1 The total sum to be paid to the Contractor under this Article shall not exceed the Contract Sum as reduced by the amount of payments otherwise made and shall be the Contractor's sole entitlement in the event of termination.

18.4.2 Unless the School District directs otherwise, after receipt of a Notice of Termination by the School District, the Contractor shall: promptly stop Work as specified in the Notice of Termination; place no further orders or subcontracts, except as necessary for completion of non-terminated Work; procure cancellation of all orders and subcontracts to the extent related to the performance of terminated Work; assign to the School District all of the Contractor's right, title and interest under all orders and subcontracts, with the School District's approval, settle outstanding liabilities and claims arising out of the termination of orders and subcontracts not assigned to the School District; transfer title and deliver to the entity or entities designated by the School District the fabricated or unfabricated parts, Work in process or completed, partially completed supplies and equipment, materials, parts, tools, dies, jigs and other fixtures, completed Work, supplies and other material produced as part of, or acquired in connection with the performance of, the Work terminated, and the completed or partially completed plans, drawings, information and other property related to the Work; take such action as may be necessary or directed by the School District to preserve and protect the Work and property related to this Project in the possession of the Contractor in which the School District has an interest; and continue performance only to the extent not terminated.

18.5 Suspension. The School District may, at its option and at any time, suspend the Contractor's performance of some or all of the Work. The School District will give the Contractor notice of any such suspension, including the scope of the suspension and the School District's estimate of the duration of such suspension. During the period of suspension, the Contractor shall use its best efforts to minimize costs associated with such suspension and to protect and maintain the Work. As full compensation for any such suspension, the Contractor will be eligible for an equitable adjustment, which shall not include consequential or indirect damages. Upon receipt of the School District's notice to resume the suspended performance, the Contractor shall immediately resume performance to the extent required in the notice.

ARTICLE 19
DISPUTE RESOLUTION

19.1 All claims, disputes and other matters in question of the Contractor, direct or indirect, arising out of, or relating to, the Contract Documents or the breach thereof ("Claims") shall be decided exclusively by the following dispute resolution procedure. Failure to comply with the requirements of this Article 19 shall constitute waiver of claim.

19.2 Notice of Claim. The Contractor shall submit notice of all Claims to the School District in writing within *seven (7) days* of the event giving rise to them and shall include a reasonable description of the event and its probably effect.

19.3 Claim Submission. Within *thirty (30) days* of the effective date of submitting the notice in Paragraph 19.2, the Contractor shall provide the School District with a written Claim that includes a clear description of the Claim, all changes in cost and in time (direct, indirect, impact, consequential, and otherwise) to which the Contractor and Subcontractors of any tier are entitled, and data supporting the Claim. No act, omission, or knowledge, actual or constructive, of the School District or any Architect shall in any way be deemed to be a waiver of the requirement for a timely written notice and a timely written Claim unless the School District and the Contractor sign an explicit, unequivocal written waiver.

19.4 Effective Date. Unless otherwise specified in the Contract Documents, the effective date of any notice or request given in connection with this Contract shall be the date on which it is delivered to the School District.

19.5 Informal Resolution. The School District will make a determination of the Claim submitted. If the Contractor disagrees with the determination and wishes to pursue the Claim further, the Contractor must, within *fourteen (14) days* of receipt of the determination, provide the School District with a written request that a representative of the Contractor, any Architect, and the School District meet, confer, and attempt to resolve the claim. This meeting will then take place at mutually convenient time and place within *fourteen (14) days* of the Contractor's request.

19.6 Mediation. The Contractor may not bring any litigation against the School District unless the Claim is first subject to mediation under the Construction Industry Mediation Procedures of the American Arbitration Association ("AAA"). This requirement cannot be waived except by an explicit written waiver signed by the School District and the Contractor. To initiate the mediation process, the Contractor shall submit a written mediation request to the School District within *thirty (30) days* after the meeting undertaken in Paragraph 19.5. If the parties are unable to agree upon a mediator within *thirty (30) days* after the School District's receipt of the written request for mediation, either party may submit a request for mediation to the AAA. An officer of the Contractor and the Superintendent or designee of the School District, both having full authority to settle the Claim, must attend the mediation session. To the extent there are other parties in interest, such as Subcontractors and insurers, their representatives, with full authority to settle the Claim, shall also attend the mediation session. All unresolved Claims in the Project shall be considered at a single mediation session that shall occur prior to Final Acceptance by the School District.

19.7 Litigation. The provisions of Paragraphs 19.1, 19.2, 19.5, and 19.6 are each a condition precedent to the Contractor bringing litigation. All unresolved Claims of the Contractor shall be waived and released unless the Contractor has strictly complied with the time limits of the Contract Documents, and litigation is served and filed within *120 days* after the Date of Substantial Completion as designated in writing by the School District. This requirement cannot be waived except by an explicit written waiver signed by the School District and the Contractor. The pendency of mediation shall toll this filing requirement.

19.8 Maintenance of Responsibilities. The Parties shall diligently carry on their respective obligations and responsibilities and maintain the Progress Schedule during any dispute resolution proceedings, unless otherwise agreed by both Parties in writing.

19.9 Waiver. The requirements of Article 19 cannot be waived except by an explicit written waiver signed by the School District and the Contractor. The fact that the School District and the Contractor may continue to discuss or negotiate a Claim that has or may have been defective or untimely under the Contract Documents shall not constitute waiver of the provisions of the Contract Documents unless the School District and Contractor sign an explicit, unequivocal written waiver approved by the School District's Board of Directors.

SECTION 007343
PREVAILING WAGE RATE INFORMATION

PART 1 - GENERAL

1.01 PREVAILING WAGE RATE INFORMATION

A. The following prevailing wage rate information is provided in accordance with RCW 39.12.030:

1. Pursuant to RCW 39.12, no worker, laborer, or mechanic shall be paid less than the "prevailing rate of wage" in effect on the Bid Date. The Bid Date is December 1, 2022.

2. Prevailing wage rate information for journeymen and apprentices is available at the Washington State Department of Labor and Industries website at www.lni.wa.gov/tradeslicensing/prevwage.

3. The project site is located in King County.

4. Prevailing wage rate information applicable to this project is available for viewing with advanced notice at the Auburn School District Purchasing Services Office, located in the Auburn School District Administration Building, 915 Fourth Street N.E., Auburn, WA 98002.

5. A copy of the applicable prevailing wage rate information will sent by U.S. Mail to bidders upon request.

PART 2 - PRODUCTS

(Not Used).

PART 3 - EXECUTION

(Not Used).

END OF SECTION 007343

SECTION 011000
SUMMARY

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Project Meetings.

B. Contractor's Use of the Premises.

C. Project Cleaning.

D. Acceptance of the Site.

E. Contractor's Work and Responsibilities.

F. Permits and Fees.

G. Time of Completion.

H. Close-Out.

1.02 WORK COVERED BY THE CONTRACT

A. The work of this contract comprises:

1. Demo of existing receptacles.
2. Extend circuit with new receptacle at LFD location.
3. Provide extension box and blank faceplate at existing receptacle location.
4. Installation of OFCI LFD's, mounts, and other tertiary technology.
5. Provide pathways and network cabling and connectivity for LFD.
6. Provide network patching.

B. Site Address: Various Locations.

1.03 CONTRACT TYPE

A. Complete the work under a single fixed-price contract.

1.04 PROJECT MEETINGS

A. Meet with the Owner and Architect prior to starting work on-site to review project schedule and completion of the Work.

B. Meet with the Owner and Architect at times during the course of the Work as deemed necessary to review the project and to coordinate work.

C. Provide Owner daily update on progress of work.

1.05 OWNER'S USE OF PREMISES

A. Owner's personnel, students, parents, and community members will be at the Building(s) during the construction time period. Coordinate with Owner to minimize disruption of Owner's ongoing activities at the site.

B. Owner's personnel and separate contractors may be performing ongoing maintenance and improvements at the site during the construction time period. Cooperate with Owner and separate contractors to minimize disruption of Owner's ongoing maintenance activities and work independent of the work under this contract.

1.06 CONTRACTOR'S USE OF PREMISES

A. Monitor and secure buildings to prevent unauthorized access. Inspect premises at end of each workday to ensure doors are locked and exterior openings are closed and secure.

B. Contractor shall be fully responsible for damage or loss that occurs to existing facilities and public as a result of the work performed. Conduct operations in such a manner as to avoid damage to existing structures, walks, curbs, paving, grass areas, plantings, fences, and other improvements that are to remain.

C. Tobacco use and open fires are not permitted on the project sites.

D. Assume full responsibility for protection and safekeeping of products stored at the sites.

E. Do not shut down building or site systems without approval of Owner. Building and site systems include but are not limited to irrigation, heating, air conditioning, ventilation, water, sewer, telephones, fire alarm, electrical power, lighting, communications, clocks and mechanical controls systems.

F. Do not use Owner's garbage and recycle dumpsters. Contractor shall dispose of all trash/recyclable material off-site.

G. Keep existing driveways, fire lanes, and entrances serving the premises clear. Do not use these areas for parking or storage of materials.

H. Confine materials, equipment, storage, staging area and refuse to within site.

I. Perform work in a manner that does not interrupt, interfere with, or create an unsafe condition for neighbors and the public. Take measures to ensure the safety of the public.

J. Provide the necessary protection and replace, repair, or restore damaged surfaces to their original condition; the expense of such work shall be borne by the Contractor.

J. Cooperate with Owner's personnel and other workers under contract with Owner during construction operations to minimize disruptions of other operations at and around the project site.

1.07 PROJECT CLEANING

A. Keep work areas clean. Do not allow accumulation of scrap, debris, waste materials, or other items. At Substantial Completion, remove tools, equipment, materials, and debris.

B. Cleaning of work area shall be completed daily prior to leaving the site. Ceiling tiles and access hatches and other items shall be closed, replaced and stored each night.

1.08 ACCEPTANCE OF SITE

A. Accept sites in "as-is" condition.

1.09 CONTRACTOR'S WORK & RESPONSIBILITIES

A. Contractor's work and responsibilities include, but are not limited to, the following:

1. Providing and paying for labor, materials, equipment, tools, machines, facilities, and services necessary for proper execution and completion of the Work.
2. Paying required taxes.
3. Securing and paying for, the following items as necessary for proper execution and completion of the Work.

    a. Permits, except as noted in paragraph 1.10.
    b. Fees.
    c. Licenses.
    d. Inspections, unless otherwise noted.
    e. Prevailing wage certifications.

4. Giving required notices.
5. Enforcing strict discipline and good order among employees.

1.10 PERMITS AND FEES

A. General:

1. The Contractor shall obtain permits necessary for the execution of the Work and pay permit and miscellaneous fees required by but not limited to the following: City of Auburn and State of Washington Department of Labor and Industries.
2. The Contractor shall coordinate and schedule work with permitting agencies necessary for completion of the Work.
3. Contractor shall be responsible for providing information, documents, and fees to the permitting agencies as necessary to obtain and coordinate permits.

1.11 PROJECT SCHEDULE AND TIME OF COMPLETION

A. Contractor may begin work at the sites starting on the date of the Notice to Proceed.

B. Work shall take place Monday – Friday after school hours and during non-school days:

a. The following start times are estimated, coordinate with the district prior to scheduling work.

i. Gildo Rey ES and Washington ES: start after 3:30pm

ii. Alpac ES and Evergreen Heights ES: start after 4:00pm

iii. Cascade MS: start after 2:30pm

b. Non-school days:

i. Winter Break: December 21, 23, 26 – 30, 2022 and January 2 – 3, 2023

ii. MLK: January 16, 2023

iii. Presidents Day/Mid-Winter Break: February 20 – 24, 2023

iv. Spring Break: April 10 – 14, 2023

v. Juneteenth: June 19, 2023

vi. Last Day of School: June 21, 2023 (pending snow days)

C. The Work of this Contract shall be Substantially Complete on or before Friday, August 18, 2023.

D. The Contractor shall achieve Final Acceptance not later than 30 days after the date of Substantial Completion.

PART 2 - PRODUCTS

(Not Used).

PART 3 - EXECUTION

(Not Used).

END OF SECTION 011000

SECTION 012300
ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Add Alternate No. 1: Newline Display Management System

1. Base Bid: Non-perform the indicated scope of work.
2. Add Alternate: Enroll large format displays into Newline Display Management software system as specified in Specification Section 274100.

END OF SECTION 012300

SECTION 012500
SUBSTITUTIONS

PART 1 - GENERAL

1.01 SUBMITTALS

A. Substitution Request Submittal: The Architect/Engineer will consider requests for substitution if received during the bidding period as prescribed in the Instructions to Bidders, and within 30 days after commencement of the Work only when the "Conditions" stated in Paragraph 2.01A of this Section are met. Requests received more than 30 days after commencement of the Work may be considered or rejected at the discretion of the Architect/Engineer.

1. Submit one copy of each request for substitution for consideration. For Post-Bid substitution requests, submit requests in the form and according to procedures required for change-order proposals.
2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
3. Form: Complete the form included at the end of this section and submit with other required data.
4. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:

    a. Coordination information (including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate contractors) that will be necessary to accommodate the proposed substitution.
    b. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.
    c. Product Data, including Drawings and descriptions of products, and fabrication and installation procedures.

5. Architect/Engineer's Action: Substitution requests received during the Bidding period will be approved or denied by addenda.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS

A. Conditions: The Architect/Engineer will receive and consider the Contractor's request for substitution after the time stated in the "Instructions to Bidders" (seven days prior to bid opening) for reviewing substitutions, only in cases where the Contractor submits evidence satisfactory to the Architect when items 1, 2, 3, 4, plus at least one other, of the following conditions are satisfied, as determined by the Architect. If the following conditions are not satisfied, the Architect will return the requests without action except to record noncompliance with these requirements.

1. Specified products are unavailable through no fault of the Contractor.
2. Extensive revisions to the Contract Documents are not required.

3. Proposed changes are in keeping with the general intent of the Contract Documents.
4. The request is timely, fully documented, and properly submitted.
5. The specified product or method of construction cannot be provided within the Contract Time. The Architect/Engineer will not consider the request if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
6. The requested substitution offers the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Owner must assume. The Owner's additional responsibilities may include compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner, and similar considerations.
7. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
8. The specified product or method of construction cannot be provided in a manner that is compatible with other materials and where the Contractor certifies that the substitution will overcome the incompatibility.
9. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.

B. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

C. In making Request for Substitution, the Manufacturer or Contractor represents that:

1. It has personally investigated proposed product and believes it to be equal or superior in all respects to that specified.
2. It will coordinate installation of accepted substitution into work and guarantees to complete it in all respects. It has outlined any changes required in accordance with form.
3. It will provide the same guarantee for substitution as for specified product.
4. It waives all claims for additional costs related to substitution which consequently became apparent.

D. Substitution will not be considered if:

1. It is indicated or implied on Shop Drawings or other Project data submittals, without proper notice shown on attached form.
2. Acceptance will require substantial revisions or Contract Documents.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012900
PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 SCHEDULE OF VALUES

A. Coordinate preparation of the Schedule of Values with Application for Payment forms. Submit schedule of values to the Architect not less than 14 days prior to the first application for payment.

B. Format and Content:

1. Provide a breakdown of the contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Break principal subcontract amounts down into several line items.
2. Round amounts to nearest whole dollar; the total shall equal the Contract Sum.
3. Provide a separate line item on the Schedule of Values for "Project Close-Out", equaling the 3 percent of the Contract Amount as indicated in the General Conditions.
4. Upon request of the Architect, submit further breakdown of the work in any of the Sections of the Project Manual.

1.02 APPLICATIONS FOR PAYMENT

A. The Contractor certifies that to the best of its knowledge, information, and belief, the work covered by each 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 Applications for Payment were issued and payments received from the Owner, and that current payment is now due.

B. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner.

C. Payment periods shall be calendar months.

D. Use Auburn School District Application for Payment forms.

E. Submit a signed copy of each Application for Payment to the Architect. Applications for Payment may be submitted electronically. All copies shall be complete, including attachments, when required.

F. Initial Application for Payment: Administrative actions and submittals that must precede submittal of the first Application for Payment include the following:

1. Statement of Intent to Pay Prevailing Wages on Public Works contract, approved by the Department of Labor and Industries for the contractor and all subcontractors.
2. List of subcontractors.
3. List of principal suppliers and fabricators.
4. Schedule of Values.
5. Contractor's Baseline Construction Schedule.
6. Copies of permits.

G. Final Payment Application: See Sections 017700 and 017800 for administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment.

1.03 PAYMENT FOR STORED MATERIAL

A. Payment for stored items will be subject to the following:

1. On-Site Materials: Progress payments shall be made for permanent materials and equipment to be incorporated in the work and properly stored on the project site with invoices from the original supplier provided to substantiate the value.
2. Off-Site Materials: No payment will be made for materials stored off-site.

PART 2 - PRODUCTS

(Not Used).

PART 3 - EXECUTION

(Not Used).

END OF SECTION 012900

SECTION 013300
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Within 10 calendar days after the Notice to Proceed, the Contractor shall submit a construction schedule for the Work. The schedule shall be in bar-graph format, or similar format approved by the Architect and Owner. The schedule shall be time-scaled, with weekends and holidays shown. Durations shall be in workdays. No on-site activity shall be of duration greater than fifteen workdays. Show all construction-related activities including activities such as mobilization, punch list completion, and project closeout.

B. Contractor shall meet with the Architect and Owner to review the construction schedule and explain the Contractor's approach to the scheduling and sequencing of the Work. Within five days after the meeting, the Contractor shall adjust and resubmit the construction schedule to fairly incorporate comments by the Architect and Owner.

PART 2 - PRODUCTS

(Not used).

PART 3 - EXECUTION

3.01 SUBMITTALS

A. Submittals, Within 10 Days of Notice of Intent to Award Contract:

1. Executed Agreement.
2. Performance and Labor & Material Payment Bonds (State of Washington Statutory Form for Public Work, RCW 39.08) with certified copy of Power of Attorney from Attorney-in-Fact Executing bonds.
3. Certified copies of Contractor's Liability Insurance Policies.
4. List of subcontractors and major material suppliers.

B. Submittals, within 10 Days After Notice to Proceed:

1. Construction Schedule.
2. Emergency telephone list for key personnel of Contractor and principal subcontractors.

C. Submittals, Within 30 Days After Notice to Proceed:

1. All submittals, shop drawings and product data.

D. Submittals, at least 14 days prior to the first Application for Payment:

1. Schedule of Values.
2. Retainage Agreement.

E. Submittals to Precede or Accompany the first Application for Payment

1. Statement of Intent to Pay Prevailing Wages on Public Works Contract:

   a. On form issued by the State of Washington, Department of Labor and Industries.
   b. One is required from the Contractor and one from each of the subcontractors who will provide labor on the project site.
   c. Completed forms shall be filed with the Industrial Statistician in Olympia for certification. After certification, send a copy to the Owner and Architect. The Contractor shall also post on the Project Site one certified copy of each Statement of Intent.
   d. For further information, phone the State of Washington Industrial Statistician.

2. Copies of permits.

END OF SECTION 013300

SECTION 013500
SAFETY REQUIREMENTS

PART 1 - GENERAL

1.01 PRELIMINARY WORK

A. Prior to the start of and during the course of the Work the Contractor shall make a thorough survey of each work site to determine all potential hazards. Workers shall be made aware of those hazards and shall be instructed in procedures and the use of equipment for their protection. The Contractor shall verify the location and condition ("live" or "dead") of all utilities on and near the work sites and take precautions to protect its employees, the general public, and the property.

1.02 IMMINENT DANGER

A. The Contractor shall be wholly responsible for any accidents (including death) occurring at any time during the progress of the work and until the final acceptance of the work by the Owner which may happen to any of its workers or those of any Subcontractor employed on the project, or for any damage or injuries (including death) which its work and operations may cause to the work being constructed, or to existing buildings, or to any tenants and occupants of the property, or of the adjoining properties, or to the public, or to any public or private property.

1.03 SAFETY

A. The Contractor shall ensure that all employees, visitors, subcontractor's employees, and suppliers' employees, while on the work site, comply with the requirements of WISHA, these requirements, and the safety precautions contained individual specification sections. The Contractor shall promptly and fully comply with, execute and, without separate charge thereof to the Owner, shall enforce compliance with the provisions of the Washington Industrial Safety and Health Act of 1973, with particular attention paid but not limited to Chapter 296-155, WAC Safety Standards for Construction Work; with particular attention paid but not limited to Chapter 296-24 WAC General Safety and Health Standards; with particular attention paid but not limited to Chapters 296-27, 196-350 and 296-360 WAC regarding Administrative Safety and Health Act Chapter 49-17 RCW, and any addenda thereto.

