



STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

STANDARD LOW BID PROJECT Project Budgets Over \$100,000

October 13, 2009

CHILDREN'S – SOUTH ELECTRICAL IMPROVEMENTS OGDEN WEBER ATC OGDEN, UTAH

DFCM Project Number 08051240

Bill Grandy
Thomas and Kolkman Engineering
64 West 1700 South
SLC Utah 84115
801-484-8161

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Technical Specifications:
Drawings:

Current copies of the following documents are hereby made part of these contract documents by reference. These documents are available on the DFCM web site at <http://dfcm.utah.gov/StdDocs/index.html> "Standard Documents" – "Reference Documents I" – "Item 6. Supplemental General Conditions" or are available upon request from DFCM:

DFCM Supplemental General Conditions dated July 1, 2009 *
DFCM Supplemental General Conditions dated July 15, 2008
DFCM General Conditions dated May 25, 2005
DFCM Application and Certification for Payment dated May 25, 2005.

*** NOTE: THE NEW SUPPLEMENTAL GENERAL CONDITIONS EFFECTIVE JULY 1, 2009 ADDRESSING HEALTH INSURANCE AND IMMIGRATION ARE REFERENCED AT THE LINK ABOVE.**

The Agreement and General Conditions dated May 25, 2005 have been updated from versions that were formally adopted and in use prior to this date. The changes made to the General Conditions are identified in a document entitled Revisions to General Conditions that is available on DFCM's web site at <http://dfcm.utah.gov>

NOTICE TO CONTRACTORS

Sealed bids will be received by the Division of Facilities Construction and Management (DFCM) for:

CHILDREN'S – SOUTH ELECTRICAL UPGRADES
OGDEN WEBER ATC – OGDEN, UTAH
DFCM PROJECT NO: 08051240

Bids will be in accordance with the Contract Documents that will be available on **Tuesday, October 13, 2009**, and distributed in electronic format only on CDs from DFCM, 4110 State Office Building, Salt Lake City, Utah and on the DFCM web page at <http://dfcm.utah.gov>. For questions regarding this project, please contact Tim K Parkinson DFCM, at 801-450-2478. No others are to be contacted regarding this bidding process. The construction estimate for this project is \$244,000.00.

A **mandatory** pre-bid meeting will be held at **10:00 AM** on **Wednesday, October 21, 2009** at OWATC Childrens South Building, 200 North Washington Blvd. Ogden Utah. All bidders wishing to bid on this project are required to attend this meeting.

Bids will be received until the hour of **2:00 PM** on **Wednesday, November 4, 2009** at DFCM, 4110 State Office Building, Salt Lake City, Utah 84114. Bids will be opened and read aloud in the DFCM Conference Room, 4110 State Office Building, Salt Lake City, Utah. NOTE: Bids must be received at 4110 State Office Building by the specified time.

A bid bond in the amount of five percent (5%) of the bid amount, made payable to the Division of Facilities Construction and Management on DFCM's bid bond form, shall accompany the bid.

The Division of Facilities Construction and Management reserves the right to reject any or all bids or to waive any formality or technicality in any bid in the interest of DFCM.

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
Joanna Reese, Contract Coordinator
4110 State Office Building, Salt Lake City, Utah 84114

PROJECT DESCRIPTION

The Project is a General Electrical upgrade for the Children's South Building at the Ogden Weber ATC campus. The work consists of alterations to the existing building electrical system to include but not limited to the following.

New electrical equipment, feeders and connections to the existing system.

New light fixtures, switches, occupancy sensors, and receptacles.

New Fire alarm system complete with all equipment in proper working order. Demolition and repair of the existing building, limited to the extent required to install the above mentioned work.

**PROJECT SCHEDULE**

PROJECT NAME: Children's – South Electrical Upgrades Ogden Weber ATC – Ogden, Utah				
DFCM PROJECT NO. 08051240				
Event	Day	Date	Time	Place
Bidding Documents Available	Tuesday	October 13, 2009	10:00 AM	DFCM 4110 State Office Bldg SLC, UT and the DFCM web site *
Mandatory Pre-bid Site Meeting	Wednesday	October 21, 2009	10:00 AM	OWATC Children's South Center 200 North Washington Blvd. Ogden Ut
Last Day to Submit Questions	Monday	October 26, 2009	8:00 AM	<u>Tim k Parkinson</u> – DFCM E-mail tparkins@utah.gov Fax 801-538-3267
Addendum Deadline (exception for bid delays)	Thursday	October 29, 2009	1:00 PM	DFCM web site *
Prime Contractors Turn In Bid and Bid Bond	Wednesday	November 4, 2009	2:00 PM	DFCM 4110 State Office Bldg SLC, UT
Sub-contractor List Due	Thursday	November 5, 2009	2:00 PM	DFCM 4110 State Office Bldg SLC, UT Fax 801-538-3677
Substantial Completion Date	Friday	January 29, 2010	5:00 PM	Onsite

* **NOTE: DFCM's web site address is <http://dfcm.utah.gov>**



BID FORM

NAME OF BIDDER _____ DATE _____

To the Division of Facilities Construction and Management
4110 State Office Building
Salt Lake City, Utah 84114

The undersigned, responsive to the "Notice to Contractors" and in accordance with the "Instructions to Bidders", in compliance with your invitation for bids for the Children's – South Electrical Improvements – Ogden/Weber ATC – Ogden, Utah – DFCM No. 08051240 and having examined the Contract Documents and the site of the proposed Work and being familiar with all of the conditions surrounding the construction of the proposed Project, including the availability of labor, hereby proposes to furnish all labor, materials and supplies as required for the Work in accordance with the Contract Documents as specified and within the time set forth and at the price stated below. This price is to cover all expenses incurred in performing the Work required under the Contract Documents of which this bid is a part:

I/We acknowledge receipt of the following Addenda: _____

For all work shown on the Drawings and described in the Specifications and Contract Documents, I/we agree to perform for the sum of:

_____ DOLLARS (\$_____)

(In case of discrepancy, written amount shall govern)

I/We guarantee that the Work will be Substantially Complete by January 29, 2010, should I/we be the successful bidder, and agree to pay liquidated damages in the amount of **\$250.00** per day for each day after expiration of the Contract Time as stated in Article 3 of the Contractor's Agreement.