B. The Contractor shall immediately advise the Owner of inspections conducted by WISHA at the work site and shall transmit copies of citations and violations to the Owner and Architect.

1.04 SAFETY RESPONSIBILITIES

A. Contractor shall be responsible to:

1. Ensure compliance with these requirements, WISHA requirements, and other safety requirements.
2. Authorize immediate action to correct substandard safety conditions.
3. Review and act to ensure compliance with safety procedures with its supervisors, subcontractors, and suppliers.

4. Make thorough daily safety inspections of the work sites and immediately act to eliminate unsafe acts and unsafe conditions.
5. Investigate work site accidents and recommend immediate corrective action.
6. Assist in the preparation of accident investigation and reporting procedures.
7. Be responsible for the control, availability, and use of safety equipment, including employee personal protective equipment.

1.05 REQUESTS FOR VARIANCES

A. Requests for variances to deviate from WISHA requirements must follow the current established procedures by that Agency.

1.06 FAILURE TO COMPLY

A. If the project is shut down due to the Contractor's failure to comply with the requirements of WISHA or other applicable safety requirements, no part of the time loss due to any such suspension of operations or stop orders shall be made the subject of a claim for extension of time or for increased cost or damage by the Contractor.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013500

SECTION 015000
TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes requirements for construction facilities and temporary controls, including temporary utilities, support facilities, and security and protection.

B. Description, General: Unless otherwise noted, the temporary utilities described herein shall be provided by the Contractor. Work and requirements include, but are not necessarily limited to, the following:

1. Provide temporary devices, equipment, power and convenience utilities for use, convenience and safety of personnel engaged in the work of the Contract. Installations of temporary utilities to be safe, non-hazardous and sanitary; they are to be protective of persons and property, and be free of deleterious effects.
2. Locate temporary utilities where required; move to other locations on site should other circumstances develop during construction requiring such action.
3. Make all service connections to existing services in approved manner, and in accordance with code requirements.
4. Maintain and protect temporary utilities.
5. Remove temporary utilities from site upon completion of the Project or when directed.

C. Temporary utilities include, but are not limited to, the following:

1. Temporary electric power and light needed beyond that provided by Owner.
2. Ventilation.
3. Telephone service.

E. Security and protection facilities include, but are not limited to, the following:

1. Temporary fire protection.
2. Building security.
3. Waste disposal services.
4. Cleaning during construction.

1.02 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:

1. Building code requirements: Local and state.
2. Health and safety regulations.
3. Utility company regulations.
4. Police, fire department, and rescue squad rules.

5. Environmental protection regulations.

PART 2 - PRODUCTS

2.01 EQUIPMENT

A. General: Provide new equipment or undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.

B. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

C. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage.

D. Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.

PART 3 - EXECUTION

3.01 TEMPORARY UTILITIES

A. Water for Construction Purposes-Existing Facilities: Contractor may use existing water service, and Owner will pay usage costs.

B. Temporary Electric Power Service: Contractor may use existing facility power, and Owner will pay usage costs. Take reasonable measures to conserve usage.

C. Temporary Lighting: Contractor may use existing facility lighting and Owner will pay usage costs. Take reasonable measures to conserve usage. Where lighting is inadequate, provide temporary lighting that will provide adequate illumination for construction operations.

D. Temporary Telephones: Provide temporary telephone service throughout the construction period for all personnel engaged in construction activities. Do not use Owner's existing system.

3.02 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Temporary Fire Protection: Maintain existing fire-protection system. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations".

1. Locate fire extinguishers where convenient and effective for their intended purpose.
2. Store combustible materials in containers in fire-safe locations outside of existing building.
3. Maintain unobstructed access routes for fighting fires.

4. Prohibit smoking on Auburn School District property.

B. Security Access: The Owner will check out two gate keys to the Contractor at the commencement of the project. The keys shall be returned at Substantial Completion. The Contractor shall maintain control of the keys at all times and shall not loan keys to any subcontractor or supplier.

C. Cleaning During Construction:

1. Do not use Owner's garbage and recycle dumpsters.
2. Execute daily cleaning. Keep work area free from accumulation of construction waste materials and rubbish.
3. Provide on-site containers for collection of waste materials, debris, and rubbish.
4. Remove all waste materials, debris and rubbish from site periodically and dispose of at legal disposal areas away from the site, at Contractor's expense.
5. Clean interior spaces at the end of each shift.
6. Clean tires of all vehicles leaving the site to avoid tracking dirt and debris into City Right of Way. Sweep City Right of Way as required by City of Auburn to keep clean.

END OF SECTION 015000

SECTION 016000
PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.

1.02 QUALITY ASSURANCE

A. Provide products of the same kind from a single source.

B. Compatibility of Options: When the Contractor is given the option of selecting between 2 or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.03 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.

1. Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
2. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
3. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
4. Store products subject to damage by the elements above ground, under cover in a weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 - PRODUCTS

2.01 PRODUCT SELECTION

A. Provide products that comply with the Contract Documents, and that are new and undamaged at the time of installation.

1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
2. Continued Availability: Where additional amounts of a product, by nature of its application, are likely to be needed by Owner at a later date for Maintenance and repair or replacement work, provide a standard, domestically produced product which is likely to be available to Owner at such later date.

3. Color and Appearance Consistency of Finish Materials: All finish materials shall be consistent in color and appearance.

B. Additional Requirements: Material and equipment incorporated into the work:

1. Shall be ASBESTOS, FORMALDEHYDE and LEAD FREE.

a. Submit Asbestos-Free and Lead-Free Certification on forms included in Section 006500.

2. Manufactured and Fabricated Products:

a. Manufacture like parts of duplicate units to standard sizes and gauges; parts to be interchangeable.
b. Two or more items of the same kind to be identical and by same manufacturer.
c. Products shall be suitable for service conditions.
d. Adhere to indicated equipment capacities, sizes, and dimensions unless variations are specifically approved in writing.

3. Do not use materials and equipment for other than designed or specified purposes and uses.

C. Name Plates: Except as otherwise indicated for required approval labels, and operating data, do not permanently attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view either in occupied spaces or on exterior of work.

1. Labels: Locate required labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface which, in occupied spaces, is not conspicuous.
2. Equipment Nameplates: Provide permanent nameplate on each item of service-connected or power-operated equipment. Indicate manufacturer, product name, model number, serial number, capacity, speed, ratings, and similar essential operating data. Locate nameplates on an easily accessed surface which, in occupied spaces, is not conspicuous.

D. Product Selection Procedures: The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:

1. Proprietary Specification Requirements: Where Specifications name only a single product or manufacturer, provide the product indicated. No substitutions will be permitted.
2. Semi-proprietary Specification Requirements: Where Specifications name 2 or more products or manufacturers, provide one of the products indicated. No substitutions will be permitted.

a. Where Specifications specify products or manufacturers by name, accompanied by the term "or approved" or "or equal" or "or approved equal," comply with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.

3. Nonproprietary Specifications: When Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of

these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.

4. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
5. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated.
6. Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.

PART 3 - EXECUTION

3.01 INSTALLATION OF PRODUCTS

A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Secure each product in place, accurately located and aligned with other Work.

B. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

3.02 JOB CONDITIONS / GENERAL INSTALLATION PROVISIONS

A. Inspect each item of material or equipment immediately prior to installation and reject damaged and defective items.

B. Manufacturer's Instructions:

1. When Contract Documents require installation of work to comply with Manufacturer's printed instructions, obtain and distribute instructions to concerned parties, including Architect, before starting that work.
2. Until project is complete, maintain at jobsite one (1) set of complete installation and maintenance instructions for materials and equipment.
3. Handle, install, connect, clean, condition and adjust products in accordance with Manufacturer's recommendations, directions, and specified requirements.

    a. If job conditions or specified requirements conflict with Manufacturer's instructions, consult with Architect for further instructions.
    b. Do not proceed with work without clear instructions.

4. Perform work in accordance with Manufacturer's instructions. Do not omit any preparatory step or installation procedure unless it is:

    a. Verified with and accepted by Architect.
    b. Specifically modified or exempted by Contract Documents.

C. Attachment & Connection Devices & Methods

1. Provide attachment and connection devices and methods for securing work properly as it is installed; true to line and level, and within recognized industry tolerances if not otherwise indicated.
2. Allow for expansions and building movements.
3. Provide uniform joint widths in exposed work, organized for best possible visual effect. Refer questionable visual-effect choices to Architect for final decision.

D. Mounting Heights: Except as otherwise indicated, mount individual units of work at industry-recognized standard mounting heights, for applications indicated. Refer questionable mounting height choices to Architect for final decision.

E. Replacement: Components with damage affecting appearance, function or structural characteristics will not be accepted; repair and/or replace all such items as directed at no additional expense to Owner.

END OF SECTION 016000

SECTION 017700
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting review for Certification of Substantial Completion, complete the following:

1. Inspect all work and identify in writing all items of work not complete. Submit information to Architect along with written request for review.
2. Complete training of Owner's personnel in the operation of systems required for Owner's use of the premises.
3. Submit to Architect approved operations and maintenance manuals.
4. Complete final cleaning, and repair and restore damaged finish work.

B. Architect Review Procedures: On receipt of a request for review, the Architect will either proceed with review or advise the Contractor of unfilled requirements. The Owner will prepare the Certificate of Substantial Completion following Architect review or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. Substantial Completion Review: The Architect will complete one project review of the Work to confirm Substantial Completion. Should it be necessary for the Architect to perform any additional reviews due to failure of Work to comply with Substantial Completion, the Owner will compensate the Architect for the additional reviews at the rate of $150.00 per hour and shall deduct the total sum paid to the Architect from the Contractor's final payment in the form of a change order.
2. Undiscovered or deficient work items of incomplete or deficient work discovered after but not identified by the Contractor or Architect during Substantial Completion inspections, shall be identified separately by the Architect or Owner, and corrected or completed by Contractor prior to final acceptance.
3. Results of the completed inspections and discovery of additional incomplete or deficient work shall form the basis of requirements for final acceptance.

1.02 FINAL ACCEPTANCE

A. Preliminary Procedures: Before requesting certification of final acceptance and final payment, submit to the Owner closeout documents and materials identified in General Conditions, Section 017800, and individual specification sections.

B. Final Acceptance (completion) Review: The Architect will complete one final acceptance review of the Work to confirm final completion. Should it be necessary for the Architect to perform any additional reviews due to failure of Work to be judged fully complete, the Owner will compensate the Architect for the additional reviews at the rate of $150.00 per hour and shall deduct the total sum paid to the Architect from the Contractor's final payment in the form of a change order.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017700

SECTION 017800
CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.01 CLOSEOUT SUBMITTALS

A. Preliminary Procedures: Before requesting certification of final acceptance and final payment, submit the following:

1. Final application for payment.
2. An affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the work for which the Owner of property might in any way be responsible, have been paid or otherwise satisfied. (Use AIA Document G706).
3. An affidavit of release of liens (Use AIA Document G706A): If any liens are filed and cause the Owner to employ the services of any attorneys, the cost of the services will be deducted from the retainage.
4. A final application for payment, including all change orders.
5. A copy of the Architect's final review list of ("punchlist") items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance.
6. Consent of surety to final payment (Use AIA Form G707).
7. Evidence of final, continuing insurance coverage complying with insurance requirements.
8. State Department of Labor and Industries Affidavit of Wages Paid (State Form 9843) approved by Department of Labor and Industries for Contractor and all Subcontractors.
9. Certified statements indicating asbestos containing materials and lead containing materials were not utilized or incorporated on the Project. (Use forms in Section 006500.)
10. Certification that all surplus materials identified in Contract Documents have been delivered to the Owner's designated representative. Attach list of items and receipts with signature by Owner's designated representative for all items.
11. Approved record documents.
12. Evidence of completion of commissioning of designated building systems.
13. Evidence of completion of Owner's training for all designated systems.
14. Signed off originals of all permits and originals sets of all approved permit documents.

1.02 EXTRA STOCK SUBMISSION

A. See individual specification sections for requirements.
B. Deliver to room(s) in buildings as designated by the Owner.
C. Provide copies of receipts for all extra stock items, signed by Owner.

1.03 RECORD DRAWINGS

A. Mark-Up Procedure: During construction, maintain a set of blue or black-line white prints of Contract Drawings and Shop Drawings for Project Record Document purposes.

1. Mark these Drawings to show the actual installation where the installation varies from the installation shown originally. Give particular attention to information on concealed elements

that would be difficult to identify or measure and record later. Items required to be marked include, but are not limited to, the following:

a. Dimensional changes to the Drawings.
b. Revisions to details shown on the Drawings.
c. Revisions to routing of piping and conduits.
d. Revisions to electrical circuitry.
e. Actual equipment locations.
f. Details provided by Contractor not on original Contract Drawings.
g. Locations of concealed internal utilities.
h. Changes made by change order.
i. Changes made following the Architect's written orders.

2. Mark additional information that was either shown schematically or omitted from original Drawings.
3. Record data as soon as possible after obtaining it. Record and check the mark-up prior to enclosing concealed installations.
4. At time of Substantial Completion, submit record drawings to the Architect for the Owner's records.

1.04 RECORD PRODUCT DATA

A. During the construction period, maintain one copy of each Product Data submittal for Project Record Document purposes.

1. Mark Product Data to indicate the actual product installation where the installation varies substantially from that indicated in Product Data submitted. Include significant changes in the product delivered to the site and changes in manufacturer's instructions and recommendations for installation.
2. Upon completion of mark-up, submit two complete sets of record Product Data (one hard copy in three ring binder and one electronic copy in PDF format) to the Architect for the Owner's records. Submit with other Record Document submittals.

1.05 WARRANTIES AND GUARANTEES

A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights or remedies.

E. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

F. Form of Submittal: At Substantial Completion provide copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1.06 RELEASE OF RETAINAGE

A. Prior to releasing retainage, the Owner must receive the following:

1. Application for release of retainage from Contractor.
2. Certificates of acceptance from the Department of Labor and Industries, Department of Employment Security, and the Department of Revenue.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017800

DIVISION 26
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SECTION 260500
GENERAL ELECTRICAL PROVISIONS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Description: Work under this section includes materials, equipment, labor, supervision, tools and items necessary for the construction, installation, connection, testing and operation of electrical work. This section applies to all Divisions 26 and 27 sections.

B. General Requirements: General Conditions and Division 01 sections apply to Work in this section.

1.02 CODES AND STANDARDS

A. Perform work in accordance with requirements of the state in which the work is performed.

B. Conform to applicable industry standards, UL standards, NEMA standards, and other standards as noted.

1. Notify the A/E of deviations in Contract Documents to applicable codes and ordinances prior to installation of the Work. Perform changes in the Work after initial installation due to requirements of code enforcing agencies at no additional cost to the Owner.
2. If conflict occurs between legally adopted codes and the Contract Documents, the codes prevail, except that this shall not be construed as relieving the Electrical Subcontractor from complying with requirements of the Contract Documents which may exceed code requirements and not contrary to same.
3. Arrange for and pay for required electrical permits, fees, and inspections.
4. Approved permit plan review drawings from Department of Labor and Industries will be transmitted from the A/E to the contractor electronically. Print one full-size, color, 36” x 24” set, 82 sheets, to be available for inspections.”

C. Operating Conditions:

1. Temperature: Minus 20 deg C to plus 40 deg C.
2. Altitude: Up to 3,300 feet (100 meters).

1.03 SUBMITTALS

A. Comply with requirements in Division 01 and with additional requirements indicated in this article.

B. Electronic Product Data:

1. Comply with requirements in Section 013300 and additional requirements indicated in this article.

2. Submit each specification section complete at one time with a dedicated submittal number for each section. For example, submit products for Section 260519 under one submittal number and products for Section 260533 under a different submittal number. Submitting multiple sections at one time acceptable as long as each section has a dedicated submittal number. Include submittal number and date submitted in file name.
3. Partial product submittals not acceptable and will be returned without review except as follows:

    a. Long lead items.

4. Clearly mark catalog pages, equipment, and model number to be used. Indicate associated specification section and paragraph number on each page. Identify required options and accessories.
5. Format:

    a. Adobe PDF file format.
    b. Bookmark each submittal to facilitate browsing to each specification paragraph number.
    c. Include table of contents for each specification section. Include catalog numbers or drawing numbers.
    d. Include the Electrical Subcontractor and manufacturer's representative contact information for each product. Include job name (or abbreviation of job name), specification number, and Electrical Subcontractor submittal number in file name.

C. Shop Drawings:

1. Submit as specified in the individual specification sections. Submit minimum 30 days prior to starting fabrication on installation work. Do not fabricate on install until reviewed by the A/E. Include complete location dimensions, and hanger and support sizes and dimensions.
2. "Typical" drawings and wiring diagrams not accepted unless they specifically apply to this project.
3. Drawings shall be drawn at sufficient scale to show details clearly on same size sheets as Drawings.
4. Show required coordination with work of other trades.
5. Identify details and show their locations in Project.
6. Include description of configuration and operation of proposed systems.
7. Include outline drawings of proposed equipment in plan and elevation views including overall dimensions, weights, and clearance required.
8. Include one-line electrical diagrams required for control and sensing.
9. Floor plan backgrounds are available in electronic format and shall be requested from the A/E.
10. Direct use of the Drawings as the basis of Electrical Subcontractor's prepared Shop Drawings not acceptable.
11. Format:

    a. Adobe PDF file format.

D. Approval: Approval of a manufacturer's name or product by the A/E does not relieve the Electrical Subcontractor of the responsibility for providing materials and equipment which comply in detail with requirements of the Contract Documents.

E. As-Built Drawings: Daily updates and markups that reflect all changes made in the specifications and working drawings during the construction process, and show the exact dimensions, geometry, and location of all elements of the work completed under the contract.

F. Re-Submittals: Clearly identify re-submittals. Provide revised tabs, indexes, page renumbering, and other formats to interface with original submittal. Identify changes and include date for project tracking.

G. Test reports and Certificates: Submit as a package prior to Substantial Completion.

H. Certifications: Submit written certifications from the governing building authorities stating that work has been inspected and accepted, and complies with applicable codes and ordinances.

I. Record Drawings: Conformed set of as-builts developed during the construction process. Drawings shall be a single digital copy for each sheet in the contract documents and developed at the end of the construction phase. Comply with Article "Record Drawings" in this section.

J. Schedule of Values:

1. Comply with the requirements in Division 01 with additional requirements as indicated in this paragraph.
2. Include costs in Schedule of Values as follows:

a. Mobilization.
b. Submittals.
c. Electrical Permit.
d. Itemize the following on a per site basis:

1) Power Systems – Branch Circuit Rough-in, Material.
2) Power Systems – Branch Circuit Rough-in, Labor.
3) Power Systems – Branch Circuit Wiring, Material.
4) Power Systems – Branch Circuit Wiring, Labor.
5) Power Systems – Devices & Trim, Material.
6) Power Systems – Devices & Trim, Labor.
7) Low Voltage – Telecommunications Pathway Rough-in, Material.
8) Low Voltage – Telecommunications Pathway Rough-in, Labor.
9) Low Voltage – Telecommunications Cabling, Material.
10) Low Voltage – Telecommunications Cabling, Labor.
11) Low Voltage – Classroom Audio Visual, Material.
12) Low Voltage – Classroom Audio Visual, Labor.

e. Punch List and Close Out.
f. Testing Commissioning and Training.

1.04 DEFINITIONS AND ABBREVIATIONS

A. Refer to Division 01 for definitions and abbreviations. Additional definitions and abbreviations are as follows.

B. "Approved" or "Approval" means written approval by the owner or "Owner's agent" (A/E).

C. "Codes" means AHJ adopted codes, rules, and ordinances and additional codes as specified herein.

D. "Concealed" means spaces out of sight. For example, above ceilings, below floors, between double walls, furred-in areas, pipe and duct shafts, and similar spaces.

E. The word "Contractor", as used in Divisions 26 and 27 sections, means the electrical subcontractor.

F. "Coordination", "Coordinating", and "Coordinate" means to bring, or the bringing, into a common action, movement, or combination so as to act together in a smooth concerted way.

G. "Directed", "Requested", "Accepted", and Similar Terms means these terms imply "by the A/E" unless otherwise indicated.

H. "Exposed" means open to view. For example, raceways installed in a tunnel or raceways installed in a room and not covered by other construction.