This bid shall be good for 45 days after bid opening.

Enclosed is a 5% bid bond, as required, in the sum of _____

The undersigned Contractor's License Number for Utah is _____.

Upon receipt of notice of award of this bid, the undersigned agrees to execute the contract within ten (10) days, unless a shorter time is specified in the Contract Documents, and deliver acceptable Performance and Payment bonds in the prescribed form in the amount of 100% of the Contract Sum for faithful performance of the contract.

The Bid Bond attached, in the amount not less than five percent (5%) of the above bid sum, shall become the property of the Division of Facilities Construction and Management as liquidated damages for delay and additional expense caused thereby in the event that the contract is not executed and/or acceptable 100% Performance and Payment bonds are not delivered within the time set forth.

Type of Organization:

(Corporation, Partnership, Individual, etc.)

Any request and information related to Utah Preference Laws:

Respectfully submitted,

Name of Bidder

ADDRESS:

Authorized Signature

INSTRUCTIONS TO BIDDERS

1. Drawings and Specifications, Other Contract Documents

Drawings and Specifications, as well as other available Contract Documents, may be obtained as stated in the Invitation to Bid.

2. Bids

Before submitting a bid, each contractor shall carefully examine the Contract Documents, shall visit the site of the Work; shall fully inform themselves as to all existing conditions and limitations; and shall include in the bid the cost of all items required by the Contract Documents. If the bidder observes that portions of the Contract Documents are at variance with applicable laws, building codes, rules, regulations or contain obvious erroneous or uncoordinated information, the bidder shall promptly notify the DFCM Representative and the necessary changes shall be accomplished by Addendum.

The bid, bearing original signatures, must be typed or handwritten in ink on the Bid Form provided in the procurement documents and submitted in a sealed envelope at the location specified by the Invitation to Bid prior to the deadline for submission of bids.

A bid bond properly signed by a qualified surety, as indicated on the DFCM Bid Bond form provided along with this Instruction to Bidders, in the amount of 5% of the bid, shall accompany the bid submission to DFCM. **THIS BID BOND MUST BE ON THE DFCM BID BOND FORM PROVIDED WITH THIS INSTRUCTION TO BIDDERS IN ORDER TO BE CONSIDERED AN ACCEPTABLE BID** unless only one bid is received by DFCM, or the failure to comply with the bid bond requirements is determined by the Director of DFCM to be nonsubstantial based on the following:

- (a) the bid bond is submitted on a form other than DFCM's required Bid Bond form and the bid bond meets all other requirements including being issued by a surety firm authorized to do business in the State of Utah and be listed in the U.S. Department of the Treasury Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies for an amount not less than the amount of the bond to be issued. A co-surety may be utilized to satisfy this requirement; and
- (b) the contractor provides a bid bond properly signed by a qualified surety and on the required DFCM Bid Bond form by the close of business of the next succeeding business day after the DFCM notifies the bidder of the defective bid bond.

3. Contract and Bond

The Contractor's Agreement will be in the form found in the specifications. The Contract Time will be as indicated in the bid. The successful bidder, simultaneously with the execution of the Contract Agreement, will be required to furnish a performance bond and a payment bond, both bearing original signatures, upon the forms provided in the procurement documents. The performance and payment bonds shall be for an amount equal to one hundred percent (100%) of the contract sum and secured from a company that meets the requirements specified in the requisite forms. Any bonding requirements for subcontractors will be specified in the Supplementary General Conditions.

4. Listing of Subcontractors

Listing of Subcontractors shall be as summarized in the “Instructions and Subcontractor’s List Form”, which are included as part of these Contract Documents. The Subcontractors List shall be delivered to DFCM or faxed to DFCM at 801-538-3677 within 24 hours of the bid opening. Requirements for listing additional subcontractors will be listed in the Contract Documents.

DFCM retains the right to audit or take other steps necessary to confirm compliance with requirements for the listing and changing of subcontractors. Any contractor who is found to not be in compliance with these requirements is subject to a debarment hearing and may be debarred from consideration for award of contracts for a period of up to three years.

5. Interpretation of Drawings and Specifications

If any person or entity contemplating submitting a bid is in doubt as to the meaning of any part of the drawings, specifications or other Contract Documents, such person shall submit to the DFCM Project Manager a request for an interpretation thereof. The person or entity submitting the request will be responsible for its prompt delivery. Any interpretation of the proposed documents will be made only by addenda posted on DFCM’s web site at <http://dfcm.utah.gov>. Neither the DFCM nor A/E will be responsible for any other explanations or interpretations of the proposed documents. A/E shall be deemed to refer to the architect or engineer hired by DFCM as the A/E or Consultant for the Project.

6. Addenda

Addenda will be posted on DFCM’s web site at <http://dfcm.utah.gov>. Contractors are responsible for obtaining information contained in each addendum from the web site. Addenda issued prior to the submittal deadline shall become part of the bidding process and must be acknowledged on the bid form. Failure to acknowledge addenda may result in disqualification from bidding.

7. Award of Contract

The Contract will be awarded as soon as possible to the lowest, responsive and responsible bidder, based on the lowest combination of base bid and acceptable prioritized alternates, provided the bid is reasonable, is in the interests of the State of Utah to accept and after applying the Utah Preference Laws in U.C.A. Title 63, Chapter 56. DFCM reserves the right to waive any technicalities or formalities in any bid or in the bidding. Alternates will be accepted on a prioritized basis with Alternate 1 being highest priority, Alternate 2 having second priority, etc.