I. "Furnish" means supply and deliver to the project site ready for unloading, unpacking, assembly, installation, and similar activities.

J. "Indicated" and "Indicated on the Drawings" means shown on Drawings by notes, graphics or schedules, or written into other portions of Contract Documents. Terms such as "shown", "noted", "scheduled" and "specified" have same meanings as "indicated", and are used to assist the reader in locating particular information.

K. "Install" means to place in position for service or use. Includes operations at project site, such as unloading, unpacking, assembly, erection, placing, preserving, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar activities.

L. "Provide" means furnish and install for a complete, finished, and operable system and ready for intended use.

M. "Shop Drawings" means Document which fully details equipment and intended installation relative to this specific Project.

N. "Structural Members" means all above and below grade elements associated with the structural support of the building or structure.

O. "Substantial Completion" shall mean that the entire project (or readily definable portion thereof if so designated in the Contracted Documents) is acceptable to code enforcement authorities and to extent required by such authorities, has been inspected and approved by such authorities, and is suitable for occupancy by the Owner or occupant for the purpose intended. Refer to Division 00 and 01 for additional requirements.

P. "Work" or "Project" means entire scope of work required by the Contract Documents.

Q. Abbreviations:

A/E	Architect
AHJ	Authorities Having Jurisdiction
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials

C	Degrees Celsius
ETL	Environmental Technology Laboratory
F	Degrees Fahrenheit
FM	Factory Mutual Engineering Corporation
IBC	International Building Code
NEC	National Electrical Code, NFPA 70 (latest adopted edition with Amendments)
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
UL	Underwriters Laboratories Inc.
RMS	Root Mean Square
THD	Total Harmonic Distortion
V	Volts

1.05 MATERIALS

A. Where two or more manufacturers are listed, select for use any of those listed. The first mentioned, in general, was used as the basis of design. Bids on any manufacturer named acceptable as long as that manufacturer meets every aspect of the Contract Documents. Note that equipment layout is based on equipment listed in equipment schedules.

B. Ensure that equipment will fit within available space. Where other than basis of design manufacturer is selected for the Project, the Electrical Subcontractor is responsible for verifying equipment will fit within available space and meet manufacturer’s and code required clearances.

C. Where other than basis of design manufacturer is selected for the Project, include cost of resulting additional work, coordination with other trades, and redesign of associated building services and structure as required to accommodate selected equipment. Include redesign drawings with submitted Shop Drawings.

D. Should any proposed product requires redesign work by A/E to accommodate proposed Product, costs for such redesign work shall be included in the Bid amount. The Owner will compensate Engineer through the A/E at rate of $150.00 per hour for time and expense for required review of submittals and additional coordination for redesign work. Amount of compensation will be deducted from Final Payment to the Electrical Subcontractor

1.06 STANDARDS OF QUALITY

A. Materials and Equipment: UL listed and labeled or other AHJ approved testing laboratory and in compliance with other industry standards as specified.

B. Equipment shall be manufacturer’s regularly catalogued items and shall be supplied as a complete unit in accordance with manufacturer’s standard specifications and any optional items required for proper installation for equipment unless otherwise noted. Equipment and materials shall be installed in accordance with the manufacturer’s recommendations and best trade practices.

C. Products shall be new unless indicated otherwise in the Contract Documents.

D. Fabricator and Manufacturer Qualifications: Specialists with at least 5 years’ experience and regularly engaged in manufacture of equipment and materials specified.

E. Furnish products of a single manufacturer for items which are used in quantity. A Product, for the purpose of this paragraph, is an assembly of components such as switchboards, transformers, panelboards, and similar items. Materials such as wire and cable, raceways, outlet boxes, and similar items not requiring maintenance are not included in the single manufacturer requirement of this paragraph.

F. Installer Qualifications: Specialists with at least 5 years' experience and regularly engaged in the installation of the system, equipment, and materials specified. Where required by the AHJ, employ licensed trades persons.

1.07 SUBSTITUTIONS

A. Comply with requirements in Division 01 with additional requirements indicated in this article.

B. Substitutions will be considered following bid award only when a product becomes unavailable through no fault of the Electrical Subcontractor.

C. Where "Manufacturer" paragraphs include the words "or approved", prior approval of the proposed substitution is required. The A/E is sole judge of quality of proposed substitution.

D. When the A/E approves a substitution request, the approval is given with the understanding that the Bidder:

1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.
2. Will provide the same warranty for the Substitution as for the specified Product.
3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension which may subsequently become apparent.

E. Whenever a Product is described by detail, specification, trade name, manufacturer's name or catalog reference, use only such Product, unless written approval is given for substitution prior to bid. Submit written requests on substitution request form included in Division 01. Approved substituted manufacturers will be listed by Addendum.

F. Provide as specified certain products, materials, and systems where "manufacturer" paragraphs are followed by the words "no substitutions".

G. Substitutions will not be considered when they are indicated or implied on Shop Drawings or product data submittals, without separate written prior approval, or when approval will require revision to the Contract Documents.

1.08 DRAWINGS AND SPECIFICATIONS

A. General: The electrical drawings are diagrammatic. Complete details of building features which affect electrical installation may not be shown. For additional details, refer to other Contract Documents. Report any discrepancies to the A/E along with suggested revisions. Obtain written response from the A/E before proceeding with changes.

B. Depiction of Work: Drawings do not show the exact characteristics of the work including, physical arrangement of equipment, lengths of wiring or conduit runs. Base work on actual field measurements and conditions. Provide work required to complete the installation.

C. Dimensions: Do not scale drawings. Dimensional accuracy is not guaranteed, and field verification of dimensions, locations, and levels to suit field conditions is required.

D. Since the Drawings of floor, wall, and ceiling installation, are made at small scale, outlets, devices, equipment, and similar items are indicated only in their approximate location. Locate outlets and apparatus symmetrically on floors, walls, and ceilings where not dimensioned and coordinate such locations with work of other trades to prevent interferences.

E. Discrepancies: Field verify dimensions and existing conditions prior to performing work. Bring to the A/E's attention any discrepancies within the Contract Documents and between the Contract Documents and field conditions. Also for any design and layout changes required due to specific equipment selection, prior to the Electrical Subcontractor's work (equipment and material purchasing and installation). Any corrective work required by the Electrical Subcontractor after his discovery of such discrepancies, inconsistencies, or ambiguities shall be at no additional cost to the Owner.

F. Specifications: These specifications are written in imperative mood and streamlined form. The imperative language is directed to the Electrical Subcontractor, unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

1.09 RECORD DRAWINGS

A. Comply with requirements in Division 01, with additional requirements as indicated in this article.

B. Prepare As-Built drawings: As-Built Drawings shall be red line prints in digital or hand drawn format (pencil and black pen not acceptable).

1. Corrections and Changes: Record during the progress of the Work, showing work as actually installed.

   a. Show the measured locations of portions of the Work and changes the Contractor has made.
   b. In general, tolerance plus or minus 1'-0" from actual location.
   c. Show addendum items, change orders, clarifications, supplemental instructions, and deviations from the Drawings. Show device or equipment changes and indicate where the change was originated. Only indicating the document where the change originated from will not be accepted.

2. Updates: Neatly hand-draft on daily basis and kept readily available at project site. Updates are subject to review by the A/E on a regular basis throughout construction. Updates are to include the following at a minimum:

   a. Feeder routing indicating upstream and downstream equipment.
   b. Installation locations for underground raceways and where they transition to above grade.
   c. Device locations and mounting heights.
   d. Junction and pull boxes with two or more home runs.

e. Junction and pull boxes with one home run.
f. Circuit information.
g. Shop Drawings: Update shop drawings with changes or deviations from the Original Shop Drawings. Provide updates to manufacturer/vendor for inclusion in Record Drawings.

C. Record Drawings: Develop a digital set of Record Drawings for the project utilizing the as-built drawings. Digital Record Drawings can be in AutoCAD or PDF format. At end of construction, check drawings for completeness and accuracy.

D. Shop Drawing Record Drawings: Provide updated shop drawings based on As-Built drawings for use as Record Drawings.

E. Per project closeout procedures, submit in Digital Record Drawings and a copy of the As-Builts. Each sheet shall be noted as "RECORD DRAWING".

1.10 COORDINATION

A. Coordinate Divisions 26 and 27 work with other trades.

B. Be aware of restricted space for installation of electrical systems. Include offsets and perform rerouting and coordination to fit elements in available space. Include provisions for such requirements in bid.

C. Electrical equipment and systems shown are based on existing drawings as available and on limited project site observations to the extent possible under current conditions. Field verify existing conditions prior to commencement of work. Obtain specific locations of structural and architectural features or equipment items from referenced drawings, field measurements, or trade providing material or equipment.

D. Coordinate raceway installations to clear light fixtures and electrical cable trays. Include clearance over light fixtures to allow removal and replacement. Include minimum 6-inch clearance above and to sides of cable trays.

E. Existing Conditions:

1. General Construction:

a. Installation of electrical, telecommunications, and electronic safety and security work will require openings, removal and replacement of ceilings, sleeves, and restoration of general construction to match existing. Some work occurs in areas not requiring alterations as part of architectural work. Coordinate new openings and restoration work so that there is no additional cost to the Owner.
b. General construction work shown on the architectural drawings may require removal, relocation, and reinstallation of existing electrical, telecommunications, electronic safety and security work. Since existing conditions cannot be completely detailed on the Drawings, survey the site and perform required Work at no additional cost to the Owner.

F. Be responsible for beam penetrations as they relate to the electrical work. Submit sizes and locations to the structural engineer for review and determination of structural details.

G. Coordinate attachments to structure to verify that attachment points on equipment and structure can accept seismic, weight, and other loads imposed.

H. Refer to architectural and structural drawings for location of expansion and seismic joints. Provide flexible loops for raceways and cable trays crossing expansion and seismic joints.

1.11 WORKMANSHIP

A. Work shall be in accordance with best trade practices. Remove substandard workmanship and provide new material at no extra cost to the Owner.

1.12 SITE VISIT

A. The Electrical Subcontractor shall visit site during bidding period to note conditions affecting installation of Work. No additional charges allowed due to failure to adequately review conditions.

B. Investigate each space through which equipment must be moved. Where necessary, arrange with equipment manufacturers to ship equipment in sections with suitable dimensions for moving through restricted spaces. For movement through occupied spaces, ascertain from the Owner as acceptable times of day or night that movement could occur. Include costs in bid for off hours labor, reassembly, and field testing.

1.13 CERTIFICATION

A. By submitting a bid for the electrical, telecommunications, electronic safety and security systems, the Electrical Subcontractor and his subcontractors acknowledge and certify the following:

1. That they have carefully examined and fully understand the Drawings and Specifications (including but not limited to architectural, site, utility, mechanical, structural and electrical drawings and specifications. In addition, they have determined that the Drawings and Specifications are adequate to complete the electrical systems and that they can provide a complete finished and operable system in accordance with the Contract Documents.
2. That they have had a reasonable opportunity to discover any ambiguities in the Contract Documents and such ambiguities have been brought to the attention of the A/E in writing prior to submitting the bid.
3. That they have reviewed the project progress schedule with the general contractor, fully understand the schedule, and they have verified, prior to submitting a bid, availability of necessary labor and materials, including supervision and office backup, and can comply with the schedule requirements.
4. That there may be changes to the scope of work and that they understand that any proposal submitted for performance of additional work shall include costs associated with such change including but not limited to labor, materials, subcontracts, equipment, taxes, fees, schedule impact, loss of efficiency, supervision, overhead and profit.

5. That the Contract requires them to coordinate their work with that of other trades and that responsibility for coordination includes rerouting, offsets, and similar provisions, to fit Work and address manufacturer's recommended clearances for service access, maintenance, and replacement of equipment in a manner that is compatible with work of other trades in the same area.
6. That routing of elements of electrical systems shown on the Drawings is schematic only and that offsets and rerouting probably will be required in installation and that labor and materials have been included for such in their bids.
7. That they understand submittals of material and equipment to the A/E is for the purpose of establishing what they are providing for the project. Any review undertaken by the A/E does not relieve them of their responsibilities to furnish and install materials and equipment required for work in the project nor does such review relieve them of their responsibilities for coordination with other trades and designers to ensure that such materials and equipment will fit and be suitable for purpose intended.
8. That they agree to receive payment for bid amounts as full compensation for furnishing materials and labor which may be required in prosecution and completion of work required under the Contract Documents and in respects to complete the contract work to the satisfaction of the A/E.
9. That they include in their bids costs to furnish bonds as specified in the Contract Documents.

1.14 WARRANTY

A. Conform to requirements in General Conditions and Division 01. Where not so prescribed or defined, the period shall be 1 year. Warranty periods within Divisions 26 and 27 shall not commence until Substantial Completion. Electrical Subcontractor shall extend longer warranties specified in other sections.

1.15 EQUIPMENT FURNISHED BY OWNER INSTALLED BY ELECTRICAL SUBCONTRACTOR (FOIC)

A. Material Handling and Delivery: Coordinate delivery of FOIC equipment. Receive, off load, transport, store, hoist, unpack, dispose of packing, same as for other project equipment arriving at job site. Requirements of the Contract Documents apply to FOIC equipment.

B. Operation and Maintenance Data: Obtain from the Owner operation and maintenance data for the FOIC equipment and incorporate them into the Operations and Maintenance Manuals.

C. Start-up and Warranty:

1. FOIC equipment suppliers will pass on to the Electrical Subcontractor start-up information, maintenance and parts information, and warranty provisions of their products in accordance with the equipment suppliers contract requirements. Organize and coordinate start-up and warranty requirements for the FOIC equipment.
2. Include one year warranty on FOIC equipment starting at Substantial Completion regardless of shorter time limits by FOIC suppliers.

1.16 DEMONSTRATION

A. Comply with requirements in Division 01 with additional requirements indicated in this article.

B. Following installation of electrical work and prior to Substantial Completion, demonstrate that equipment and systems operate as indicated in the Contract Documents and in accordance with manufacturer's recommendations.

C. Perform in presence of the A/E and Owner, unless otherwise directed by the A/E. Give minimum 1 week notice prior to demonstrations. Submit a draft copy of O&M information and as-built drawings minimum 1 week prior to demonstration for Owner Review.

D. Provide instruments and personnel required to conduct demonstrations.

1.17 SUBSTANTIAL COMPLETION

A. Comply with requirements in Division 01.

B. Prepare list of items that are not complete prior to asking for a substantial completion review by the A/E.

1.18 CONTINUITY OF EXISTING UTILITY SERVICES

A. Shutdown Duration: Comply with requirements in Division 01. Perform work without shutdown of more than 8-hour duration of existing systems. Schedule each shutdown in writing with the Owner at least 14 days in advance of shutdown and obtain advance written approval from the Owner.

B. Temporary Services: Provide during necessary interruptions of existing utilities.

C. Owner Occupancy:

1. Perform work in the existing building with respect for the necessity of the Owner's employees to perform their regular work.
2. Plan installation of new work and connections to existing work to assure minimum interference with regular operation of existing facilities. Do not remove, disconnect, or shutdown systems without prior review by the Owner to confirm that areas needed to remain in operation are not affected.
3. Provide temporary, wiring, lighting, and similar systems and connect to existing systems to keep existing electrical systems in operation to service areas that need to remain occupied.

1.19 OPERATION AND MAINTENANCE MANUALS

A. Prepare Operation and Maintenance Manuals for equipment and materials furnished under Divisions 26 and 27.

B. Comply with requirements in Division 01 with additional requirements indicated in this article.

C. Submit one hard copy and one electronic PDF format of Operation and Maintenance Manuals for review at least 4 weeks prior to Substantial Completion date. Assemble hard copy Operation and Maintenance Manual in 3-ring binder(s). Use multiple binders if pages in a single binder would exceed 4-inch thickness. Separate binders for each category, such as Electrical, Telecommunications, and Electronic Safety and Security. Where one subject matter encompasses more than one binder, differentiate by volume numbers. Include indexed tabs for each binder. Engrave cover with the project title in 1/2-inch high letters and name and address of the Electrical Subcontractor in 1/4-inch-high letters. Provide same information in 1/8-inch high letters on spine.

D. Include complete cleaning and servicing data compiled in clearly and easily understandable form. Include serial numbers of each piece of equipment, complete lists of replacement parts, motor ratings, and similar information. Each item of equipment shall have its own individual sheet. (Example: If 2 items of equipment A and D appear on the same sheet, individual sheet shall be included for each unit specified).

E. Include the Following Information:

1. Identifying name and mark number.
2. Certified outline drawings and Shop Drawings.
3. Parts list.
4. Performance curves and data.
5. Wiring diagrams.
6. Manufacturer's recommended operating and maintenance instructions.
7. Vendor's name, address and telephone number for all parts and equipment.
8. Name, address and telephone number of Electrical Subcontractor performing the work.
9. Test reports.
10. Product data and Record Drawings.

F. Provide one (1) hard copy and one (1) electronic copy in PDF format of Operation and Maintenance Manuals after review and acceptance by Architect.

1.20 TESTING

A. Comply with requirements in Section 260810.

1.21 PROJECT TRAINING

A. Upon completion and testing of equipment and system installation, assemble equipment factory representatives and subcontractors for system training with Owner as required in specific specification sections.

B. Prepare and submit an agenda for Owner review a minimum of (7) days prior to each training session.

C. Each representative and subcontractor shall assist in start-up, check out, and training for their respective system and remain on-site until the total system operation is thoroughly reviewed by the Owner's maintenance and operation personnel and they are thoroughly trained. Return for additional training sessions as required to completely train Owner's personnel.

D. Submit copy of sign-in list for each Owner training session to A/E.

1.22 PUNCHLIST AND FINAL REVIEWS

A. At the time of punchlist and final reviews, the project electrical foreman shall accompany the reviewing party, and remove coverplates, panel covers and other access panels as requested to allow review of entire electrical system.

B. Punch List: Review each punch list item; update field conditions to address items or provide comment response for reason the item has not been addressed in the field.

1.23 PROJECT CLOSEOUT

A. Engineering services required beyond the Substantial Completion date shall be paid by the Electrical Subcontractor at a rate of $150 per hour.

B. Punchlists will be done at Substantial Completion and final completion dates. Submit Record Drawings and final Operation and Maintenance Manuals prior to Substantial Completion date. Subsequent reviews shall be paid by the Electrical Subcontractor at a rate of $150 per hour.

PART 2 - PRODUCTS

(Not used).

PART 3 - EXECUTION

(Not used).

END OF SECTION 260500

SECTION 260510
BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Description: Work includes basic electrical requirements specifically applicable to Divisions 26 and 27 sections including general material and installation requirements and site work.

B. General Requirements: Drawings and general provisions of the Contract, including General Conditions and Division 01 sections apply to the Work in this section.

1.02 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. UL Compliance: Where UL fire-resistance rating is indicated for construction penetrated by access units, furnish UL listed and labeled units, except for those units which are smaller than minimum size requiring ratings as recognized by governing authority.

C. Codes and Standards:

1. ASTM D 1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3).

1.03 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products in accordance with manufacturer's recommendations, using means and methods to prevent damage, deterioration, and loss, including theft.

B. Deliver products to site in manufacturer's original containers, complete with labels.

C. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

D. Store products subject to damage by weather conditions above ground, under cover in weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 - PRODUCTS

2.01 GENERAL

A. Furnish specified items acceptable to AHJ as suitable for intended use.

B. New, unless otherwise indicated, free from defects and the standard products of reputable manufacturers regularly engaged in production of such equipment.

C. Furnish similar items of equipment by same manufacturer.

D. Materials and Equipment: UL listed and labeled or other AHJ approved testing laboratory and in compliance with other industry standards as specified.

E. Remove rejected or damaged material from site.

F. Samples may be required for non-standard or substituted items before installation. Submit samples as required in specific specification sections.

G. Furnish required items necessary for installation and testing procedures.

2.02 POSTED INSTRUCTIONS

A. Posted Operating Instructions: Furnish simplified, consolidated equipment control and power diagrams. Graphically represent entire system and actual equipment installed. Include concise written instructions on how to start and stop systems. Show settings and conditions to be observed. Indicate what control adjustments are to be made or maintained by the operator.

1. Include control diagrams and specific operating instructions.
2. Indicate how to energize each major component of systems. Show what action must be taken in an emergency, how to restore power following an outage, and what precautions to be taken when maintenance is required.
3. Include photographic or comparable non-fading reproductions, either framed under glass or encased in non-discoloring plastic.
4. Include one-line diagrams of electric power distribution riser.