8. DFCM Contractor Performance Rating

As a contractor completes each DFCM project, DFCM, the architect/engineer and the using agency will evaluate project performance based on the enclosed “DFCM Contractor Performance Rating” form. The ratings issued on this project will not affect this project but may affect the award on future projects.

9. Licensure

The Contractor shall comply with and require all of its subcontractors to comply with the license laws as required by the State of Utah.

10. Permits

In concurrence with the requirements for permitting in the General Conditions, it is the responsibility of the Contractor to obtain the fugitive dust plan requirements from the Utah Division of Air Quality and the SWPPP requirements from the Utah Department of Environmental Quality and submit the completed forms and pay any permit fee that may be required for this specific project. Failure to obtain the required permit may result in work stoppage and/or fines from the regulating authority that will be the sole responsibility of the Contractor. Any delay to the project as a result of any such failure to obtain the permit or noncompliance with the permit shall not be eligible for any extension in the Contract Time.

11. Right to Reject Bids

DFCM reserves the right to reject any or all Bids.

12. Time is of the Essence

Time is of the essence in regard to all the requirements of the Contract Documents.

13. Withdrawal of Bids

Bids may be withdrawn on written request received from bidder prior to the time fixed for opening. Negligence on the part of the bidder in preparing the bid confers no right for the withdrawal of the bid after it has been opened.

14. Product Approvals

Where reference is made to one or more proprietary products in the Contract Documents, but restrictive descriptive materials of one or more manufacturer(s) is referred to in the Contract Documents, the products of other manufacturers will be accepted, provided they equal or exceed the standards set forth in the drawings and specifications and are compatible with the intent and purpose of the design, subject to the written approval of the A/E. Such written approval must occur prior to the deadline established for the last scheduled addenda to be issued. The A/E's written approval will be in an issued addendum. If the descriptive material is not restrictive, the products of other manufacturers specified will be accepted without prior approval provided they are compatible with the intent and purpose of the design as determined by the A/E.

15. Financial Responsibility of Contractors, Subcontractors and Sub-subcontractors

Contractors shall respond promptly to any inquiry in writing by DFCM to any concern of financial responsibility of the contractor, subcontractor or sub-subcontractor.

16. Debarment

By submitting a bid, the Contractor certifies that neither it nor its principals, including project and site managers, have been, or are under consideration for, debarment or suspension, or any action that would exclude such from participation in a construction contract by any governmental department or agency. If the Contractor cannot certify this statement, attach to the bid a detailed written explanation which must be reviewed and approved by DFCM as part of the requirements for award of the Project.

BID BOND

(Title 63, Chapter 56, U. C. A. 1953, as Amended)

KNOW ALL PERSONS BY THESE PRESENTS:

That _____ hereinafter referred to as the "Principal," and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ and authorized to transact business in this State and U. S. Department of the Treasury Listed, (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the STATE OF UTAH, hereinafter referred to as the "Obligee," in the amount of \$ _____ (5% of the accompanying bid), being the sum of this Bond to which payment the Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has submitted to Obligee the accompanying bid incorporated by reference herein, dated as shown, to enter into a contract in writing for the _____ Project.

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that if the said principal does not execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the principal, then the sum of the amount stated above will be forfeited to the State of Utah as liquidated damages and not as a penalty; if the said principal shall execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the Principal, then this obligation shall be null and void. It is expressly understood and agreed that the liability of the Surety for any and all defaults of the Principal hereunder shall be the full penal sum of this Bond. The Surety, for value received, hereby stipulates and agrees that obligations of the Surety under this Bond shall be for a term of sixty (60) days from actual date of the bid opening.

PROVIDED, HOWEVER, that this Bond is executed pursuant to provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument under their several seals on the date indicated below, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

DATED this _____ day of _____, 20_____.

Principal's name and address (if other than a corporation):

By: _____

Title: _____

Principal's name and address (if a corporation):

By: _____

Title: _____
(Affix Corporate Seal)

Surety's name and address:

By: _____
Attorney-in-Fact (Affix Corporate Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

On this ___ day of _____, 20____, personally appeared before me _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20____.
My Commission Expires: _____
Resides at: _____

NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

**Division of Facilities Construction and****INSTRUCTIONS AND SUBCONTRACTORS LIST FORM**

The three low bidders, as well as all other bidders that desire to be considered, are required by law to submit to DFCM within 24 hours of bid opening a list of **ALL** first-tier subcontractors, including the subcontractor's name, bid amount and other information required by Building Board Rule and as stated in these Contract Documents, based on the following:

DOLLAR AMOUNTS FOR LISTING

PROJECTS UNDER \$500,000: ALL FIRST-TIER SUBS \$20,000 OR OVER MUST BE LISTED
PROJECTS \$500,000 OR MORE: ALL FIRST-TIER SUBS \$35,000 OR OVER MUST BE LISTED

- Any additional subcontractors identified in the bid documents shall also be listed.
- The DFCM Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law.
- List subcontractors for base bid as well as the impact on the list that the selection of any alternate may have.
- Bidder may not list more than one subcontractor to perform the same work.
- If there are no subcontractors for the job that are required to be reported by State law (either because there are no subcontractors that will be used on the project or because there are no first-tier subcontractors over the dollar amounts referred to above), then you do not need to submit a sublist. If you do not submit a sublist, it will be deemed to be a representation by you that there are no subcontractors on the job that are required to be reported under State law. At any time, DFCM reserves the right to inquire, for security purposes, as to the identification of the subcontractors at any tier that will be on the worksite.

LICENSURE:

The subcontractor's name, the type of work, the subcontractor's bid amount, and the subcontractor's license number as issued by DOPL, if such license is required under Utah Law, shall be listed. Bidder shall certify that all subcontractors, required to be licensed, are licensed as required by State law. A subcontractor includes a trade contractor or specialty contractor and does not include suppliers who provide only materials, equipment, or supplies to a contractor or subcontractor.