B. Copies of operating instructions shall be used with Operation and Maintenance Manuals as basis in training Owner's employees in the operation and maintenance of systems and related installed equipment.

2.03 ENCLOSURES

A. NEMA Type 1 – Dry Interior locations unless otherwise noted on drawings or as specified below.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of the various sections. Do not install until unsatisfactory conditions are corrected.

3.02 INSPECTIONS

A. Confirm that installations have been inspected before enclosure within building features, buried, or otherwise hidden from view. Pay costs associated with uncovering or exposing installations and features not previously inspected and for repair to exposed surfaces.

3.03 PREPARATION

A. Protect surrounding areas and surfaces to prevent damage as work is installed.

B. Obtain equipment roughing-in dimensions from approved Shop Drawings or actual measurements.

C. Be familiar with the location of other trade's equipment. Eliminate conflicts. Check door swings before installing switches. Locate switches on strike side of doors unless noted otherwise.

D. Layout electrical, telecommunications, and electronic safety and security work in advance of construction to eliminate unnecessary cutting, drilling, channeling, and similar activities. Where such cutting, drilling, channeling and similar activities become necessary for proper installation, perform with care using skilled mechanics of trades involved. Repair damage to building and equipment at no additional cost to the Owner.

E. Perform cutting work of other trades only with consent of that trade. Cutting structural members not permitted without consent of the A/E.

3.04 INSTALLATION

A. Install Work as specified and in accordance with the Drawings and manufacturer's instructions. Where these conflict, manufacturer's instructions govern.

B. Review Architectural, Mechanical and other applicable drawings and applicable Shop Drawings to prevent switches, outlets, and other equipment from being hidden behind doors, cabinets, counters, heating equipment, and similar items, or from being located in whiteboards, tackboards, glass panels, and similar items. Relocate electrical devices and connections as directed by the A/E at no additional cost to the Owner if the work is not properly coordinated.

C. Where conduit, outlets, and apparatus are encased in concrete, locate and secure at point of installation. Check locations of electrical items before and after concrete and masonry installation and relocate displaced items.

D. Provide block-outs, sleeves, demolition work, and similar items required for installation of Work specified in this division.

3.05 WORKMANSHIP

A. Work and materials will be subject to observation at any time by the Owner and the A/E.

B. Install material and equipment in accordance with manufacturer's instructions. Provide calibrated torque wrenches and screwdrivers as required.

C. Cutting and Patching: Do not weld to, cut, or notch structural members or building surfaces without approval of the A/E. Restore surfaces neatly to original condition after cutting, channeling, chasing, and drilling of walls, partitions, ceilings, paving, and anchorage of conduit, raceways, and other electrical equipment.

3.06 WELDING, CUTTING, AND DRILLING

A. Perform in accordance with American Welding Society Standards.

3.07 CLEANING

A. Clean equipment, conduit, and fittings and remove packing cartons and other debris created by Divisions 26 and 27 Work.

B. Before Substantial Completion, carefully clean equipment, fixtures, exposed raceways and similar items. Remove construction labels, dirt, cuttings, paint, plaster, mortar, concrete, and similar items. Clean fixtures, interiors and exteriors of equipment and raceways.

3.08 IDENTIFICATION

A. Provide nameplates and decals required to identify equipment and components, comply with requirements in Section 260553.

B. Mount operating instructions and diagrams near equipment or elsewhere as otherwise designated by the Owner.

3.09 PROTECTION

A. Protect equipment during and after electrical hookup, painting, and final testing.

END OF SECTION 260510

SECTION 260512
ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Description: Work includes selective demolition of existing electrical work as indicated in the Contract Documents.

B. General Requirements: Drawings and general provisions of the Contract, including General Conditions and Division 01 sections apply to Work in this section.

1.02 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

PART 2 - PRODUCTS

(Not used).

PART 3 - EXECUTION

3.01 EXISTING CONDITIONS

A. Dust Control: Provide protective measures to minimize transfer of noise, dust, dirt, and refuse to adjacent areas of building. Such measure may include dusttight barriers, temporary walls, portable exhaust fans, vacuum systems, and temporary partitioning.

B. Extent: Keep areas of demolition as clean and orderly as physically possible. Do not allow demolition debris to accumulate. Gather debris and dispose daily. Broom or vacuum-clean work areas on daily basis.

C. Protection: Protect existing equipment, furnishing, and systems with protective coverings. Protect finished surfaces including floors, ceilings, and walls.

3.02 DAMAGES

A. Repairs: Promptly repair damage to existing surfaces, equipment, finishes, or adjacent facilities at no cost to the Owner and to the satisfaction of the A/E and the Owner.

3.03 DEMOLITION

A. General: Provide demolition work required in existing building for removal of existing electrical equipment, raceways, and conductors and for installation of new electrical equipment, raceways, and conductors. Relocate and modify existing electrical equipment, raceways and conductors as required by general construction alterations and by installation of new electrical equipment, raceways, and conductors in existing building to achieve a complete and functioning installation as defined in the Contract Documents.

B. Extent: Remove and dispose of existing materials indicated in the Contract Documents to be removed.

C. Reuse: Do not reuse existing products unless indicated on the Drawings.

D. Materials to Owner: Deliver items to the Owner as indicated in the Contract Documents.

E. Materials to Electrical Subcontractor: Materials other than those reserved by the Owner.

F. Existing Conditions: Comply with requirements in Division 01. Verify specific demolition work and operating conditions to be encountered from on-site review and coordination with the Owner. Maintain service to existing equipment and devices during new construction work as required by construction sequencing/scheduling provisions. In areas adjacent to new construction work, provide temporary services as necessary to meet these conditions. Protect active conductors encountered. Notify the A/E of utilities encountered whose services are not known.

G. Repair of Damages to Underground Utilities: Exact location of existing underground utilities is not definitely known. Should any underground utilities be damaged in excavations, restore such utilities without additional cost to the Owner.

H. Drilling of Concrete: Drill openings through existing concrete with diamond tipped rotary core-drilling equipment or carbide tipped drills.

I. Saw-Cutting of Concrete: Saw cut through existing concrete with diamond tipped or carbide tipped saw blade.

3.04 DISPOSAL OF DEMOLISHED MATERIALS

A. Disposal: Remove debris, rubbish, and other materials resulting from demolition operations from building site unless reinstalled or delivered to the Owner as indicated in the Contract Documents. Transport and legally dispose of material off site.

B. Burning: Burning of removed materials is not permitted on project site.

3.05 CLEAN-UP AND REPAIR

A. Clean-Up: Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protection and leave interior areas clean.

B. Repair: Repair demolition performed in excess of that required at no additional cost to Owner. Return structures and surfaces to conditions existing prior to commencement of demolition work or as directed by the Owner.

END OF SECTION 260512

SECTION 260519
WIRE AND CABLES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Description: Work includes wire, cable, splices, and terminations for systems 600 Volts and less and associated appurtenances.

B. General Requirements: Drawings and general provisions of the Contract, including General Conditions and Division 01 sections apply to Work in this section.

1.02 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. NFPA 70, National Electrical Code (NEC).
2. UL 83, Thermoplastic-Insulated Wires and Cables.

C. Comply with NEC as applicable to construction and installation of electrical wire and cable. Electrical wire and cable UL listed and labeled.

D. Comply with applicable portions of NEMA/Insulated Cable Engineers Association standards pertaining to materials, construction and testing of wire and cable.

E. Comply with applicable portions of ANSI/ASTM and IEEE standards pertaining to construction of wire and cable.

1.03 SUBMITTALS

A. Comply with requirements in Division 01 and Section 260500.

B. Product Data: Submit manufacturer's technical product data for each type of wire, cable, and appurtenance.

C. Test Reports:

1. Field test reports.
2. Submit completed copy of reports and include copy in the Operation and Maintenance Manual.

PART 2 - PRODUCTS

2.01 POWER AND LIGHTING CIRCUITS

A. Factory-fabricated conductors of sizes, ratings, materials and types indicated on the Drawings for each service. Where not indicated, select to comply with project's installation requirements and NEC standards. Comply with the following:

1. UL 83.
2. Copper Conductor. No. 12 AWG and No. 10 AWG wire and cable to be solid. Wire and cable larger than No. 10 AWG stranded.
3. Insulation type THHN/THWN-2 dual rated or XHHW-2 dual rated, 600 Volt for circuits from 115 to 600 Volts.
4. Use only 90 C insulated conductors based on 75 C ampacity tables of the NEC.

2.02 REMOTE CONTROL AND SIGNAL CIRCUITS

A. Class 1:

1. UL 83.
2. Stranded copper conductor.
3. Insulation type THHN, or THWN, 600 Volt for circuits from 115 to 600 Volts.

B. Class 2 and 3:

1. Copper conductor, 300 Volt insulation, rated 75 C in dry locations and 60 C in wet locations. Individual conductors twisted together and covered with non-metallic jacket unless otherwise noted on the Drawings.
2. UL listed for use in air handling ducts and hollow spaces used as ducts and plenums.

2.03 PLASTIC CABLE TIES

A. Teflon or nylon, locking type.

PART 3 - EXECUTION

3.01 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.03 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article “Quality Assurance” provisions, specifications, and manufacturer’s installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

3.04 WIRING AND CABLE INSTALLATION, GENERAL

A. Install electric conductors and cables as indicated on the Drawings, in compliance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standards of Installation," and in accordance with recognized industry practices.

B. Coordinate installation work with electrical raceway and equipment installation work for proper interface.

C. Pull cables by direct attachment to conductors or by use of basket weave pulling grip applied over cables. Attachment to pulling device made through approved swivel connection. Non-metallic jacketed cables of small size may be pulled directly by conductors by forming them into a loop to which pull wire can be attached. Remove insulation from conductors before forming loop. Larger sizes of cable may be pulled by using basket weave pulling grip, if pulling force does not exceed limits recommended by manufacturer. If pulling more than one cable, bind them together with friction tape before applying grip. For long pulls requiring heavy pulling force, use pulling eyes attached to conductors.

D. Do not exceed manufacturer's recommendations for maximum allowable pulling tension, side wall pressure, and minimum allowable bending radius. In all cases, pulling tension applied to conductors limited to 0.008 lbs. per circular mil of conductor cross-section area.

E. Pull in cable from end having the sharpest bend (bend closest to reel). Keep pulling tension to minimum by liberal use of lubricant, turning of reel, and slack feeding of cable into duct entrance. Employ not less than one man at reel and one in pullhole during this operation.

F. For training of cables, minimum bend radius to inner surface of cable shall be 12 times cable diameter.

G. Where cable is pulled under tension over sheaves, conduit bends, or other curved surfaces, make minimum bend radius 50 percent greater than specified above for training.

H. Apply wire and cable pulling compound recommended by specific cable manufacturer.

I. Seal cable ends unless splicing is done immediately.

J. Support cables in pullholes, concrete trenches, and similar locations by cable racks. Secure to rack insulators with nylon cord or self-locking nylon cable ties. Place each cable on separate insulator.

K. Follow manufacturer's instructions for splicing and cable terminations.

L. Provide separate neutral conductor for each circuit serving single phase loads, unless indicated otherwise on the Contract Drawings. Where shared neutrals are indicated for multi-wire branch circuits, provide circuit breaker handle ties per Section 262813.

M. Branch circuit wiring:

1. Group in separate raceways as indicated on the Contract Drawings. Where branch circuit raceways are not indicated on Contract Drawings, a maximum of three circuits may be installed in the same raceway if each circuit originates from the same panelboard.
2. GFCI Circuit Breakers: XHHW-2 insulation.

3.05 WIRING METHODS, GENERAL

A. Install wiring in raceways unless indicated otherwise on the Contract Drawings or authorized by the A/E.

B. Install Wire After:

1. Interior of building is protected from weather.
2. Mechanical work likely to injure conductors is completed.
3. Conduits have been cleaned and moisture removed.

C. Neatly train and lace wiring inside boxes, equipment, and panel boards.

D. Clean raceway system before installing conductors.

E. Use half-lapped synthetic tape if taping is utilized for insulation purposes.

F. Provide conductor support devices as required by NEC in vertical conduit runs.

G. Torque conductor connections and terminations to manufacturer's recommended values.

H. Maintain minimum 12 inch clearance between open cabling and heat sources such as flues, steam pipes, and heating appliances.

3.06 MINIMUM SIZES

A. Minimum No. 12 AWG for power and lighting circuits.

B. Minimum No. 14 AWG for control wiring.

3.07 CLASS 2 AND 3 CABLE INSTALLATION

A. Class 2 and 3 Cable: Install using open cabling support methods at indoor locations where allowed by codes, unless otherwise noted. Install Class 2 and 3 cabling in raceway in concealed locations, including above hard/inaccessible ceilings and within wall cavities, where exposed in finished and unfinished spaces, and where subject to physical damage, below 9’, mechanical/electrical/telecom equipment rooms, service yard, loading dock.

3.08 OPEN CABLING INSTALLATION

A. Provide all hanger supports and cable supports for cabling specified by Division 26, 27, and 28. All support structures shall adhere to the requirements in the National Electrical Code. Comply with requirements in Section 260529 Supporting Devices.

B. Install cable bundles horizontal with a maximum deflection of two inches from the bottom of the cable support.

C. Provide additional cable management products to protect exposed cabling and complete the installation of cabling in a neat professional manner.

D. Maintain 12" clear from mechanical equipment and ductwork, fire protection piping and electrical raceways systems. Where limited space exists for cable routing, cables may cross ducts, piping and conduit systems perpendicular with minimum 4" separation. Maintain separation from all mechanical and electrical equipment, ductwork, piping, conduit, clearance spaces and structure.

E. Maintain proper bend radius of cabling bundles and supports changing pathway direction as to not impact the physical jacket construction of the cabling. Replace cabling that becomes damaged during this transition in its entirety.

F. Follow manufacturer's recommendations for quantity of cables supported in J-hooks and adjustable cable supports. Comply with requirements in Section 260529 Supporting Devices.

G. Observe the applicable requirements and recommended good practices contained within TIA-568-C standard for cabling installation requirements.

H. Protect exposed cables where subject to damage. Provide conduit sleeves with bushings at all wall, ceiling and floor penetrations.

3.09 WIRING SPLICES AND TERMINATIONS

A. Splice only in accessible junction boxes.

B. Splices and Taps:

1. Use compression-set pressure connectors with insulating covers or screw-on pressure (wire nuts) for sizes No. 10 AWG and smaller.
2. Use compression-set pressure connectors with insulating covers for wire splices and taps sizes No. 8 AWG and larger. Split bolt splices and connectors not acceptable.

C. Terminations: Eye-type compression lug when termination is to a bolt or screw terminal.

1. 250 kcmil and larger, two hole long barrel compression lugs.
2. Smaller than 250 kcmil: Single hole compression lug.

D. Tape un-insulated portions of conductor and connectors with electrical tape to 150 percent of conductor insulation value.

E. Clean wires before installing lugs and connectors.

F. Make splices, taps, and terminations to carry full capacity of conductors without perceptible temperature rise.

G. Leave minimum 8 inches of pigtail at outlet boxes for connection to fixtures and devices. Where wiring is continued to other outlets, splice connection wire in a tap. In no case will continuity through double terminal of device be allowed for either hot or neutral leg of circuit.

H. Insulate ends of spare conductors with electrical tape or wire nut.

I. Terminate control circuit conductors at terminal blocks only.

J. Utilize eye or forked tongue type compression set terminator for conductors No. 12 AWG and smaller when termination is to a bolted or screw set type terminal block or terminal cabinet.

K. Make below grade splices in handholes and vaults watertight with epoxy resin type splicing kits similar to Scotchcast.

3.10 FIELD QUALITY CONTROL

A. Test for Wires and Cables in accordance with Section 260810.

END OF SECTION 260519

SECTION 260521
METAL CLAD CABLES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Description: Work includes metal clad (MC) cable for systems 600 Volts and less and associated appurtenance.

B. General Requirements: Drawings and general provisions of the Contract, including General Conditions and Division 01 sections apply to Work in this section.

1.02 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. ASTM B 3, Standard Specification for Soft or Annealed Copper Wire.
2. ASTM B 8, Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.
3. NFPA 70, National Electrical Code (NEC).
4. UL 1569, Standard for Metal-Clad Cable.
5. UL 1581, Reference Standard for Electrical Wires, Cables, and Flexible Cords.
6. UL 83, Thermoplastic - Insulated Wires and Cables.
7. UL 1479, Standard for Fire Tests of Through-Penetration Firestops.

C. Comply with NEC as applicable to construction and installation of MC Cable. Cable UL listed and labeled.

D. Comply with applicable portions of NEMA/Insulated Cable Engineers Association Standards pertaining to materials, construction and testing of wire and cable.

E. Comply with applicable portions of ANSI/ASTM and IEEE Standards pertaining to construction of wire and cable.

F. Comply with UL 1569 for Metal Clad Cable. Include UL label and manufacturer's "E" number.

1.03 SUBMITTALS

A. Comply with requirements in Division 01 and Section 260500.

B. Product Data: Submit manufacturer's technical product data for each type of MC Cable and appurtenance.

C. Test Reports:

1. Field test reports

2. UL test report for MC Cable.
3. Submit completed copy of reports and include copy in the Operation and Maintenance Manual.

PART 2 - PRODUCTS

2.01 METAL CLAD CABLES

A. Manufacturers:

1. Southwire
2. AFC Cable Systems, Inc.
3. Encore

B. Conductors: Copper, THHN/THWN-2 insulation, polypropylene or polyester assembly tape in armor. Conductors No. 12 AWG and No. 10 AWG shall be solid. Conductors larger than No. 10 AWG shall be stranded.

C. Electrical and Physical Properties of Copper Conductors: Conform to applicable standards referenced above. Soft-annealed copper in compliance with ASTM B 3 or ASTM B 8.

D. Polyvinylchloride/Nylon (Polyamide Polymer), Type THHN Insulation/Jacket: Heat, flame, moisture resistant dielectric layer manufactured and tested in compliance with UL 83.

E. Insulated grounding conductors sized in accordance with UL 1569, cabled with circuit conductors and identified in compliance with UL 1569.

F. Circuit and grounding conductors cabled (twisted) with lay length and covered with polypropylene or polyester assembly tape.

G. Armor: Galvanized steel over cabled wire assembly with interlock in compliance with UL 1569.

H. Terminate metal clad cable with malleable iron/steel construction, electro zinc plated inside outside, equipped with nylon insulated throat fittings and shall be of angled saddle type. Thomas and Betts series 3110 & 3150 series or approved. Direct bearing screw type fittings shall not be used.

I. Connectors: UL listed and labeled MC connectors manufactured for MC Cable.

2.02 MC CABLE SUPPORTS

A. Cable Clamps, Straps, and Supports: Steel or malleable iron. Comply with requirements in Section 260529.

PART 3 - EXECUTION

3.01 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section. Protect exposed cable from damage. Remove cable which proves to have faulty wiring and provide new. Abandoning existing and pulling new not acceptable. Repair, repull, and restrap MC Cable determined by the A/E to be poor installation.

3.03 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article “Quality Assurance” provisions, specifications, and manufacturer’s installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

3.04 METAL CLAD CABLE INSTALLATION

A. Provide metal clad cables as indicated on the Drawings, in compliance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standards of Installation", and in accordance with recognized industry practices.

B. Install cables only concealed in walls within spaces with accessible suspended ceiling, and above accessible suspended ceiling. Install metal clad cables only within room served. Provide conduit and wire from panel to junction box above accessible suspended ceiling within each room before transition to metal clad cabling.

C. Route parallel and perpendicular to building planes.

D. Maintain minimum 6-inch clearance between cabling and piping. Maintain 12-inch clearance between cabling and heat sources such as flues, steam pipes, heating and hot water pipes, and heating appliances.

E. Where cabling is run in parallel, group on common supports. Comply with requirements in Section 260529.

F. Coordinate installation work with equipment installation work for proper interface.

G. Install No. 10 AWG conductors for 20 Amp 120 Volt branch circuits longer than 75 feet.

H. Install No. 12 AWG minimum for power and lighting circuits.

I. Splice only in accessible junction boxes.

J. Verify continuity of each branch circuit conductor.

K. Tape un-insulated portions of conductor and connectors with electrical tape to 150 percent of conductor insulation value.

L. Include green wire ground. Jacket shall not serve as grounding means.

M. Cut cable using equipment exclusively designed for such use. Seatek, Thomas & Betts, or approved. Knives, hacksaws, bending to break, dikes, pliers, wire cutters, or other similar methods not acceptable.

N. Insulate ends of spare conductors with electrical tape or wire nut.

O. Distance Between Supports: Maximum 6-foot centers and within 6 inches of each outlet, and junction box.

P. Support cables below roof decking to provide minimum 1-1/2" separation from raceway surface to nearest surface of metal roof decking.

Q. Cable to be routed around structural members.

3.05 FIELD QUALITY CONTROL

A. Comply with requirements in Section 260810. Include copy of field test report in the Operation and Maintenance Manual.

END OF SECTION 260521

SECTION 260526
GROUNDING AND BONDING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Description: Work includes grounding and bonding systems, equipment and associated appurtenances.

B. General Requirements: Drawings and general provisions of the Contract, including General Conditions and Division 01 sections apply to Work in this section.

1.02 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. IEEE C2, National Electrical Safety Code (NESC).
2. IEEE 81, Guide for Measuring Earth Resistivity, Ground Impedance and Earth Surface Potentials of a Ground System Part 2: Normal Measurements.
3. IEEE 837, Standard for Qualifying Permanent Connections Used in Substation Grounding
4. NFPA 70, National Electrical Code (NEC).
5. NFPA 780, Standard for the Installation of Lightning Protection Systems
6. UL 467, Standard for Grounding and Bonding Equipment.
7. UL486A-486B, Wire Connectors
8. CSA C22.1, Canadian Electrical Code Part I (CEC)
9. CSA C22.2 No. 41, Grounding and Bonding Equipment
10. CSA C22.2-65, Wire Connectors
11. ANSI C119.4, Electric connectors - connectors to use between Aluminum-to-aluminum or aluminum-to-copper conductors

C. Comply with NEC and IEEE requirements as applicable to electrical grounding and ground fault protection systems.

D. Products UL listed and labeled.

1.03 SUBMITTALS

A. Comply with requirements in Division 01 and Section 260500.

B. Product Data: Submit manufacturer’s technical product data for each item and appurtenance.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 467 for grounding and bonding materials and equipment.

2.02 GROUNDING ELECTRODES AND CONDUCTORS

A. Ground Rods: Copper clad steel, 3/4-inch diameter by 10 foot long. Copper-Weld Erico, Burndy, Harger, Thomas & Betts or approved.

B. Bare Ground Conductors: Soft drawn copper. Stranded unless indicated otherwise. Tinned where indicated. Solid for No. 8AWG and smaller. Stranded conductors for No. 6 AWG and larger.

C. Insulated Ground Conductors: Copper with 600 Volt insulation in accordance with Section 260519. Aluminum conductor acceptable for feeders where circuit conductors are aluminum.

D. Ground Bars: Predrilled rectangular bars of annealed copper, 1/4" inch by 4 inches with holes spaced 1-1/8 inches apart to accommodate lug connections. Length 18 inches unless indicated otherwise. Standoff insulators for wall-mounting.

2.03 GROUND CONNECTORS

A. Listed and labeled for applications and for specific types, sizes, and combinations of conductors and other items connected.

B. Welded Connections: Exothermic-welding kits of type recommended by kit manufacturer for materials being joined and installation conditions. Manufacturer: Cadweld, Thermoweld, Thomas & Betts, or approved.

C. Compression Ground Connectors: Conform to IEEE 837 and UL 467.

1. Cable-to-Cable Connections: Copper or copper alloy. Approved for direct burial or in concrete applications. Manufacturer: Thomas & Betts EZ-Ground® or approved.
2. Cable-to-Busbar Connections: Two-hole long barrel compression lug, unless indicated otherwise on Contract Drawings.
3. Cable-to-Cable Tray Connections: Two-hole long barrel compression lug.

D. Mechanical Ground Connectors: Conform to IEEE 837 and UL 467.

1. Cable-to-Water Piping Connections: Two-piece silicon bronze with stainless steel bolts. Listed for direct bury.
2. Split-Bolt Connectors: Not acceptable.

PART 3 - EXECUTION

3.01 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

C. Preparation of Surfaces: Clean contacting surfaces of ground connections to bright metal before connecting.

3.03 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article “Quality Assurance” provisions, specifications, and manufacturer’s installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

B. System ground not to exceed maximum 5 ohms meggered resistance.

C. Ground each separately-derived system neutral to nearest building steel.

D. Bond together system neutrals, service equipment enclosures, exposed noncurrent carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, receptacle ground connectors, underground metal water piping systems, and gas piping systems.

3.04 GROUNDING ELECTRODE AND CONDUCTOR INSTALLATION

A. Equipment Ground Conductor: Install separate, insulated equipment ground conductor in each feeder and branch circuit. Terminate each end on grounding lug, bus, and bushing and to intermediate metallic enclosures.

B. Isolated Ground Conductor: For isolated ground branch circuits and feeders, install insulated isolated ground conductor. Isolated ground conductor is in addition to equipment ground conductor. Terminate each end on isolated ground bus.

C. Connect grounding conductors to motors in accordance with NEC. Remove paint, dirt, and other surface coverings at grounding conductor connection points so that good metal-to-metal contact is made.

D. Bare Grounding Conductors Below Grade:

1. Minimum 30 inches below grade.

2. Not in contact with gravel fill or concrete. Provide Schedule 40 PVC sleeve where routing through concrete.
3. Train neatly around foundations and footings.

E. Concrete-Encased Grounding Electrode (Ufer Ground): Fabricate according to NFPA 70; use a minimum of 20 feet of bare copper conductor not smaller than No. 4/0 AWG. Bond to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building's grounding grid or to grounding electrode external to concrete.

F. Size main grounding system per NEC. Provide conduit to protect ground wire from damage to an area 6 feet above floor.

G. Conductor to Conductors, Conductor to Steel, and Conductor to Ground Rod: Exothermic-welded type connectors. Cadweld, Thermoweld, Thomas & Betts, or approved.

H. When making bolted connection to aluminum and galvanized structures, apply corrosion-inhibitor to contact surfaces between cable, connector, and surface of structure. Penetrox A or approved.

I. Ground Bars: Install where indicated on Contract Drawings. Install horizontally at 12 inches above finished floor, unless indicated otherwise.

3.05 GROUND CONNECTORS

A. Welded Connections:

1. Provide for underground connections.
2. Provide for connections to structural steel.
3. Provide for connections to ground bars where indicated.
4. Provide full weld between coupling and ground rod at joint.
5. Connect grounding conductors to ground rods at upper end of rod with end of rod and connection point below finished grade, except provide bolted connections at test wells and as otherwise indicated.
6. When making connections, wire brush or file point of contact to bare metal surface. Use welding cartridges and molds in accordance with manufacturer’s recommendations. After welds have been made and cooled, brush slag from the weld area and clean joint. Use connectors of specified size for conductors and ground rods. Notify A/E before backfilling ground connections.

B. Ground shields of shielded power and control cable at each splice and termination as recommended by manufacturer.

C. Ground metal sheathing and exposed vertical metal structural elements of building. Ground metal fences enclosing electrical equipment. Bond metal equipment platforms which support electrical equipment to equipment ground. Provide electrical contact between metal frames and railings supporting pushbutton stations, receptacles, instrument cabinets, raceways, and similar items carrying circuits to these devices.

3.06 FIELD QUALITY CONTROL

A. Comply with requirements in Section 260810.

B. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

C. Include field test reports of grounding system in the Operation and Maintenance Manual.

END OF SECTION 260526

SECTION 260529
SUPPORTING DEVICES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Description: Work includes conduit and equipment supports, fastening hardware, and associated appurtenances.

B. General Requirements: Drawings and general provisions of the Contract, including General Conditions and Division 01 sections apply to Work in this section.

1.02 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

1.03 SUBMITTALS

A. Comply with requirements in Division 01 and Section 260500.

B. Product Data: Submit manufacturer's technical product data for each item and appurtenance.

PART 2 - PRODUCTS

2.01 MATERIAL

A. General: Built-up framing for electrical raceway and equipment supporting systems, including but not limited to channel, rod, clamps, and hardware. Unless design is shown on the Drawings, size for 400 percent of calculated load.

B. Channel: 12 gauge galvanized formed metal with or without pre-drilled holes, Pre-galvanized. Cooper B-Line, Unistrut, Powerstrut, or approved.

C. Beam Clamps, in Pairs, at each Supporting (Structural) Beam: B-line B441-22 and B441-22A; Superstrut U-501 and U-502; Unistrut P2785, P2786, and P1379S, or approved. Submit other manufacturers for approval with evidence proving clamp complies with IBC and ASCE 7-05 for seismic requirements. Submitted proof can consist of letter signed and stamped by a professional engineer licensed in engineering in the state in which the Work is performed.

D. Beam Clamps for Use with Rods: B-Line B751-J4, B751-J6, B751-J9, and B751-J12; Superstrut U-569; Unistrut P2824-6, P2824-9, and P2824-12, or approved. Submit other manufacturers for approval with evidence proving clamp complies with seismic requirements. Submitted proof can consist of letter signed and stamped by a professional engineer licensed in engineering in the state in which the Work is performed.

E. Fittings for Attaching Channel-to-Channel for Built-Up Framing: Unistrut P6028, P6033, P6069, P6290, P6291, P6326, P6331, P6332, P6346, P6358A, P6359, P6381, P6382, P6726A, P6917, P6962, or approved.

F. Connectors for Bracing: Unistrut P6186, P7097, P7098, P7100, P7101, P7108, P7109, P7110, P6546, or approved.

G. Hardware, including Nuts (Locking Type), Bolts, and Set Screws: Corrosion resistant, designed for intended use.

H. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened Portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

I. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58

J. Hanger Rods: Threaded steel

K. Spring Steel Conduit Clips: Erico K series or approved.

L. MC Cable Support Brackets: Erico MCS Series or approved.

M. Circular Cable Retainer:

1. Cable retainers shall be of plastic material with rounded edges, plenum rated, utilizing an easy-lock closure and an attachment base. Cable retainers shall be screwed into structure and only be utilized in spaces that are extremely tight and J-hooks do not have sufficient space to be mounted.

a. Manufacturer: Erico Caddy, Part No. CAT CR50

N. J-Hooks:

1. J-hooks shall have a galvanized finish with rounded edges for smoother cable pull and greater corrosion resistance.

a. Manufacturer: Erico Caddy or approved:

1) 1” Dia., Part No. CAT16HP
2) 1-5/16” Dia., Part No. CAT21HP
3) 2” Dia., Part No. CAT32HP
4) Note: The paragraph below is intended for use when you have 100+ cables in a bundle

O. Adjustable Cable Support:

1. Adjustable cable supports shall be of steel and polyethylene, plenum rated, with unlocking and locking bar allowing additional cables to be added easily after installation.

a. Manufacturer: Erico Caddy, Part No. CAT425**.**

P. Outlet Box Support:

1. Where more than one outlet box is shown on the Contract Drawings, and indicated to be at same elevation, align them exactly on center lines horizontally with wall mounting bracket.

a. Manufacturer: Cooper B-Line Series BB8 or approved.

PART 3 - EXECUTION

3.01 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.03 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article “Quality Assurance” provisions, specifications, and manufacturer’s installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

3.04 SUPPORTING DEVICES INSTALLATION

A. Unless otherwise shown on the Contract Drawings, attach connectors to vertical framing members with 2 bolts

B. Install toggle bolts or hollow wall fasteners in hollow masonry, plaster, and gypsum board partitions and walls. Install expansion anchors or preset inserts in solid masonry walls, self-drilling anchors, and expansion anchors on concrete surfaces.

C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. To Steel: Beam clamps MSS SP-58, Type 19 or 23, complying with MSS SP-69.
6. To Light Steel: Sheet metal screws.
7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers,

and other devices on slotted-channel racks attached to substrate by means that comply with seismic-restraint strength and anchorage requirements

D. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under nuts.

E. Bridge studs top and bottom with channels to support flush-mounted cabinets and panelboards in stud walls.

F. Open Cabling Support Installation

1. Provide hanger supports and cable supports for cabling specified in Division 26. All support structures shall adhere to the requirements in the National Electrical Code.
2. Space cabling supports no further than 4’-0" apart.
3. Install cabling supports on their own dedicated support system.

G. Raceways:

1. Single raceway runs: Spacing to comply with requirements of Section 260533

   a. Mounted to building structure: double hole pipe straps.

2. Two or more parallel runs of raceway: Install trapeze support systems. Refer to Section 260533 for spacing requirements.
3. Welding conduit and conduit fittings to structure not acceptable.
4. Spacing: Space so that fittings are accessible to accommodate pulling or splicing.

H. MC Cable:

1. Single cable runs mounted to building structure with single hole straps specifically designed for MC cabling. Spacing shall comply with requirements of Section 260521.
2. Where two or more cables runs are routed in parallel, mount to building structure with MC Cable brackets. Spacing shall comply with requirements of Section 260521.

END OF SECTION 260529

SECTION 260533
RACEWAY SYSTEMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Description: Work includes conduit, electrical metallic tubing, wireway, surface metal raceway, and associated appurtenances within building perimeter.

B. General Requirements: Drawings and general provisions of the Contract, including General Conditions and Division 01 sections apply to Work in this section.

1.02 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances. Comply with local Utility requirements and standards.

B. Codes and Standards:

1. UL 1, Standard for Flexible Metal Conduit.
2. UL 5, Standard for Surface Metal Raceways and Fittings.
3. UL 6, Standard for Rigid Metal Conduit.
4. UL 360, Standard for Liquid-Tight Flexible Steel Conduit.
5. UL 514B, Standard for Conduit, Tubing, and Cable Fittings.
6. UL 797, Standard for Metallic Tubing – Steel.
7. UL 870, Standard for Wireways, Auxiliary Gutters, and Associated Fittings.
8. UL 1242, Standard for Intermediate Metal Conduit – Steel.

C. NEC Compliance: Comply with applicable portions of NEC as to type of products used and installation of electrical power connections.

D. Comply with applicable NEMA standards and refer to NEMA standards for definitions of terminology herein. Comply with NEC for workmanship and installation requirements of raceway systems.

E. Manufacturers: Firms regularly engaged in manufacture of raceway systems of types and sizes specified and whose products have been in satisfactory use in similar service for not less than 3 years.

1.03 SUBMITTALS

A. Comply with requirements in Division 01 and Section 260500.

B. Product Data: Submit manufacturer’s technical product data for each type of raceway system and appurtenance.

PART 2 - PRODUCTS

2.01 RIGID METAL CONDUIT (RMC) AND FITTINGS

A. Ferrous Metal Conduit: Steel, UL 6, hot-dip galvanized.

B. Fittings and Conduit Bodies: UL 514B, threaded galvanized.

2.02 INTERMEDIATE METAL CONDUIT (IMC) AND FITTINGS

A. Ferrous Metal Conduit: Steel, UL 1242, hot-dip galvanized.

B. Fittings and Conduit Bodies: UL 514B, threaded galvanized.

2.03 ELECTRICAL METALLIC TUBING (EMT) AND FITTINGS

A. Ferrous Metal Conduit: Steel, UL 797, hot-dip galvanized.

B. Fittings: UL 514B, galvanized steel, insulated throat, raintight compression ring type through 1-1/4 inch, set screw type for 1-1/2 inch and larger. Drive-on type and cast fittings not acceptable.

2.04 FLEXIBLE METAL CONDUIT AND FITTINGS

A. Ferrous Metal Conduit: Steel, UL 1, galvanized. UL listed for grounding as available. Aluminum and flexible metallic tubing not acceptable.

B. Fittings: Insulated throat, UL 514B, galvanized steel, UL listed for grounding as available.

2.05 SURFACE METAL RACEWAY

A. UL 5, sheet metal channel with fitted cover. Type and size as shown on the Drawings.

B. Finish: Enamel. Field paint to match wall color.

C. Fittings, Boxes, and Extension Rings: Designed for use with raceway systems.

D. All raceway and fittings to be supplied by one manufacturer.

E. Manufacturers: Mono-Systems, Wiremold, or approved.

2.06 CONDUIT BODIES

A. Conduit bodies cast malleable iron, zinc or cadmium plated with threaded connections. Covers gasketed, blank steel, or cast malleable iron, zinc or cadmium plated, and of same manufacturer as conduit body. Where conduit bodies are used as junction or splice boxes, comply with NEC.

B. Conduit bodies (Smart LB) for telecommunications cables shall be die cast aluminum, gray powder coat paint finish, threaded connections with internal built-in radius. Covers gasketed, die cast aluminum, and of same manufacturer as conduit body. Madison Electric or approved equal.

1. 1-1/4” Smart LB, Madison Electric, KLB120

2. 2-1/2" Smart LB, Madison Electric, KLB 250
3. 4" Smart LB, Madison Electric, KLB400

2.07 WIREWAY AND AUXILIARY GUTTER

A. UL 870, lay-in type, with hinged cover but without knockouts.

B. Size: As shown on the Drawings, 4 by 4 inch minimum.

C. Finish: Rust-inhibiting primer coat with manufacturer's standard enamel finish.

2.08 EXPANSION FITTINGS

A. Malleable iron, hot-dip galvanized allowing 4 inches (plus or minus 2 inches) conduit movement. OZ/Gedney Type AX Series, Thomas and Betts Type EJG series or approved.

2.09 SEALING FITTINGS

A. Wall Sealing Fittings: At each wall sealing fitting, include conduit seal fitting, OZ/Gedney FSK Series, Crouse Hinds EYS Series, Thomas and Betts EYS Series or approved.

B. Raceway Stubups and Stubouts: Conduit seals together with wall sealing fittings. OZ/Gedney CSB Series or approved.

2.10 CONDUIT SUPPORTS

A. Conduit Clamps, Straps, and Supports: Steel or malleable iron. Comply with requirements in Section 260529.

2.11 FIRE RATED SEALING COMPOUND

A. Dow Corning 3-6548 Silicone RTV Foam or approved.

PART 3 - EXECUTION

3.01 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.03 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article "Quality Assurance" provisions, specifications, and manufacturer's installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

3.04 RACEWAY SIZING, ARRANGEMENT, AND SUPPORT

A. Unless otherwise shown on the Drawings, size conduit for conductor type installed. Minimum size 3/4 inch.

B. Install conduit to maintain headroom and present neat appearance in unfinished spaces. Install a minimum of 9'-6" above finished floor in spaces unless otherwise indicated on the Contract Drawings.

C. Install conduit concealed in walls, below floors, and above ceiling in spaces, except conduit may be exposed in mechanical rooms, electrical rooms, and similar unfinished spaces. Horizontal conduit installation is not allowed in floor slab unless specifically noted on electrical and structural drawings.

D. Route conduit parallel and perpendicular to building planes.

E. Maintain minimum 6-inch clearance between conduit and piping. Maintain 12-inch clearance between conduit and heat sources such as flues, steam pipes, heating and hot water pipes, and heating appliances.

F. Brace conduit or conduit supports to prevent distortion of alignment by wire-pulling operations.

G. Where conduit is run in parallel, group on formed channel supports. Comply with requirements in Section 260529.

H. Do not fasten or support with wire or perforated pipe straps. Remove temporary conduit supports used during construction before conductors are pulled.

I. Raceway to be routed around structural members including columns, beams, reinforced masonry, footings and associated stem walls. Structural Engineer to approve proposed modifications of structural elements prior to commencement of work.

3.05 RACEWAY INSTALLATION

A. Cut conduit square using a saw or pipe cutter. Deburr cut ends.

B. Bring conduit to shoulder of fittings and couplings and tighten securely.

C. Use conduit hubs for fastening conduit to cast boxes and for fastening conduit to sheet metal boxes in damp or wet locations.

D. Do not use conduit bodies to make sharp changes in direction unless shown on the Drawings.

E. Use hydraulic one-shot conduit bender or factory elbows for bends in 2-inch conduit and larger.

F. Provide plastic bushings on conduit stubs used for transition from conduit to open cable runs.

G. During construction, use suitable conduit caps to protect installed conduit against entrance of dirt and moisture.

H. Distance Between Supports:

1. Threaded Rigid Metal Raceways: Maximum 8-foot centers and within 18 inches of each outlet, junction box, and bend.
2. Electrical Metallic Tubing: Maximum 8-foot centers at each bend and within 12 inches of each outlet, junction box, and coupling.
3. Surface Metal Raceway, Auxiliary Gutter, and Wireway: Maximum 5-foot centers or in accordance with manufacturer's instruction, whichever is less, unless otherwise shown on the Drawings.

I. Install nylon pull string with printed footage indicators secured at each end of each empty conduit, except sleeves and nipples. Identify with tags at each end origin and destination of each empty conduit.

J. Route conduit through roof inside openings for ductwork where possible. Otherwise, install through roof jack and seal weather tight.