'SPECIAL EXCEPTION':

A bidder may list 'Special Exception' in place of a subcontractor when the bidder intends to obtain a subcontractor to perform the work at a later date because the bidder was unable to obtain a qualified or reasonable bid under the provisions of U.C.A. Section 63A-5-208(4). The bidder shall insert the term 'Special Exception' for that category of work, and shall provide documentation with the subcontractor list describing the bidder's efforts to obtain a bid of a qualified subcontractor at a reasonable cost and why the bidder was unable to obtain a qualified subcontractor bid. The Director must find that the bidder complied in good faith with State law requirements for any 'Special Exception' designation, in order for the bid to be considered. If awarded the contract, the Director shall supervise the bidder's efforts to obtain a qualified subcontractor bid. The amount of the awarded contract may not be adjusted to reflect the actual amount of the subcontractor's bid. Any listing of 'Special Exception' on the sublist form shall also include amount allocated for that work.

GROUNDS FOR DISQUALIFICATION:

The Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law. Director may withhold awarding the contract to a particular bidder if one or more of the proposed subcontractors are considered by the Director to be unqualified to do the Work or for

INSTRUCTIONS AND SUBCONTRACTORS LIST FORM
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such other reason in the best interest of the State of Utah. Notwithstanding any other provision in these instructions, if there is a good faith error on the sublist form, at the sole discretion of the Director, the Director may provide notice to the contractor and the contractor shall have 24 hours to submit the correction to the Director. If such correction is submitted timely, then the sublist requirements shall be considered met.

CHANGES OF SUBCONTRACTORS SPECIFICALLY IDENTIFIED ON SUBLIST FORM:

Subsequent to twenty-four hours after the bid opening, the contractor may change its listed subcontractors only after receiving written permission from the Director based on complying with all of the following criteria.

- (1) The contractor has established in writing that the change is in the best interest of the State and that the contractor establishes an appropriate reason for the change, which may include, but not is not limited to, the following reasons: the original subcontractor has failed to perform, or is not qualified or capable of performing, and/or the subcontractor has requested in writing to be released.
- (2) The circumstances related to the request for the change do not indicate any bad faith in the original listing of the subcontractors.
- (3) Any requirement set forth by the Director to ensure that the process used to select a new subcontractor does not give rise to bid shopping.
- (4) Any increase in the cost of the subject subcontractor work is borne by the contractor.
- (5) Any decrease in the cost of the subject subcontractor work shall result in a deductive change order being issued for the contract for such decreased amount.
- (6) The Director will give substantial weight to whether the subcontractor has consented in writing to being removed unless the Contractor establishes that the subcontractor is not qualified for the work.

EXAMPLE:

Example of a list where there are only four subcontractors:

TYPE OF WORK	SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"	SUBCONTRACTOR BID AMOUNT	CONTRACTOR LICENSE #
ELECTRICAL	ABCD Electric Inc.	\$350,000.00	123456789000
LANDSCAPING	"Self" *	\$300,000.00	123456789000
CONCRETE (ALTERNATE #1)	XYZ Concrete Inc	\$298,000.00	987654321000
MECHANICAL	"Special Exception" (attach documentation)	Fixed at: \$350,000.00	(TO BE PROVIDED AFTER OBTAINING SUBCONTRACTOR)

* Bidders may list "self", but it is not required.

PURSUANT TO STATE LAW - SUBCONTRACTOR BID AMOUNTS CONTAINED IN THIS SUBCONTRACTOR LIST SHALL NOT BE DISCLOSED UNTIL THE CONTRACT HAS BEEN AWARDED.



SUBCONTRACTORS LIST
FAX TO 801-538-3677

PROJECT TITLE: _____

Caution: You must read and comply fully with instructions.

Table with 4 columns: TYPE OF WORK, SUBCONTRACTOR, 'SELF' OR 'SPECIAL EXCEPTION', SUBCONTRACTOR BID AMOUNT, CONT. LICENSE #

We certify that:

- 1. This list includes all subcontractors as required by the instructions, including those related to the base bid as well as any alternates.
2. We have listed 'Self' or 'Special Exception' in accordance with the instructions.
3. All subcontractors are appropriately licensed as required by State law.

FIRM: _____

DATE: _____

SIGNED BY: _____

NOTICE: FAILURE TO SUBMIT THIS FORM, PROPERLY COMPLETED AND SIGNED, AS REQUIRED IN THESE CONTRACT DOCUMENTS, SHALL BE GROUNDS FOR OWNER'S REFUSAL TO ENTER INTO A WRITTEN CONTRACT WITH BIDDER. ACTION MAY BE TAKEN AGAINST BIDDERS BID BOND AS DEEMED APPROPRIATE BY OWNER. ATTACH A SECOND PAGE IF NECESSARY.

CONTRACTOR'S AGREEMENT

FOR:

THIS CONTRACTOR'S AGREEMENT, made and entered into this ____ day of _____, 20__, by and between the DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT, hereinafter referred to as "DFCM", and _____, incorporated in the State of _____ and authorized to do business in the State of Utah, hereinafter referred to as "Contractor", whose address is _____.

WITNESSETH: WHEREAS, DFCM intends to have Work performed at _____.

WHEREAS, Contractor agrees to perform the Work for the sum stated herein.

NOW, THEREFORE, DFCM and Contractor for the consideration provided in this Contractor's Agreement, agree as follows:

ARTICLE 1. SCOPE OF WORK. The Work to be performed shall be in accordance with the Contract Documents prepared by _____ and entitled "_____."