K. Install no more than equivalent or four 90 degree bends between boxes.

L. Avoid moisture traps where possible. Where unavoidable, install junction box with drain fitting at conduit low point.

M. Sealing of Conduit Penetrations:

1. Exterior Wall Surfaces Above Grade: Seal around penetrations with caulking approved by the A/E. For concrete construction above ground level, cast conduit in wall or core drill wall and hard pack with mixture of equal parts of sand and cement.
2. Fire Rated Construction: Seal penetrations with fire rated sealing compound to maintain fire rating of construction penetrated.

N. Sealing of Raceways: Seal interior of raceways that pass through building roof and through outside walls of building, above or below grade. Seal on end inside building. Use raceway sealing fittings manufactured for purpose sealed with non-hardening, compound-type mastic, specially designed for such service. Pack around wires in raceways.

O. Where flexible metal conduit is installed, install bonding conductor to insure electrical continuity of raceway. Route bonding jumper inside conduit and terminate at grounding bushing or grounding locknut installed on inside of junction boxes at each side of flexible section. In instances where this method is not feasible (such as when cast boxes with hubs are used or where required by the NEC, route bonding jumper on outside of flexible conduit and terminate in accordance with methods acceptable to the AHJ.

P. Raceway shall not penetrate sheet metal ducts.

Q. Support raceways below roof decking to provide minimum 1-1/2" separation from raceway surface to nearest surface of metal roof decking.

3.06 SURFACE METAL RACEWAY INSTALLATION

A. Use flat-head screws to fasten channel to surfaces. Mount plumb and level.

B. Install insulating bushings and inserts at connections to outlets and corner fittings.

C. Maintain grounding continuity between raceway components for continuous grounding path.

D. Fastener Option: Use manufacturer's standard clips and straps for installed purpose.

3.07 AUXILIARY GUTTER INSTALLATION

A. Bolt auxiliary gutter to steel channels fastened to wall or in self-supporting structure. Install level.

B. Gasket each joint in oil-tight gutter.

C. Mount raintight gutter in horizontal position only.

3.08 RACEWAY SCHEDULE

A. Rigid Metal Conduit:

1. Acceptable in all locations except as modified in this section.
2. Where in contact with earth or concrete, install protective coating consisting of spirally wrapped 20 mil PVC tape with 1/2-inch minimum overlap – 3M Scotchrap Tape 51 or approved - or utilize PVC Coated Rigid Metal Conduit. Completely wrap and tape field joints.

B. Intermediate Metal Conduit:

1. May be used in lieu of rigid metal conduit unless otherwise prohibited by code or indicated on the Contract Drawings.
2. Not acceptable for circuits over 600 Volts.

C. Electrical Metallic Tubing:

1. Acceptable for dry interior locations where not exposed to moisture or physical damage.
2. Not acceptable for circuits over 600 Volts.

D. Flexible Steel Conduit:

1. For connections to recessed light fixtures and devices installed in suspended ceilings, maximum six-foot length.
2. For connections to motors, transformers and other equipment subject to vibration. Minimum of three foot and maximum of six-foot length with 90 degree loop.

E. Surface Metal and Multi-Outlet Raceway: Install where indicated on the Contract Drawings.

F. Auxiliary Gutters and Wireways: Install where indicated on the Contract Drawings and as required in unfinished spaces. Elsewhere as approved by the A/E.

END OF SECTION 260533

SECTION 260534
OUTLET BOXES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Description: Work includes outlet, junction, and pull boxes and associated appurtenances required to enclose devices, permit pulling conductors, and for wire splices and branches.

B. General Requirements: Drawings and general provisions of the Contract, including General Conditions and Division 01 apply to Work in this section.

1.02 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. NEMA 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
2. NFPA 70, National Electrical Code (NEC).
3. UL 514A, Metallic Outlet Boxes.

1.03 SUBMITTALS

A. Comply with requirements in Division 01 and Section 260500.

B. Product Data: Submit manufacturer's technical product data for each type of outlet box and appurtenance.

PART 2 - PRODUCTS

2.01 OUTLET BOXES FOR INTERIOR WIRING

A. General: Outlet and pull boxes pressed steel, zinc coated with plaster ring where applicable, minimum 4 inch size.

B. Surface Metal Raceway: Boxes of same manufacturer and to match raceway. Boxes shall accommodate standard devices and device plates.

C. Concrete and Masonry: Boxes for casting in concrete and mounting in masonry walls of type specifically designed for that purpose.

D. Ceiling Outlet Boxes: Galvanized octagonal 4 inch, 1-1/2 inches deep (without fixture stud) and 2-1/8 inch deep (with fixture stud).

E. Sheet Metal Boxes Larger than 12 Inches in any Dimension: Include hinged enclosure.

2.02 OUTLET BOXES CONTAINING MULTIPLE DEVICES

A. Outlet Boxes Containing Emergency and Normal Devices: Permitted only with steel barriers manufactured especially for purpose of dividing outlet box into 2 completely separate compartments.

B. Outlet Boxes Containing Multiple Devices and Wiring Rated over 150 Volts to Ground and Over 300 Volts between Conductors: Permitted only with steel barrier manufactured especially for purpose of dividing outlet box into separate compartments for each device having exposed live parts.

PART 3 - EXECUTION

3.01 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.03 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article “Quality Assurance” provisions, specifications, and manufacturer’s installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

3.04 COORDINATION OF OUTLET BOX LOCATIONS

A. Locate as shown on the Drawings and as required to facilitate pulling. Limit number of bends per NEC.

B. Electrical box locations shown on the Drawings are approximate unless dimensioned. Verify location of floor boxes and outlets before roughing in.

C. Locate outlet boxes to allow access. If inaccessible, furnish, arrange, and pay for installation of access doors.

D. Coordinate Work of this section with the Work of other sections and trades to avoid conflicts. Check and verify door swings and locations of built-in cabinets, plumbing, heating, and ventilating equipment.

E. Install outlet boxes of sizes and at locations necessary to serve equipment furnished under this or other divisions of the specifications. Make final connections thereto. Outlet boxes required if equipment is furnished with pigtail for external connection, does not have space to accommodate branch circuit wiring, or requires wire with insulation rating different from branch circuit wiring. Review equipment Shop Drawings for required outlet locations.

F. Where more than one outlet box is shown on the Drawings, and indicated to be at same elevation or one above the other, align them exactly on center lines horizontally or vertically. Relocate outlet boxes which are not so installed (including lighting, receptacle, power, signal, and temperature control outlets) at no additional cost to the Owner.

G. Locate to maintain headroom and to present a neat appearance.

H. Ceiling Locations: Locate outlet either at corner joint or in center of a panel, whichever is closer to normal spacing. Locate outlet boxes in same room in same panel locations.

3.05 OUTLET BOX INSTALLATION

A. Firmly anchor flush outlet boxes directly or with concealed bracing to studs and joists.

B. Close unused openings.

C. Use multiple-gang outlet boxes where 2 or more devices are mounted together. Do not use sectional boxes.

D. Install blank covers or plates over outlet boxes that do not contain devices.

E. Install pull boxes to be accessible after completion of building construction.

3.06 ELECTRICAL WORK IN COUNTERBACKS, MILLWORK, AND CASEWORK

A. Install as shown on the Drawings. Furnish templates to other trades for drilling and cutting to ensure accurate location of electrical fixtures (outlets and devices) as verified with the A/E. Install wiring, devices, plates, and connections required by said fixtures.

END OF SECTION 260534

SECTION 260553
ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Description: Work includes nameplates, wire and cable markers, conduit color coding, buried duct marking tape, and associated appurtenances.

B. General Requirements: Drawings and general provisions of the Contract, including General Conditions and Division 01 sections apply to Work in this section.

1.02 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards: NFPA 70, National Electrical Code (NEC).

1.03 SUBMITTALS

A. Comply with requirements in Division 01 and Section 260500.

B. Product Data: Nameplate schedule.

PART 2 - PRODUCTS

2.01 IDENTIFICATION MATERIAL

A. Adhesive Printed Labels:

1. Laminated tape – Brother TZe Series 12mm width tape or equivalent.

a. Normal Power: Black letters on clear background.

2. Receptacles: 1/4-inch letters to identify panelboard and circuit number.

B. All outlet boxes, junction boxes and pull boxes for emergency system devices and circuits shall be orange in color, both inside and outside.

C. All outlet boxes, junction boxes and pull boxes for fire alarm system devices and conductors shall be red in color, both inside and outside.

D. Permanent felt marker for junction and pull box circuit notation.

1. Normal: Black letters.

E. Wire and Cable Markers:

1. Split sleeve or tubing type. Vinyl impregnated cloth, vinyl, and mylar self-adhesive types not acceptable.
2. Color code wire in accordance with the coding shown in Decal Detail below. Conductors of power systems in this building (plant) are identified as follows:

Conductor	208Y/120 Volt
A Phase (Left Bus In Panel):	Black
B Phase (Center Bus In Panel):	Red
C Phase (Right Bus In Panel):	Blue
Neutral:	White
Equipment Ground:	Green

3. Where dedicated neutral conductors are provided for single phase circuits, neutral conductor shall have a colored stripe to match the color of the corresponding phase conductor.

F. Phase Identification: Vinyl colored electrical tape.

G. Electrical Hazard Marking Tape: Black and yellow striped vinyl 2-inch wide hazard tape, Identi-Tape #VH2BKY or equal.

H. Printed Labels: Printed labels shall be clear polypropylene with adhesive back designed for exterior applications. Label text shall be 4.8 mm (3/16”) high, black and shall be applied to the label by a thermal transfer printer.

PART 3 - EXECUTION

3.01 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.03 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. Description: Install, apply, erect, and perform work in accordance with Article “Quality Assurance” provisions, specifications, and manufacturer’s installation instructions and directions. Where these may be in conflict, more stringent requirements govern.

B. Wire Identification:

1. Install wire markers on conductors in panelboard gutters, pull boxes, outlet and junction boxes, and at load connection. Identify with branch circuit or feeder number for power and lighting circuits and with control wire number as indicated on schematic and interconnection diagrams or equipment manufacturer's shop drawings for control wiring.
2. Install solid colored jackets for wire sizes smaller than number 8 AWG. Wire sizes larger than number 10 AWG may be taped at both ends and at pull and junction boxes with appropriate colored tape. Color coding tape to completely encircle conductor at least 3 inches wide.

C. Decals: Install decal behind circuit breaker door where it can be easily seen when circuits are added.

D. Felt Marker Identification: Apply on front of cover in non-finished areas, such as mechanical/electrical rooms, above ceilings, and similar locations, and on back of cover in finished areas.

E. Provide black and yellow striped vinyl 2” wide hazard tape on floor and stencil “Electrical Hazard-Keep Clear” on floor, spaced as to not exceed 4 feet on center to identify code required clearance in front of electrical equipment including switchboards, panelboards, motor control centers, transformers, transfer switches, etc. in unfinished spaces such as electrical and mechanical rooms.

3.04 INSTALLATION

A. General:

1. Provide identification for electrical equipment as specified herein.
2. Attach identification in durable manner, suitable to each respective type of identification. Nameplates shall be securely fastened to equipment with two (2) rivets. Wiring color code schedules shall be fastened to equipment with permanent adhesive.

B. Relays and Time Switches:

1. Provide a nameplate on the outside front of each relay and time switch enclosure. Nameplate text shall include the name of the load controlled as designated on the Drawings.

C. Wiring Devices:

1. Receptacle Labels: Indicate panelboard and circuit number.
2. Provide an engraved printed label for each switch that controls luminaires not within sight of the switch or that controls receptacles. Engraved printed label text shall include the type and location of the load controlled.

D. Junction Boxes and Pull Boxes:

1. Provide nameplates on the outside of the front cover of junction boxes and pull boxes in finished areas and of junction boxes and pull boxes that are larger than 150 mm by 150 mm (6″ by 6″). Nameplate text shall designate the system for which wiring is to be enclosed in the box. In the case of power system junction boxes or pull boxes, the nameplate text shall also include the panelboard name and circuit number. Nameplates for emergency power junction boxes or pull boxes shall be orange in color.
2. Junction boxes and pull boxes 150 mm by 150 mm (6″ by 6″) or smaller in unfinished areas and above accessible ceilings shall be color coded by spray painting the outside edges of the box and spray painting the cover with the following colors:

208Y/120 VAC Power:	Unpainted
Security and Video Surveillance:	Light Blue
Telecommunications:	White
Intercom/Paging & Clock:	Green
Television:	Black
Audio-video:	Gold

3. After painting, mark the covers of power system junction boxes and pull boxes with the panelboard name and circuit numbers. Marking shall be done with a wide-tip, permanent-ink black marker.

E. Raceway systems:

1. Raceway systems for emergency power where outlet boxes or enclosures are not encountered, provide adhesive label at intervals not exceeding 25ft. Brady #44328 or approved.

END OF SECTION 260553

SECTION 260810
ELECTRICAL TESTING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Description: Work includes testing requirements for individual components, equipment, systems, and integration to ensure intended facility operation. Test equipment per manufacturer guidelines and industry standards. Test modes of operation and interlocks and alarm functions. This section presents a guideline of system testing. Provide complete, comprehensive testing in addition to minimum requirements specified in individual sections and in this section.

B. Training: Include comprehensive Owner operation and maintenance training of individual components, equipment, and systems. Training includes normal operation and alternate modes of operations.

C. General Requirements: Drawings and general provisions of the Contract, including General Conditions and Division 01 sections apply to Work in this section.

1.02 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. ANSI/NETA ATS 2017, Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems
2. ANSI/NETA MTS-2015, Standard for Maintenance Testing Specifications for Electrical Power Equipment and Systems
3. NFPA 70B, Recommended Practice for Electrical Equipment Maintenance
4. NFPA 70, National Electrical Code (NEC)

C. Testing Agency: Testing shall be accomplished by an approved testing agency. Retain services of a NETA certified firm or approved. Testing agency shall not be associated with manufacturer of equipment or systems under test.

D. Perform testing and inspections with the assistance of a factory-authorized service representative, where indicated in individual specification sections.

1.03 SUBMITTALS

A. Comply with requirements in Division 01 and Section 260500.

B. Qualifications: Testing agency qualifications.

C. Testing Plan and Schedule: Detailed plan and schedule of testing, and training for acceptance by the Owner and the A/E prior to initiation of work.

D. Test Procedures: Test procedures and sample test forms.

E. Test Reports: Submit detailed report of testing functions with associated results. Include date of testing and corresponding line item for system tested and individual components. Include testing checklists for each system and device tested. Record for each line item test results that comply with requirements. Record for each line item test results that do not comply with requirements, corrective actions taken to achieve compliance with requirements and retest date and confirmation.

F. Include copy of reports in the Operation and Maintenance Manual.

G. Certification: Certification that tests have been completed.

PART 2 - PRODUCTS

(Not used).

PART 3 - EXECUTION

3.01 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.03 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article “Quality Assurance” provisions, specifications, and manufacturer’s installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

3.04 GENERAL

A. Perform acceptance tests in accordance with manufacturer’s recommendations, NFPA 70 and ANSI/NETA ATS.

B. Report any system, material, or workmanship which is found defective on basis of electrical inspections and tests to the A/E.

C. If test reveals a fault or problem, remove and replace malfunctioning units. Repeat entire test until problem is corrected. Submit additional written test reports.

D. Maintain written record of tests. Upon completion of project, assemble and certify final test report and include in the Operation and Maintenance Manual. Compile field test reports signed by individuals performing the tests.

3.05 GENERAL COMPONENT AND EQUIPMENT TESTING REQUIREMENTS

A. Receptacles: Test for open ground, reversed polarity, open hot, open neutral, hot and ground reversed, and hot on neutral.

3.06 REPORTS

A. Prepare test reports for each system, equipment and device tested. Include copy of each test report in the Operation and Maintenance Manual. Utilize test forms for systems and equipment tested. Use manufacturer's standard or other appropriate test forms commensurate with test performed. Test reports shall include the following.

1. Summary of project.
2. Description of equipment tested.
3. Description of test.
4. Test results including retesting results.
5. Test dates.
6. Tester's name.
7. Witnesses (when required).
8. Corrective work.
9. Acceptance criteria.
10. Conclusions and recommendations.
11. Appendix including appropriate test forms.

END OF SECTION 260810

SECTION 262726
WIRING DEVICES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Description: Work includes wall switches, receptacles, device plates, box covers, and associated appurtenances.

B. General Requirements: Drawings and general provisions of the Contract, including General Conditions and Division 01 sections apply to Work in this section.

1.02 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. Federal Specification W-C-596, Electrical Power Connector, Plug, Receptacle, and Cable Outlet.
2. Federal Specification W-S-896, Switch, Toggle.
3. NEMA WD 1, General Color Requirements for Wiring Devices.
4. NFPA 70, National Electrical Code (NEC).
5. UL 498, Standard for Attachment Plugs and Receptacles.

1.03 SUBMITTALS

A. Comply with requirements in Division 01 and Section 260500.

B. Product Data: Submit manufacturer's technical product data for each type of wiring device and appurtenance.

C. Test Reports:

1. Field test reports.
2. Submit completed copy of reports and include copy in the Operation and Maintenance Manual.

PART 2 - PRODUCTS

2.01 RECEPTACLES

A. Manufacturers: Leviton, Bryant Electric, Crouse Hinds, Hubbell, Pass and Seymour, or approved. Leviton model numbers are listed.

B. Finish

1. White unless otherwise noted.

C. Convenience and Straight-Blade Receptacles: NEMA WD 1. Units specification grade.

D. Tamper Resistant Receptacle Configuration: (20A-125V NEMA 5-20R) straight blade with grounding type with, back and side wired screw type terminals.

1. Duplex Receptacle: Leviton Model 5362-SG.
2. GFCI Receptacles: Duplex convenience receptacle with integral ground fault circuit interrupter. Units feed-through type for downstream device protection. Leviton Model G5362-WT.

E. Specific Receptacle Configuration: NEMA WD 1. Type as indicated on the Drawings, with black plastic face.

2.02 DEVICE PLATES

A. Manufacturers: Bryant Electric, Hubbell, Leviton, Pass and Seymour, or approved. Bryant Electric and Leviton model numbers are listed.

B. Plates in Finished Areas: Type 302 non-magnetic stainless steel except as noted below:

1. Wall plates for dedicated receptacles with 3/16 inch specially engraved black letters “DEDICATED”.
2. Wall plates for receptacles protected by a GFCI circuit breaker or feed through GFCI receptacle with 3/16 inch specially engraved black letters “GFCI PROTECTED”.
3. Wall plates for receptacles other than NEMA 5-20R with 3/16 inch specially engraved black letters which show configuration, example “14-50” for a NEMA 14-50R receptacle.

C. Plates on Surface Mounted Boxes: Sized to fit box without extending over sides of box.

D. Cast Metal Plates: Cast metal box. Steel plates with steel boxes and copper-free aluminum with aluminum boxes. Stainless steel screws.

E. Raised Sheet Steel Plates: 1/2-inch-high zinc or cad-plated covers with surface mounted sheet steel boxes.

F. Weather Resistant Cover Plate:

1. While In-Use Cover: Cast metal with hinged gasketed device covers. Leviton IUM1V-GY unless otherwise noted.
2. Not In-Use Cover: Cast metal with hinged gasketed device covers. Leviton WM1V-GY, only where noted on contract drawings.

G. Finish of Attachment Screws: Match that of its respective device plate.

PART 3 - EXECUTION

3.01 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.03 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article “Quality Assurance” provisions, specifications, and manufacturer’s installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

3.04 WIRING DEVICE INSTALLATION

A. Install wiring devices in clean electrical boxes, free from excess building materials, dirt, and debris.

B. Install jumbo size plates for outlets in masonry walls.

C. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

D. Install devices and wall plates flush and level.

E. Fasten each device to outlet box at wall surface to bring receptacle flush with plate or for switch handle the proper distance through plate.

3.05 ORIENTATION

A. Install switches vertical with handle operating vertically, up position "ON". Install center at 44 inches above finished floor unless noted otherwise on the Drawings.

B. Install receptacles vertical with ground slot up.

1. Install receptacles centered at 18 inches above finished floor unless otherwise noted on contract documents.
2. Where receptacles are noted above counter “AC” on contract documents, install receptacles vertical with ground slot up centered at 4 inches above top of backsplash.
3. Install exterior receptacles centered at 18 inches above finished grade.

3.06 RECEPTACLE GROUNDING

A. Install bare bonding wire between receptacle grounding terminal and box. Plaster ear screws connecting frame to box not acceptable for grounding.

3.07 HANDICAPPED ACCESS

A. Comply with requirements of Washington State Handicapped Access Code.

3.08 FIELD QUALITY CONTROL

A. Comply with requirements in Section 260810. Include copy of field test reports in the Operation and Maintenance Manual.

B. Prior to energizing circuitry, test wiring devices for electrical continuity and polarity connections. After energizing circuitry, test wiring devices to demonstrate compliance with requirements.

END OF SECTION 262726

DIVISION 27
TABLE OF CONTENTS

SECTION 271100
TELECOMMUNICATIONS SYSTEM

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Description: Work includes the following:

1. Structured Cabling System supporting various low-voltage systems
2. Telecommunications Rooms and Spaces
3. Manufacturer Certification

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and 260500 sections apply to Work in this section.

1.02 RELATED SECTIONS

A. Related Sections

1. 260500 – General Electrical Provisions
2. 260510 – Basic Electrical Materials and Methods
3. 260533 – Raceway Systems
4. 260534 – Outlet Boxes

1.03 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. Installation Standards: Comply with following standards for cable and equipment installations. Publications shall be latest issue and addenda:

a. NEC, National Electric Code.
b. NESC, National Electric Safety Code.
c. TIA-568.0-D, Generic Telecommunications Cabling for Customer Premises.
d. TIA-568-C.1, Commercial Building Telecommunications Cabling Standard Part 1: General Requirements.
e. TIA-568-C.2, Balanced Twisted-Pair Telecommunications Cabling and Components Standards.
f. TIA-569-D, Commercial Building Standard for Telecommunications Pathways and Spaces.
g. TIA-606-B, Administration Standard for the Telecommunications Infrastructure of Commercial Building.
h. TIA-862-B, Structured Cabling Infrastructure for Intelligent Building Systems.
i. IEEE 802.3-2000. Ethernet Standard.
j. BICSI 001, Information Transport Systems Design Standard for K-12 Educational Institutions.

k. BICSI Information Transport Systems Installation Methods Manual.
l. BICSI Telecommunications Distribution Methods Manual.

2. Contractor shall have read the above documents and shall be familiar with the requirements that pertain to this installation. The documents may be obtained from:

a. Global Engineering Documents, 15 Inverness Way East, Englewood, CO, 80112-5776, 800-854-7179, http://global.ihs.com/
b. BICSI, 8610 Hidden River Parkway, Tampa, FL, 33637, 800-242-7405, www.bicsi.org

3. Materials:

a. UL listed and labeled. Install label to be visible.
b. Equipment: Regularly catalogued items of manufacturer and supplied as complete unit in accordance with manufacturer's standard specifications with optional items required for proper installation unless otherwise noted in this section.
c. Telecommunications connectivity and cabling independently tested to meet current TIA standards.

C. Qualifications:

1. Contractor performing work specified in this section is required to have special skills obtained by education, experience, or both.
2. Contractors bidding work specified herein shall have a minimum of seven years of experience in the construction, testing, and servicing of systems of the type and magnitude specified in this section.
3. Contractor shall be a certified installer of the telecommunications system and pre-qualified by the manufacturer for the purpose of offering the Applications Assurance warranty at the time of bid.
4. Contractor shall have direct access to the tools and test equipment required to complete the Work at the time of bid.
5.

1.04 SUBMITTALS

A. Comply with requirements in Division 01 and Section 260500.

1. Submit complete at one time. Partial product submittals are not acceptable and will be returned unreviewed.

B. Pre-Construction Submittal:

1. Labeling

a. Include sample labeling for each of the following telecommunications infrastructure components:

1) Workstation device faceplate identification labeling. Include label per telecommunications room.

2. Product Data

   a. Submit with data arranged under basic categories, such as, certifications, personnel training, manufacturer warranty, products, test equipment and calibration, and similar items. Include index with the submittals.
   b. Organize by specification infrastructure component sections described in Part 1 and Part 2 of this section.
   c. Submit Product Data information sheets for coordination with item and model number.
   d. Where more than one product is indicated on a page, mark product with arrow or by other means to identify exact product or products being submitted by specific part number.
   e. Submit network test equipment proof of calibration by manufacturer.
   f. Submit resumes and certifications of technicians and project manager who will support this project. Certifications shall include:

      1) Manufacturer's certification to provide warranty

C. Test Reports:

1. Prepare test reports and submit to the Owner's Representative an electronic copy of the detailed test results, including overall test summary report.
2. Include a copy of the detailed test reports on flash drive in each Operation and Maintenance Manual.
3. Include a hard copy of the summary test sheets in each Operation and Maintenance Manual.
4. Submit electronic copies in PDF and LinkWare software formats, including LinkWare reader software.

D. Record Drawings:

1. Keep complete set of telecommunications drawings in job-site office updated within 3 days to show actual installation of cabling and equipment during construction.
2. Use of this set of drawings for recording as-built conditions.
3. Indicate where material, equipment, and system component are installed differently from that indicated on the Contract Drawings, clearly and neatly using ink or indelible pencil in color red during construction.
4. Prepare electronic set of Record Drawings, incorporating changes during construction. Submit Record Drawings to the Owner's Representative for review and acceptance.
5. Submit Record Drawings using latest version of AutoCAD software or as approved by the Owner, and in PDF format. Request (from architect) final architectural background drawing files that incorporate floor plan and program spaces numbering modifications.
6. AutoCAD drawings shall be e-transmitted to include backgrounds, title blocks and other associated files.
7. Submit electronic copy of Record Drawings in full-size PDF and AutoCAD format, on flash drive.

E. Project Closeout:

1. Submit closeout documentation to the Owner's Representative and Architect under provisions of Division 01, Section 260500 and this section.

2. Provide project closeout documentation including but not limited to; test result documentation, Record Drawings, manufacturer warranty certificates and Operation and Maintenance manuals.

1.05 DEFINITIONS

Accessible ceiling: An area above acoustical ceiling tiles/grid (or lay-in type ceilings) with a readily accessible space. Gypboard ceilings with access hatches and open to structure spaces shall not be considered accessible ceilings

Administration: Methodology defining the documentation requirements of a cabling system and its containment, the labeling of functional elements, and the process by which moves, additions, and changes are recorded

Bonding: Permanent joining of metallic parts to form an electrically conductive path that will ensure electrical continuity and the capacity to conduct safely any current likely to be imposed

Cable: An assembly of one or more insulated conductors or optical fibers within an enveloping sheath

Cable run: Length of installed media, which may include other components along its path

Cabling: System of cables, cords, and connecting hardware

Channel: End-to-end transmission path between 2 points at which application-specific equipment is connected including test cords and patch cords for a maximum total distance of 328 feet (100 meters)

Connecting hardware: Device, or combination of devices, used to connect cables or cable elements

Consolidation point: Location for interconnection between horizontal cables extending from building pathways and horizontal cables extending into furniture pathways

Cross-connection: Connection scheme between cabling runs, subsystems, and equipment using patch cords or jumpers that attach to connecting hardware on each end

Demarcation point: Point where operational control or ownership changes

Equipment room: Environmentally controlled centralized space for telecommunications equipment that usually houses a main or intermediate cross-connect

Ground: Conducting connection, whether intentional or accidental, between an electrical circuit or equipment and the earth, or to some conducting body that serves in place of earth

Horizontal cabling: Distribution media that connects the telecommunications outlet/connector at the work area and the first piece of connecting hardware in the horizontal cross-connect

Horizontal cross-connect: Group of connectors that allows equipment and backbone cabling to be cross-connected with patch cords or jumpers

Infrastructure (telecommunications): Collection of those telecommunications components, excluding equipment, that together provides basic support for the distribution of information within a building or campus

Local area network (LAN): Standard industry term for a network installation that serves a relatively small area (for example, structured cabling installation serving a building)

Main cross-connect: Cross-connect normally located in the (main) equipment room for cross-connection and interconnection of entrance cables, first-level backbone cables, and equipment cables

Metropolitan area network (MAN): Data communications network that covers an area larger than a campus area and smaller than a wide area network

Modular jack: Female telecommunications connector that may be keyed or unkeyed and may have 6 or 8 contact positions

Outlet/connector (telecommunications): Connecting device in the work area on which a horizontal cable or outlet cable terminates

Patch cord: Length of cable with connectors on both ends used to join telecommunications circuits/links at the cross-connect

Patch panel: Connecting hardware system that facilitates cable terminations and cabling administration using patch cords

Pathway: Sequence of connections that provides connectivity between devices on a network or between networks on an internetwork; the vertical and horizontal route of the telecommunications cable; a facility for the placement of telecommunications cabling

Permanent link: Test configuration for link excluding test cords and patch cords for maximum total distance of 295 feet (90 meters)

Plenum: Compartment or chamber to which one or more air ducts are connected and that forms part of the air distribution system

Telecommunications Room: Enclosed architectural space for housing telecommunications equipment, cable terminations, and cross-connect cabling

Storage Area Network (SAN): Specialized high-speed network dedicated to the transport of data between storage devices and servers

Star topology: Network topology in which services are distributed from or through a central point

Telecommunications: Transmission, emission, and reception of signs, signals, writings, images, and sounds, that is information of any nature by cable, radio, optical, or other electromagnetic systems

Unshielded twisted pair (UTP): Cable made up of one or more pairs of twisted copper conductors with no metallic shielding; the entire assembly is covered with an insulating sheath (cable jacket)

Wireless access point: Stand-alone hardware device or computer wireless adapter with software that acts as a wireless communication hub for users of wireless devices to connect with each other and to bridge those devices to the cabled portion of the network

Wide area network (WAN): Data communications system that uses telecommunications circuits to link LANs that are distributed over large geographic distances

Wireless local area network (WLAN): Data communications system that uses using radio frequency technology, such networks transmit and receive data over the air, minimizing the need for wired connections; they combine data connectivity with user mobility

Work area (workstation): Building space where occupants interact with telecommunications terminal equipment

Work area cable (cord): Cable connecting the telecommunications outlet/connector to the terminal equipment
A.

1.06 MANUFACTURER CERTIFICATION

A. Structured cabling system shall be covered by an Extended Product and Application Assurance Warranty.

1. Approved manufacturer partner is Ortronics/ Berk-Tek solution.
2. Warranty shall cover passive telecommunications infrastructure copper and optical fiber connectivity and cabling products and performance for a minimum of 25 years from date of installation registration, and will support existing or future applications.

3. Installation practices shall follow the installation guidelines and procedures specified in the manufacturer certified installer training course and current TIA standards.
4. Submit closeout documentation in accordance with the manufacturer warranty requirements to comply for acceptance of warranty.

B. Provide the original hard copy certificate for the Application Assurance Warranty to the Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Substitutions: The substitution of products shall adhere to the requirements defined in this section.

1. Submit requests for substitutions a minimum of 10 days prior to Bid date. Request submitted less than 10 days prior to, shall not be accepted.
2. The basis of design for manufacturer partners is Berk-Tek cabling, and Leviton connectivity as specified herein.
3. Copper connectivity shall be Category 6:

a. Pre-approved acceptable alternate manufacturer partners are:

1) Berk-Tek Cabling with Ortronics Connectivity.

a) Copper: LANmark-1000 cabling with TracJack modular jacks and Clarity (6-port module) patch panels.

2) Superior Essex Cabling with Ortronics Connectivity.

a) Copper: Category 6 NextGain cabling with Ortronics as specified.

2.02 COPPER HORIZONTAL CABLING

A. Category 6 UTP cabling for interior spaces:
1. Horizontal cables shall be constructed from 23 AWG insulated solid bare copper conductors formed into four individually twisted pairs with a crossfiller center spline.
2. Conductors shall have an impedance of 100Ω ±10% / 100m.
3. Cables shall meet the most current technical characteristics of TIA-568-C standard.

a. Wire map
b. Length
c. Insertion loss (Attenuation) 32.6dB/100m @ 250MHz
d. Near-end crosstalk (NEXT) loss 43.3dB/100m @ 250MHz
e. Attenuation to crosstalk ratio far-end (ACRF) 24.8dB/100m @ 250 MHz
f. Power sum Attenuation to crosstalk ration far-end (PSACRF) 21.8dB/100m @ 250MHz
g. Power sum-near-end crosstalk (PS-NEXT) 41.3dB/100m @ 250MHz
h. Return loss (RL) 20.5dB/100m @ 250MHz
i. Propagation delay (PD) (CMP) 72% nom, (CMR) 68% nom
j. Delay skew (DS) 45ns/100m max
k. Balance (LCL/TCL) 27.0dB/100m @ 200MHz

l. Balance (EL-TCTL) 9.0dB/100m @ 200MHz

4. Cables shall be NFPA 262 CMP (plenum) rated as specified herein, unless otherwise noted. Cable diameter shall not exceed 0.23 inches.

a. Manufacturer Berk-Tek LANmark-1000 series:

1) Yellow plenum rated, Part No. 10032090

2.03 TELECOMMUNICATIONS WORKSTATION DEVICES

A. Category 6 Modules:

1. 8-Position 8-Conductor modules shall be Category 6, dual reactance technology, non-keyed, universal T568A/B pin configuration standard and used to terminate Category 6 UTP cables as specified herein. Module shall be high impact plastic housing, flame retardant UL 94V-O, modular contacts shall be beryllium copper, nickel plating under 50 micro-inches gold plating in contact area. IDC contacts shall be phosphor bronze, nickel under plating with tin lead over plate serving 22 through 24 AWG.

a. Manufacturer Ortronics:

1) Category 6 module:

a) Cloud white, Part No. OR-TJ600-88

2) Blank module in package of 10:

a) Cloud white, Part No. OR-42100002-88

B. Faceplates:

1. Faceplate shall be stainless steel manufactured to hold 8P8C modules with recessed designation strips with clear plastic covers in accordance with the TIA-606-B labeling standard.

a. Manufacturer Ortronics:

1) 2-port stainless steel, Part No. OR-403STJ12

2.04 TELECOMMUNICATIONS ROOM CONNECTIVITY

A. Patch Panels:

1. Category 6 Modular Patch Panels

a. Category 6, 8-Position 8-Conductor module, non-keyed, dual reactance technology, 110 type printed circuit board style patch panels, universal T568A/B pin configuration standard and used to terminate UTP cables as specified herein. Patch panels shall be high density, 6-port modules, panel thickness at .125" aluminum with black powder coat finish; module shall be high impact plastic housing, flame retardant UL 94V-O, and fully encased protected printed circuitry. Modular contacts shall be beryllium copper, nickel under plating, 50 micro-inches of gold in contact area with IDC contacts phosphor bronze, nickel under plating with tin lead over plate, serving 22 through 24 AWG.

1) Manufacturer Ortronics:

a) 24 port patch panel, Part No. PHD66U24

b) 48 port patch panel, Part No. PHD66U48

2.05 OPEN CABLING SUPPORTS

A. Accessories and mounting hardware shall be provided for securing supports to structure for a complete and working installation of open cabling supports. Supports shall comply with TIA requirements for structured cabling systems and pathway supports. Follow manufacturer’s recommendations for quantity of cables supported.

B. Hook & Loop Fasteners:

1. Hook and loop fastener rolls shall be 0.5-inch in width. Shear strength for plenum hook and loop fasteners shall be 29 PSI. Hook and loop fasteners installed in plenum air spaces shall be UL Listed (plenum) and be in the color maroon.

a. Manufacturer Leviton, plenum, Part No. 43115-75P or equal

C. Circular Cable Retainer:

1. Cable retainers shall be of plastic material with rounded edges, plenum rated, utilizing an easy-lock closure and an attachment base. Cable retainers shall be screwed into structure and only be utilized in spaces that are extremely tight and J-hooks do not have sufficient space to be mounted.

a. Manufacturer Erico Caddy, Part No. CAT CR50

D. J-Hooks:

1. J-hooks shall have a Galvanized finish with rounded edges for smoother cable pull and greater corrosion resistance.

a. Manufacturer Erico Caddy:

1) 1" Dia., Part No. CAT16HP
2) 1-5/16" Dia., Part No. CAT21HP
3) 2" Dia., Part No. CAT32HP

2.06 FIRE-RATED PATHWAYS

A. Firestopping putty shall be a one-part, two-stage intumescent, non-hardening compound. The putty, when exposed to high heat or flame shall be capable of expanding a minimum of five times. Range of continuing expansion shall be from 230°F to >1,000°F (110°C to >538°C). The putty shall be soft and pliable with aggressive adhesion and shall not contain any water-soluble intumescent ingredients. The putty shall be UL Classified and/or FM Systems Approved and tested to the requirements of ASTM E814 (UL1479).

1. Manufacturer Specified Technologies, Inc. SpecSeal:

a. 24" putty bar, Part No. SSP28

PART 3 - EXECUTION

3.01 GENERAL

A. Include labor, materials, tools, equipment, and services for installation as indicated on the Contract Documents.

B. Coordinate Work with other trades for complete and operational system.

C. Include supplementary and miscellaneous items, appurtenances, and devices incidental to and necessary for sound, secure, and complete installation, whether or not specifically indicated in the Contract Documents.

D. Provide suitable barriers and take any other safety precautions required by applicable codes.

E. Work area shall be kept free from debris of all types and remove all rubbish resulting from their work on the premises. Upon completion, vacuum and clean room floors, equipment racks, enclosures and cable management where work has been performed.

F. Contractor shall be responsible for any building repairs made necessary by their work or caused by negligence of their employees. No cutting, notching, drilling or altering of any kind shall be done to the building without first obtaining permission from the Owner.

G. Provide patch panels on the telecommunications drawings whether they are fully populated with cables.

H. Provide cables, devices and equipment racking systems as indicated on the Contract Drawings.

3.02 TELECOMMUNICATIONS ROOM EQUIPMENT INSTALLATION

A. Provide equipment including the following, but not limited to the following, and shall be installed according to the Contract Drawings:

1. Cross-connect patch panels, whether they are populated or not
2. Telecommunications workstation devices

3.03 OPEN CABLING SUPPORT INSTALLATION

A. Cabling shall be run exposed as "open cabling" in accessible ceiling spaces and accessible ceiling plenums, unless otherwise noted. Where ceiling spaces are inaccessible or open to structure cabling shall be routed in conduit.

B. Provide all hanger supports and cable supports for cabling specified in this section. All support structures shall adhere to the requirements in the National Electrical Code.

C. Cabling supports shall be spaced no further than 4’-0" apart.

D. Cabling bundles shall not sag a maximum of two inches from the bottom of the cable support.

E. Provide all additional cable management products as required to protect exposed cabling and complete the installation of cabling in a neat professional manner.

F. Floor penetrations shall be at columns, exterior walls unless otherwise specified.

G. Cabling supports shall be installed on their own support system. The use of ceiling grid supports shall be prohibited.

H. Do not support cables from ductwork, sprinkler piping, water piping, waste piping, conduit or other system supports. Cabling shall never come in physical contact with these mechanical, fire protection and electrical systems and raceways.

I. Cabling bundles and supports changing pathway direction shall maintain proper bend radius as to not impact the physical jacket construction of the cabling. Cabling that becomes damaged during this transition shall be replaced in its entirety.

J. Follow manufacturer’s recommendations for quantity of cables supported in J-hooks and adjustable cable supports.

K. Installers shall observe the applicable requirements and recommended good practices contained within TIA-568-C standard for cabling installation requirements.

3.04 CABLING INSTALLATION

A. Telecommunications devices shall be connected to the horizontal cross-connect in a telecommunications room with horizontal cabling installed in star topology.

B. Horizontal cabling shall be installed in continuous runs from the telecommunications rooms to telecommunications device locations. Splices are not permitted.

C. Maximum length of horizontal cables shall be 295 feet (90 m) including all service loops.

D. Cabling shall be installed in accordance with manufacturer's recommendations, including but not limited to maximum tensile loading and maximum bend radius.

E. Cabling shall be organized and identified to facilitate locating and handling individual sheaths for maintenance functions.

F. Bundles shall be neatly secured without cinching or stressing the cabling, using hook and loop fasteners in open cabling installations and in the telecommunications room. Hook and loop fasteners shall be loose enough so that the fastener can be easily rotated around the cabling bundle and does not impact the physical construction of the cabling.

G. Provide machine typed label on both ends of the horizontal cabling jacket no more than 4-inches from each termination point.

H. Great care shall be taken to protect all cabling from physical damage beneath floors, above ceilings or elsewhere. Cabling shall not be exposed to any forces or handling factors that will degrade performance, such as crushing, pull stressing, twisting, or damaging sheathing materials. When left unattended, all cabling shall be secured and protected to avoid damage.