The DFCM General Conditions ("General Conditions") dated May 25, 2005 and Supplemental General Conditions dated July 15, 2008 and July 1, 2009 ("also referred to as General Conditions") on file at the office of DFCM and available on the DFCM website, are hereby incorporated by reference as part of this Agreement and are included in the specifications for this Project. All terms used in this Contractor's Agreement shall be as defined in the Contract Documents, and in particular, the General Conditions.

The Contractor Agrees to furnish labor, materials and equipment to complete the Work as required in the Contract Documents which are hereby incorporated by reference. It is understood and agreed by the parties hereto that all Work shall be performed as required in the Contract Documents and shall be subject to inspection and approval of DFCM or its authorized representative. The relationship of the Contractor to the DFCM hereunder is that of an independent Contractor.

ARTICLE 2. CONTRACT SUM. The DFCM agrees to pay and the Contractor agrees to accept in full performance of this Contractor's Agreement, the sum of _____ DOLLARS AND NO CENTS (\$_____.00), which is the base bid, and which sum also includes the cost of a 100% Performance Bond and a 100%

CONTRACTOR'S AGREEMENT
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Payment Bond as well as all insurance requirements of the Contractor. Said bonds have already been posted by the Contractor pursuant to State law. The required proof of insurance certificates have been delivered to DFCM in accordance with the General Conditions before the execution of this Contractor's Agreement.

ARTICLE 3. TIME OF COMPLETION AND DELAY REMEDY. The Work shall be Substantially Complete by _____. Contractor agrees to pay liquidated damages in the amount of \$_____ per day for each day after expiration of the Contract Time until the Contractor achieves Substantial Completion in accordance with the Contract Documents, if Contractor's delay makes the damages applicable. The provision for liquidated damages is: (a) to compensate the DFCM for delay only; (b) is provided for herein because actual damages can not be readily ascertained at the time of execution of this Contractor's Agreement; (c) is not a penalty; and (d) shall not prevent the DFCM from maintaining Claims for other non-delay damages, such as costs to complete or remedy defective Work.

No action shall be maintained by the Contractor, including its or Subcontractor or suppliers at any tier, against the DFCM or State of Utah for damages or other claims due to losses attributable to hindrances or delays from any cause whatsoever, including acts and omissions of the DFCM or its officers, employees or agents, except as expressly provided in the General Conditions. The Contractor may receive a written extension of time, signed by the DFCM, in which to complete the Work under this Contractor's Agreement in accordance with the General Conditions.

ARTICLE 4. CONTRACT DOCUMENTS. The Contract Documents consist of this Contractor's Agreement, the Conditions of the Contract (DFCM General Conditions, Supplementary and other Conditions), the Drawings, Specifications, Addenda and Modifications. The Contract Documents shall also include the bidding documents, including the Invitation to Bid, Instructions to Bidders/ Proposers and the Bid/Proposal, to the extent not in conflict therewith and other documents and oral presentations that are documented as an attachment to the contract.

All such documents are hereby incorporated by reference herein. Any reference in this Contractor's Agreement to certain provisions of the Contract Documents shall in no way be construed as to lessen the importance or applicability of any other provisions of the Contract Documents.

ARTICLE 5. PAYMENT. The DFCM agrees to pay the Contractor from time to time as the Work progresses, but not more than once each month after the date of Notice to Proceed, and only upon Certificate of the A/E for Work performed during the preceding calendar month, ninety-five percent (95%) of the value of the labor performed and ninety-five percent (95%) of the value of materials furnished in place or on the site. The Contractor agrees to furnish to the DFCM invoices for materials purchased and on the site but not installed, for which the Contractor requests payment and agrees to

safeguard and protect such equipment or materials and is responsible for safekeeping thereof and if such be stolen, lost or destroyed, to replace same.

Such evidence of labor performed and materials furnished as the DFCM may reasonably require shall be supplied by the Contractor at the time of request for Certificate of Payment on account. Materials for which payment has been made cannot be removed from the job site without DFCM's written approval. Five percent (5%) of the earned amount shall be retained from each monthly payment. The retainage, including any additional retainage imposed and the release of any retainage, shall be in accordance with UCA 13-8-5 as amended. Contractor shall also comply with the requirements of UCA 13-8-5, including restrictions of retainage regarding subcontractors and the distribution of interest earned on the retention proceeds. The DFCM shall not be responsible for enforcing the Contractor's obligations under State law in fulfilling the retention law requirements with subcontractors at any tier.

ARTICLE 6. INDEBTEDNESS. Before final payment is made, the Contractor must submit evidence satisfactory to the DFCM that all payrolls, materials bills, subcontracts at any tier and outstanding indebtedness in connection with the Work have been properly paid. Final Payment will be made after receipt of said evidence, final acceptance of the Work by the DFCM as well as compliance with the applicable provisions of the General Conditions.

Contractor shall respond immediately to any inquiry in writing by DFCM as to any concern of financial responsibility and DFCM reserves the right to request any waivers, releases or bonds from Contractor in regard to any rights of Subcontractors (including suppliers) at any tier or any third parties prior to any payment by DFCM to Contractor.

ARTICLE 7. ADDITIONAL WORK. It is understood and agreed by the parties hereto that no money will be paid to the Contractor for additional labor or materials furnished unless a new contract in writing or a Modification hereof in accordance with the General Conditions and the Contract Documents for such additional labor or materials has been executed. The DFCM specifically reserves the right to modify or amend this Contractor's Agreement and the total sum due hereunder either by enlarging or restricting the scope of the Work.

ARTICLE 8. INSPECTIONS. The Work shall be inspected for acceptance in accordance with the General Conditions.

ARTICLE 9. DISPUTES. Any dispute, PRE or Claim between the parties shall be subject to the provisions of Article 7 of the General Conditions. DFCM reserves all rights to pursue its rights and remedies as provided in the General Conditions.

ARTICLE 10. TERMINATION, SUSPENSION OR ABANDONMENT. This Contractor's Agreement may be terminated, suspended or abandoned in accordance with the General Conditions.

ARTICLE 11. DFCM'S RIGHT TO WITHHOLD CERTAIN AMOUNT AND MAKE USE THEREOF. The DFCM may withhold from payment to the Contractor such amount as, in DFCM's judgment, may be necessary to pay just claims against the Contractor or Subcontractor at any tier for labor and services rendered and materials furnished in and about the Work. The DFCM may apply such withheld amounts for the payment of such claims in DFCM's discretion. In so doing, the DFCM shall be deemed the agent of Contractor and payment so made by the DFCM shall be considered as payment made under this Contractor's Agreement by the DFCM to the Contractor. DFCM shall not be liable to the Contractor for any such payment made in good faith. Such withholdings and payments may be made without prior approval of the Contractor and may be also be prior to any determination as a result of any dispute, PRE, Claim or litigation.

ARTICLE 12. INDEMNIFICATION. The Contractor shall comply with the indemnification provisions of the General Conditions.

ARTICLE 13. SUCCESSORS AND ASSIGNMENT OF CONTRACT. The DFCM and Contractor, respectively bind themselves, their partners, successors, assigns and legal representatives to the other party to this Agreement, and to partners, successors, assigns and legal representatives of such other party with respect to all covenants, provisions, rights and responsibilities of this Contractor's Agreement. The Contractor shall not assign this Contractor's Agreement without the prior written consent of the DFCM, nor shall the Contractor assign any moneys due or to become due as well as any rights under this Contractor's Agreement, without prior written consent of the DFCM.

ARTICLE 14. RELATIONSHIP OF THE PARTIES. The Contractor accepts the relationship of trust and confidence established by this Contractor's Agreement and covenants with the DFCM to cooperate with the DFCM and A/E and use the Contractor's best skill, efforts and judgment in furthering the interest of the DFCM; to furnish efficient business administration and supervision; to make best efforts to furnish at all times an adequate supply of workers and materials; and to perform the Work in the best and most expeditious and economic manner consistent with the interests of the DFCM.

ARTICLE 15. AUTHORITY TO EXECUTE AND PERFORM AGREEMENT. Contractor and DFCM each represent that the execution of this Contractor's Agreement and the performance thereunder is within their respective duly authorized powers.

ARTICLE 16. ATTORNEY FEES AND COSTS. Except as otherwise provided in the dispute resolution provisions of the General Conditions, the prevailing party shall be entitled to reasonable attorney fees and costs incurred in any action in the District Court and/or appellate body to enforce this Contractor's Agreement or recover damages or any other action as a result of a breach thereof.

PERFORMANCE BOND

(Title 63, Chapter 56, U. C. A. 1953, as Amended)

That _____ hereinafter referred to as the "Principal" and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ and authorized to transact business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah, hereinafter referred to as the "Obligee," in the amount of _____ DOLLARS (\$) _____ for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____, 20____, to construct _____ in the County of _____, State of Utah, Project No. _____, for the approximate sum of _____ Dollars (\$ _____), which Contract is hereby incorporated by reference herein.

NOW, THEREFORE, the condition of this obligation is such that if the said Principal shall faithfully perform the Contract in accordance with the Contract Documents including, but not limited to, the Plans, Specifications and conditions thereof, the one year performance warranty, and the terms of the Contract as said Contract may be subject to Modifications or changes, then this obligation shall be void; otherwise it shall remain in full force and effect.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the state named herein or the heirs, executors, administrators or successors of the Owner.

The parties agree that the dispute provisions provided in the Contract Documents apply and shall constitute the sole dispute procedures of the parties.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the Provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20____.

WITNESS OR ATTESTATION:

PRINCIPAL:

By: _____

(Seal)

Title: _____

WITNESS OR ATTESTATION:

SURETY:

By: _____

Attorney-in-Fact (Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

On this _____ day of _____, 20____, personally appeared before me _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney in-fact of the above-named Surety Company and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

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

My commission expires: _____

Resides at: _____

NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

PAYMENT BOND

(Title 63, Chapter 56, U. C. A. 1953, as Amended)

KNOW ALL PERSONS BY THESE PRESENTS:

That _____ hereinafter referred to as the "Principal," and _____, a corporation organized and existing under the laws of the State of _____ authorized to do business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); with its principal office in the City of _____, hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah hereinafter referred to as the "Obligee," in the amount of _____ Dollars (\$ _____) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____, 20____, to construct _____ in the County of _____, State of Utah, Project No. _____ for the approximate sum of _____ Dollars (\$ _____), which contract is hereby incorporated by reference herein.

NOW, THEREFORE, the condition of this obligation is such that if the said Principal shall pay all claimants supplying labor or materials to Principal or Principal's Subcontractors in compliance with the provisions of Title 63, Chapter 56, of Utah Code Annotated, 1953, as amended, and in the prosecution of the Work provided for in said Contract, then, this obligation shall be void; otherwise it shall remain in full force and effect.

That said Surety to this Bond, for value received, hereby stipulates and agrees that no changes, extensions of time, alterations or additions to the terms of the Contract or to the Work to be performed thereunder, or the specifications or drawings accompanying same shall in any way affect its obligation on this Bond, and does hereby waive notice of any such changes, extensions of time, alterations or additions to the terms of the Contract or to the Work or to the specifications or drawings and agrees that they shall become part of the Contract Documents.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20____.

WITNESS OR ATTESTATION:

PRINCIPAL:

By: _____ (Seal)

Title: _____

WITNESS OR ATTESTATION:

SURETY:

By: _____ Attorney-in-Fact (Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

On this _____ day of _____, 20____, personally appeared before me _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

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

My commission expires: _____
Resides at: _____

NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General



CERTIFICATE OF SUBSTANTIAL COMPLETION

PROJECT _____ PROJECT NO: _____

AGENCY/INSTITUTION _____

AREA ACCEPTED _____

The Work performed under the subject Contract has been reviewed on this date and found to be Substantially Completed as defined in the General Conditions; including that the construction is sufficiently completed in accordance with the Contract Documents, as modified by any change orders agreed to by the parties, so that the State of Utah can occupy the Project or specified area of the Project for the use for which it is intended.