I. Hook and loops fasteners shall be utilized in the telecommunications room for all cabling bundles. Tie wraps are prohibited in the telecommunications rooms and spaces.

J. Route cabling runs from workstations parallel to building grid lines and directly to open cabling pathways without passing over adjacent office spaces or cubicles.

K. Provide 5 feet of slack in neatly suspended loops above each workstation and 10 feet of slack neatly coiled in the ladder rack or cable tray in the telecommunications room unless indicated otherwise on Contract Drawings. Service loops in the telecommunications room shall not be located above the equipment racks and server enclosures.

L. Cables shall contact only dedicated and properly protected cable accesses and support mechanisms.

M. Telecommunications unshielded twisted pair cabling supported utilizing open cabling methods shall maintain a minimum separation of three inches from fire alarm, intercom/paging, clocks, and security cabling. Cabling supports shall maintain increased separation requirements when attaching to the same hanger rod to ensure cabling sag maintains the minimum three-inch separation.

N. Maintain the following distances between cabling and other building systems:

1. One foot from fluorescent lights.
2. Six feet from motors and transformers.
3. Three feet from water piping or other mechanical equipment.
4. One foot from electrical conduits or other electrical equipment.

3.05 CONNECTIVITY AND CABLING INSTALLATION

A. Cabling shall be dressed and terminated in accordance with the cabling installation requirements identified in TIA-568-C, BICSI Telecommunication Cabling Installation Manual, and the manufacturer's documentation.

B. Cabling shall be neatly bundled and dressed to their respective panels or blocks. Each panel or block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the equipment rack.

C. Cables shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support straps. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.

D. Installation of 8-position 8-conductor modular jacks into faceplates and attaching of the faceplates to the wall shall ensure that the faceplates are flush. The faceplate shall be secured to the wall but shall not be secured to the wall with such force as to bow the faceplate.

3.06 WORK AREA

A. 4-pair UTP horizontal cabling shall be terminated on an 8-position 8-conductor modular jack or plug at each telecommunications device as indicated on the applicable Contract Drawings.

B. Telecommunications devices shall be provided with 8-position 8-conductor modular jacks or plugs in the quantity as indicated on the applicable Contract Drawings.

3.07 CABLING TERMINATIONS

A. Provide all necessary installation materials, tools and equipment to perform insulation displacement type terminations at all the telecommunications outlets, patch panels and 110 cross-connect blocks.

B. Pairs in each cable shall be terminated on a 110 block, modular patch panel or telecommunications modules in accordance with this specification.

C. Cabling shall be terminated in accordance with the T568B pin configuration standard.

D. Remove only as much of the cable sheath as is necessary to terminate the cabling on the connecting hardware.

E. A maximum of 0.25" of cable pair twists shall be removed from a 4-pair UTP cable. Cabling and terminations exceed these dimensions shall be re-terminated.

F. At the horizontal station patch panel, the cabling shall terminate from the center of the 110 IDC termination.

G. Terminate cabling in accordance with connecting hardware manufacturer's recommendations. All cabling shall terminate in numerical sequence.

3.08 FIRESTOPPING

A. Firestop systems shall be installed in accordance with the NEC and the manufacturer's recommendations and shall be accomplished in a manner acceptable to the local fire and building authorities having jurisdiction over this work.

B. Cabling running through rated and non-rated floors and walls shall be firestopped in accordance with the requirements within this Section.

C. Penetrations through fire-rated and non-fire-rated building structures (walls and floors) shall be sealed with an appropriate firestop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure).

D. Penetrations created by or for the contractor and left unused shall also be sealed as part of the contractor's scope of work.

E. Firestop putty or pillows shall be used inside conduits and cable trays to provide a re-enterable system allowing telecommunications cables to be easily removed or added in the future. Firestop putty shall not be water soluble.

F. Firestop systems shall be UL Classified to ASTM E814 (UL 1479).

3.09 LABELING

A. General:

1. Labeling shall be in accordance with TIA-606-B, Administration Standard for Commercial Telecommunications Infrastructure.

B. General:

1. Labeling shall be in accordance with TIA-606-B, Administration Standard for Commercial Telecommunications Infrastructure.
2. Labels shall be permanent typewritten labels produced by a labeling machine.
3. Labels shall be installed on all cabling at each end. Ensure labels are securely fastened.
4. Labels shall be located within 6 inches of cable termination and placed so they can be easily read.
5. Font type for each type of label shall be Arial with maximum size font allowed.
6. Labeling information will be reviewed at the Pre-Construction Meeting.
7. Labeling shall be completed prior to the substantial completion date of the project.

C. Telecommunications Device Labeling:

1. Label shall be produced to fit into the recess provided and covered with a clear plastic cover.

a. TR-2-03-04 where:

1) TR = Telecommunications Room (MC, HC or as indicated on the Contract Drawings)
2) –2 = Equipment rack number

3) –03 = Patch panel number
4) –04 = Port number

D. Patch Panel Labeling:

1. Station Patch Panel:

a. 48-port modular patch panels shall be labeled with sequential numbering starting with “01” for the topmost patch panel and moving downward to the bottom of the rack. Patch panel labels shall be affixed to the left-hand side of the patch panel.

3.10 TESTING

A. Test procedures shall be as prescribed by the TIA, Insulated Cable Engineers Association and the National Electrical Testing Association.

B. Test Equipment:

1. Network testing equipment shall be a Fluke Networks DSX-5000 Cable Analyzer or equal and shall have a certified calibration from the manufacturer within the past 12 months at the time of testing. Proof of calibration shall be provided with the product submittal. Test equipment shall be utilized to test horizontal and backbone cabling.
2. Field tester and adapters shall be certified by an independent laboratory as meeting or exceeding current level as defined in TIA-1152 Level IIIe.
3. 8P8C test plug for the network testing equipment adapters shall be in range of values defined in Annex C with TIA-568-C for Near-end Crosstalk, Far-end Crosstalk and Return Loss.
4. Test equipment shall support the complete suite of Resistance Unbalanced standards for PoE per IEEE 802.3af, IEEE 802.3at and TIA-568-C.2.
5. Test equipment shall be able to test up to a 1000 MHz frequency range.
6. Test equipment shall be ISO 9001 certified.
7. An electronic copy of the manufacturer’s testing procedures shall be kept in the job site office.
8. Test equipment batteries shall be charged daily and a level of greater than twenty-five percent of capacity shall be maintained during the testing.
9. Test equipment shall be calibrated daily before the start of testing.

C. Horizontal Cabling:

1. Horizontal cabling shall be certified to meet or exceed the permanent link performance specifications for Category 6 horizontal cabling tested with a frequency range from 1MHz to 250 MHZ as defined in TIA-568-C.
2. Certifications shall include the following parameters for each pair of each cable installed:

a. Building identification
b. Cable identification
c. Date of test
d. Test equipment manufacturer and model number
e. Wire map

1) Continuity to the remote end.

2) Shorts between any two or more conductors
3) Reversed pairs
4) Split pairs
5) Transposed pairs
6) Any other miswiring

f. Length
g. Near-end crosstalk (NEXT)
h. Attenuation to crosstalk ration far-end (ACRF)
i. Power sum Attenuation to crosstalk ration far-end (PSACRF)
j. Power sum-near-end crosstalk (PS-NEXT)
k. Return loss (RL)
l. Propagation delay (PD)
m. Delay skew (DS)

3. Horizontal cabling shall be tested using a Permanent Link configuration as defined in TIA-568-C.
4. Test reports with an asterisk (*) or fails, shall be documented identifying the reason for the test failure and a corrective action plan developed.
5. After corrective action has been completed, the permanent link shall be retested.
6. It is the Telecommunications Contractor's responsibility to ensure 100 percent of the network horizontal cabling system links pass all tests.
7. Test results shall be organized by building identification and cable identification number. The test results shall contain the date and time of when each test was saved in the memory of the tester. The test results shall be recorded on a flash drive in both PDF and LinkWare software formats.

END OF SECTION 271100

SECTION 274100
CLASSROOM AUDIO VISUAL SYSTEM

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Description:

1. Base Bid: Install Owner furnished LFD, mounts, cabling components and accessories as required to provide a complete operating system as specified herein.
2. Add Alternate No. 1: Enroll large format displays into Newline Display Management software system.

B. General Requirements: Drawings and general provisions of the Contract, including General Supplementary Conditions, Division 01 sections and Section 260500 apply to the Work in this Section.

1.02 RELATED SECTIONS

A. Related Sections

1. 260500 – General Electrical Provisions
2. 260510 – Basic Electrical Materials and Methods
3. 260533 – Raceway Systems
4. 260534 – Outlet Boxes
5. 271100 – Telecommunications System

1.03 QUALITY ASSURANCE

A. The system and its components shall be Underwriters Laboratories, Inc., listed under the appropriate UL testing standard as listed herein for audio visual applications.

B. Codes and Standards:

1. American National Standards Institute (ANSI):

   a. ANSI C63.4 Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

2. Federal Communications Commission (FCC):

   a. Title 47 CFR – Part 15; Class B – Radiated and Conducted Emissions.

3. Underwriters Laboratories, Inc. (UL):

   a. UL 50 – Enclosures for Electrical Equipment.
   b. UL 60950-2 – Information Technology Equipment.

4. National Electric Code (NEC): Latest Version
5. National Electric Safety Code (NESC): Latest Version
6. Department of Justice (DOJ): 2010 ADA Standards for Accessible Design
7. Provide all wiring in accordance with Article 725 of the National Electrical Code and local ordinances, and other sections of these specifications.

C. Qualifications:

1. The contractor shall hold the necessary licenses as issued by the State of Washington for a low voltage electrical contractor. Installation shall be made by a licensed and bonded contractor holding a valid Washington State Electrical Contractor's License as described in Chapter 19.28 of the Electrician and Electrical Installation Revised Code of Washington State.

1.04 SUBMITTALS

A. Provide submittals in accordance with Division 01 and Section 260500.

B. Product Data:

1. Submit with data arranged under basic categories, such as, certifications, personnel training, manufacturer warranty, products, test equipment and calibration, and similar items. Include index with the submittals.
2. Organize by specification infrastructure component sections described in Part 1 and Part 2 of this section.
3. Submit Product Data information sheets for coordination with item and model number.
4. Where more than one product is shown on a page, mark product with arrow or by other means to identify exact product or products being submitted by specific part number.

C. Shop Drawings:

1. Drawings shall provide details of proposed system and the equipment and work to be provided. Drawings shall include point-to-point drawings of systems, wiring diagrams of individual devices and mounting details.
2. Connections to other equipment/ systems not specified herein.
3. LFD identification numbers, i.e., 3-digital school code and room number.
4. Drawings shall include owner furnished equipment mounting heights based on installation heights, where multiple heights exist provide heights for each.

D. Record Drawings:

1. Keep complete set of audio-visual drawings in job-site office to show actual installation of cabling and equipment during construction.
2. Use of this set of drawings for recording as-built conditions.
3. Indicate where material, equipment, and system component are installed differently from that shown on the Drawings.
4. Prepare electronic set of Record Drawings, incorporating changes during construction. Submit Record Drawings to the Owner's Representative for review and acceptance.

5. Submit Record Drawings using latest version of AutoCAD software or as approved by the Owner, and in PDF format. Request final architectural background drawing files that incorporate floor plan and program spaces numbering modifications.

    a. AutoCAD drawings shall be e-transmitted to include backgrounds, title blocks and other associated files.

6. Submit electronic copy of Record Drawings in full-size PDF and AutoCAD format, on flash drive.

E. Project Closeout:

1. Submit closeout documentation to the Owner's Representative and Architect under provisions of Division 01, Section 260500 and this section.
2. Provide all project closeout documentation including but not limited to; test acceptance documentation, Record Drawings, manufacturer warranty and Operation and Maintenance Manuals.

1.05 OWNER FURNISHED CONTRACTOR INSTALLED (OFCI) EQUIPMENT

A. Material Handling and Delivery: Coordinate delivery of OFCI equipment. Receive, off load, transport, store, hoist, unpack, dispose of packing, same as for other project equipment arriving at job site. Requirements of the Contract Documents apply to OFCI equipment.

B. Operation and Maintenance Data: Obtain from the Owner operation and maintenance data for the OFCI equipment and incorporate them into the Operations and Maintenance Manuals.

1.06 SYSTEM REQUIREMENTS

A. Owner to furnish Ethernet network connectivity for all devices requiring network connections.

B. Large Format Display

1. Large format display and mounts will be an interactive and Owner Furnished, Contractor Installed. Large format display installation, testing, and training shall be provided by the Contractor.

PART 2 - EQUIPMENT

2.01 MANUFACTURER

A. Substitutions: The substitution of products shall not be considered under the terms and conditions of this Section.

2.02 LARGE FORMAT DISPLAY AND MOUNT

A. Classroom large format displays shall be Newline 75-inch, Part No. TT-7521Q with wall mount bracket and Wi-Fi module. Large format display, Wi-Fi module and wall mount bracket are Owner Furnished, Contractor Installed.

1. AV interconnect 10-foot cables (HDMI, USB A/B and audio 3.5mm) are included with the display.

B. Custom Cable Harness:

1. Braided expandable sleeving shall be black, polyethylene terephthalate (PET), rated for use up to 257 degrees F and have a nominal I.D. of 1.25 inches.
2. Provide heat shrink wrap at both ends of harness to secure sleeve.

a. Manufacturer Panduit, Part No. SE125P-LR0 (per 50'-0" roll)

2.03 MOBILE AV CARTS

A. Mobile AV carts and accessories shall be Owner Furnished, Contractor Installed.

1. Classrooms at Cascade room 403, Evergreen rooms 115, and 116, Alpac room 201, Washington rooms 109, and 110 shall utilize Boxlight, Part No. ProColor IFPD-MOB.
2. All other mobile carts shall be Newline TrueTouch Mobile Stand Part No. EPR8A50500-SQR.

2.04 IP CONNECTIVITY

A. Category 6 Patch Cords shall be constructed from Category 6 4-pair 24 AWG, stranded patch cable material. Patch cord cable assembly shall be UL® listed and meet FCC Part 65 plug and termination.

1. Manufacturer Leviton:

a. LFD side, 5' green, Part No. 6D460-05G
b. HC (wall rack) side, 3' green, Part No. 6D460-03G
c. MC/HC (floor rack) side, 7' green, Part No. 6D460-07G

PART 3 - EXECUTION

3.01 IP DEVICE MATRIX

A. Contractor shall request the IP Device Matrix from the Owner in writing a minimum of three weeks in advance of starting the installation of IP devices.

B. Complete the owner furnished IP Address matrix, in Microsoft Excel format, indicating the devices; make, model, MAC address, cable port number (or note 'wireless'), room name and room number. Coordinate the specific function identifications and classifications with the Owner and Owner's Representative prior to the start of the installation.

3.02 ASSET TAG TRACKING SHEET AND DEVICE LABELING

A. Complete an asset tag tacking sheet, in Microsoft Excel format, indicating the devices; manufacturer, make, model, serial number, device name, district asset tag number, room name and room number.

1. Auburn School District DoT will furnish asset tags. Asset tags shall be installed on each large flat panel display.

3.03 INSTALLATION

A. Provide all labor, tools, supplies, software, hardware, materials, and equipment required for the design, installation, configuration/ programming and testing of a complete and operational system.

B. System shall be installed in accordance with details on the Contract Documents and manufacturer's installation instructions.

C. Large format displays and mounting brackets shall be securely mounted. Provide necessary anchoring in walls. Wi-Fi module (OFCI) shall be installed into slot on the back side of the LFD.

1. Wi-Fi module doesn’t support hot plugging, disconnect LFD from power prior to installation.

D. Work area shall be kept free from debris of all types and remove all rubbish resulting from their work on the premises. Upon completion, vacuum and clean room floors, equipment racks, enclosures and cable management where work has been performed.

1. Contractor to dispose of all trash/recyclable materials off-site.

E. Large format displays shall be connected to the District network. See IP Device Matrix herein for requirements. Provide one patch cord for the LFD and one patch cord for the MC/HC room. Connect MC/HC side from the station patch cord to the switch port number assigned by ASD DoT.

F. Provide picture of large format displays installation with the following written on it (date of installation, serial number, asset tag, school, room number). Pictures shall be included with closeout document.

1. Image shall be saved in a *.jpg format, file name shall contain school and room number.

3.04 LABELING

A. Provide computer generated wrap around label on both ends of the cabling jacket no more than 4-inches from each termination point.

1. Labels shall identify connection point, i.e., HDMI-1, USB A-B, Audio-1.

3.05 PROGRAMMING & TESTING

A. Programming – Base bid

1. Verify large format displays are updated to the latest firmware version.
2. Verify the latest software is being used to configure devices.

a. Enable Wi-Fi and Ethernet function
b. Enable the Wake on LAN function
c. Setup and document on IP programming matrix the following:

1) Mac address, IP address, gateway, subnet mask and DNS information.

d. Setup date and time settings to use network provided time.

3. Large Format Display

a. Install per the manufacturer requirements. Coordinate and/or confirm mounting heights prior to installation, provide misc. hardware as required.

4. Interactive Pens & Touch controls

a. Interactive pens/touch controls shall be calibrated with the large format display and tested to verify functionality from each USB-B port. Interactive pens/touch controls shall provide mouse like functions on the teacher's computers.

1) Owner to furnish computer for the testing.

5. Audio Visual Devices

a. Connect to each input/output on the flat panel display (being used or not) and verify that audio (mic/line), digital audio, USB (A/C) and video signals are being broadcasted correctly.

6. Prior to requesting the acceptance test, Contractor shall correct any deficiencies discovered as the result of the programming and testing.

B. Programming – Add Alternate No. 1

1. Enroll large format displays into Newline Display Management software system. The District has created school groups in the management system, each LFD shall be added to their respected school.

a. Also referred to as "adding" a display, pairing a display to the web app is required:

1) Installing and running the software application on the display will generate a six-digit PIN, to be used on the web app to pair the display.
2) Sign into ASD's Newline Display Management account by accessing the web app homepage and following on-screen instructions.

2. Large format displays shall be identified in the system as follows:

a. CAS205-12345 where:

1) CAS = 3-Digit School Code

a) ALP = Alpac ES

b) CAS = Cascade MS

c) EVN = Evergreen Heights

d) GRY = Gildo Rey ES

e) WAS = Washington ES

2) 205 = Room number (verify physical classroom number matches floor plans)
3) -12345 = Asset tag number

3. Verify interactive panel's ability to access District wireless network (provided/pushed by Newline Display Management).

3.06 FINAL ACCEPTANCE

A. Contractor shall submit a request for the Acceptance test in writing to the Owner no less than twenty-one days prior to the requested test date. The request for acceptance test shall constitute a certification from the Contractor that all Work is complete and in compliance with the Contract Documents; all systems have been tested; and that all corrections have been made.

B. Acceptance testing shall be completed using the Owner's installed computing/ audio devices that are to be used in that space in order to denote actual conditions.

C. Acceptance test shall be scheduled during a period when the building is unoccupied, and a complete system test can be accomplished. Contractor shall provide the services of no fewer than two (2) technicians to perform the acceptance test. Technicians performing the acceptance test shall have been involved in the installation of this project and shall be thoroughly familiar with all aspects of the Work. Technicians shall be equipped with portable two-way radios that will be used during the test.

D. Contractor shall provide all ladders, tools, test equipment, and other facilities needed to accomplish the Acceptance test.

E. During acceptance test, Contractor shall demonstrate all equipment and system features to the Owner. Contractor shall fully cooperate with the Owner and provide assistance with the inspection and test. Contractor shall remove and reinstall covers, open and restore wiring connections, operate equipment, and perform other reasonable work as requested by the Owner.

F. Any portions of the Work found to be deficient or not in compliance with the Contract Documents will be rejected. Owner will record any such deficiencies observed during the Acceptance test. A copy of said list will be provided to Contractor. Contractor shall promptly correct all deficiencies.

3.07 WARRANTY AND SERVICE

A. Contractor shall provide parts and labor guarantee on all Work. Unless otherwise specified herein, Contractor's guarantee shall be for a period of one (1) year from Date of Acceptance, except where any specific guarantees from a supplier or equipment manufacturer extends for a longer time.

B. Contractor's guarantee shall cover all costs associated with troubleshooting, repair, and replacement of defective Work, including costs of labor, transportation, lodging, materials, and equipment.

3.08 TRAINING

A. Owner shall receive 4 hours of instruction in (4) 1-hour segments covering all aspects of operating the audio-visual system.

END OF SECTION 274100