The DFCM - (Owner) accepts the Project or specified area of the Project as Substantially Complete and will assume full possession of the Project or specified area of the Project at _____ (time) on _____ (date).

The DFCM accepts the Project for occupancy and agrees to assume full responsibility for maintenance and operation, including utilities and insurance, of the Project subject to the itemized responsibilities and/or exceptions noted below:

The Owner acknowledges receipt of the following closeout and transition materials:

- As-built Drawings O & M Manuals Warranty Documents Completion of Training Requirements

A list of items to be completed or corrected (Punch List) is attached hereto. The failure to include an item on it does not alter the responsibility of the Contractor to complete all the Work in accordance with the Contract Documents, including authorized changes thereof. The amount of _____(Twice the value of the punch list work) shall be retained to assure the completion of the punch list work.

The Contractor shall complete or correct the Work on the list of (Punch List) items appended hereto within _____ calendar days from the above date of issuance of this Certificate. The amount withheld pending completion of the list of items noted and agreed to shall be: \$_____. If the list of items is not completed within the time allotted the Owner has the right to be compensated for the delays and/or complete the work with the help of independent contractor at the expense of the retained project funds. If the retained project funds are insufficient to cover the delay/completion damages, the Owner shall be promptly reimbursed for the balance of the funds needed to compensate the Owner.

_____ by: _____ (Signature) DATE

CONTRACTOR (include name of firm) _____ by: _____ (Signature) DATE

_____ by: _____ (Signature) DATE

A/E (include name of firm) _____ by: _____ (Signature) DATE

_____ by: _____ (Signature) DATE

**General Contractor Performance Rating Form**

Project Name:		DFCM Project#	
Contractor: <small>(ABC Construction, John Doe, 111-111-1111)</small>	A/E: <small>(ABC Architects, Jane Doe, 222-222-2222)</small>	Original Contract Amount:	Final Contract Amount:
DFCM Project Manager:		Contract Date:	
Completion Date:		Date of Rating:	

Rating Guideline	QUALITY OF PRODUCT OR SERVICES	COST CONTROL	TIMELINESS OF PERFORMANCE	BUSINESS RELATIONS
5-Exceptional	Contractor has demonstrated an exceptional performance level in any of the above four categories that justifies adding a point to the score. Contractor performance clearly exceeds the performance levels described as "Very Good"			
4-Very Good	Contractor is in compliance with contract requirements and/or delivers quality product/service.	Contractor is effective in managing costs and submits current, accurate, and complete billings	Contractor is effective in meeting milestones and delivery schedule	Response to inquiries, technical/service/administrative issues is effective
3-Satisfactory	Minor inefficiencies/errors have been identified	Contractor is usually effective in managing cost	Contractor is usually effective in meeting milestones and delivery schedules	Response to inquires technical/service/administrative issues is somewhat effective
2-Marginal	Major problems have been encountered	Contractor is having major difficulty managing cost effectively	Contractor is having major difficulty meeting milestones and delivery schedule	Response to inquiries, technical/service/administrative issues is marginally effective
1-Unsatisfactory	Contractor is not in compliance and is jeopardizing achievement of contract objectives	Contractor is unable to manage costs effectively	Contractor delays are jeopardizing performance of contract objectives	Response to inquiries, technical/service/administrative issues is not effective

1. Rate Contractors quality of workmanship, management of sub contractor performance, project cleanliness, organization and safety requirement.	Score
<u>Agency Comments:</u>	
<u>A & E Comments:</u>	
<u>DFCM Project Manager Comments:</u>	

2. Rate Contractor administration of project costs, change orders and financial management of the project budget.	Score
<u>Agency Comments:</u>	
<u>A & E Comments:</u>	
<u>DFCM Project Manager Comments:</u>	

3. Rate Contractor's performance and adherence to Project Schedule, delay procedures and requirements of substantial completion, inspection and punch-list performance.	Score
<u>Agency Comments:</u>	
<u>A & E Comments:</u>	
<u>DFCM Project Manager Comments:</u>	

4. Evaluate performance of contractor management team including project manager, engineer and superintendent also include in the rating team's ability to work well with owner, user agency and consultants.	Score
<u>Agency Comments:</u>	
<u>A & E Comments:</u>	
<u>DFCM Project Manager Comments:</u>	

5. Rate success of Contractor's management plan, completion of the plans mitigation of project risks and performance of value engineering concepts.	Score
<u>Agency Comments:</u>	
<u>A & E Comments:</u>	
<u>DFCM Project Manager Comments:</u>	

Signed by:	Date:	Mean Score
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Additional Comments:

TECHNICAL SPECIFICATIONS

FOR



Main Campus
200 North Washington Blvd
Ogden, Utah 84404

CHILDREN'S SCHOOL - SOUTH ELECTRICAL IMPROVEMENTS



State of Utah—Department of Administrative Services

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT

4110 State Office Building / Salt Lake City, Utah 84114 / 538-3018

DFCM Project No. 08051240

Prepared by

Thomas & Kolkman Engineering Company Inc.
64 West 1700 South
Salt Lake City, Utah 84115
Tele: (801) 484-8161
Fax: (801) 484-3538

September 30, 2009

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END OF TECHNICAL SPECIFICATION INDEX

SECTION 01010 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 PROJECT DESCRIPTION

- A. The Project is a general electrical upgrade for the Children's School South building at Ogden-Weber Applied Technology College, Main Campus, 200 North Washington Blvd, Ogden, Utah, as described by the Contract Documents prepared by Thomas & Kolkman Engineering Company Inc..
- B. The Work consists providing new work and alterations to the existing building and existing electrical systems including, but not limited to the following:
 - 1. New electrical equipment, feeders and connections to the existing electrical system.
 - 2. New light fixtures, switches, occupancy sensors, receptacles, etc..
 - 3. New Fire Alarm System complete with all equipment in proper working order.
 - 4. Demolition and repair of the existing building, limited to the extent required to install the above work.

1.3 CONTRACTOR USE OF PREMISES

- A. The Contractor will have limited use of areas included in the scope of the work as required for storage and construction operations. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.
 - 1. The Contractor may have limited use of the mechanical and electrical rooms, as approved by the Owner, for material storage. These areas are not secure and it will be the responsibility of the contractor to provide additional measures, such as lockable gang boxes, to secure stored materials, tools, and equipment.
 - 2. Material storage will not in any way interfere with the normal building operations or interfere with access or working clearance in the existing mechanical and electrical rooms.
- B. Staging area will be made available to the contractor in the parking lot as indicated. Coordinate exact location with the Owner. Contractor to provide suitable barricades to protect staging area and passersby. Barricades will not impede traffic flow.
- C. Contractor may use existing building restrooms during the construction period. Restrooms are to be kept clean. The Owner reserves the right to require the Contractor to furnish portable toilet facilities if the Contractor fails to keep building restroom clean.
- D. Keep driveways and entrances serving the premises clear and available to the Owner and the Owner's employees at all times. Do not use these areas for parking or storage of materials except as specifically allowed by the Owner. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.
- E. Maintain the existing building in a weathertight condition throughout the construction period. Repair all damage caused by construction operations. Take all precautions necessary to protect

the building and its occupants during the construction period.

1.4 WORK SCHEDULING

- A. The Owner will occupy the existing buildings during the entire construction period. The Work will be scheduled with the least possible interference to the activities of the Owner's personnel.
 - 1. Normal hours of operation for the Children's School are from 6:00 am to 6:00 pm, Monday through Friday.
 - 2. The contractor will not be allowed to work in normally occupied portions of the building during the normal hours of operation. Work will be allowed in the mechanical and electrical rooms provided the work does not interfere with normal school activities.
 - 3. Work done when building is not occupied shall be completed to a state which will not interfere with normal building operations or safety when normal hours of operation are resumed.
- B. The contractor shall submit a complete construction schedule plan prior to beginning work. The plan shall include provision for dust control, pedestrian control including means to maintain access to all existing offices, classrooms, and building exits, and to protect the safety of all passersby.
- C. Excessively noisy construction operations such as hammer drilling shall be accomplished during times when the building is not normally occupied, such as weekends, holidays, etc.
- D. Cooperate with the Owner to minimize conflicts with Owner's usage.

1.5 PROJECT SUPERINTENDENT

- A. The contractor shall assign a Project Superintendent to supervise and coordinate all constructions activities. Submit the name of the Project Superintendent at, or prior to, the pre-construction meeting along with telephone numbers and other contact information.
- B. The Project Superintendent shall be present at the project site at all time work is being performed including work by subcontractors and/or vendors.

1.6 GUARANTEE/WARRANTY

- A. Notwithstanding other guarantees or warranties for specific components, The Contactor shall Warranty the entire work included in the Contract for a period of One (1) Year from the date of issuance of the Certificate of Substantial Completion against all defects in equipment, material and workmanship.
- B. Furnish and pay for all labor, equipment and material required to correct defects and deficiencies in the work without additional cost to the Owner and as approved by the Owner and Engineer.
- C. In addition to the general project warranty, specific project warranties are required and are noted in the indicated Specification Sections.
- D. Submit all warranties in binders which are indexed, tabbed and labeled.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION (Not Applicable).

* END OF SECTION 01010 *

SECTION 01200 - PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project meetings including but not limited to:

- 1. Pre-Construction Conference
- 2. Coordination/Progress meetings

1.3 PRE-CONSTRUCTION CONFERENCE

- A. Schedule a pre-construction conference and organizational meeting at the Project Site or other convenient location prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.

- B. Attendees: The Owner, Engineer, the Contractor and its superintendent, and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.

- C. Agenda: Discuss items of significance that could affect progress including such topics as:

- 1. Tentative construction schedule.
- 2. Critical Work sequencing.
- 3. Designation of responsible personnel.
- 4. Procedures for processing field decisions and Change Orders.
- 5. Procedures for processing Applications for Payment.
- 6. Distribution of Contract Documents.
- 7. Submittal of Shop Drawings and Product Data.
- 8. Preparation of Record Documents.
- 9. Use of the premises.
- 10. Working Hours.
- 11. Work and Storage Areas.
- 12. Equipment deliveries and priorities.
- 13. Safety procedures.
- 14. Security.
- 15. Sexual Harassment.
- 16. Housekeeping.

1.4 COORDINATION/PROGRESS MEETINGS

- A. Conduct Project coordination meetings at regularly scheduled times convenient for all parties involved.

- 1. Meetings will be conducted weekly unless otherwise agreed upon by Owner, Engineer and Contractor.

- B. The Owner, Engineer, the Contractor and/or its superintendent, and other parties currently involved in coordination or planning for the construction activities involved will be represented at each meeting.

- C. The Engineer will record meeting results and distribute copies to everyone in attendance and to others affected by decisions resulting from each meeting.
- D. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project.
 - 1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments for parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 2. Review the present and future needs of each entity present, including such items as:
 - a. Interface requirements.
 - b. Time.
 - c. Sequences.
 - d. Deliveries.
 - e. Off-Site fabrication problems.
 - f. Access.
 - g. Site utilization.
 - h. Temporary facilities and services.
 - i. Hours of work.
 - j. Hazards and risks.
 - k. Housekeeping.
 - l. Quality and Work standards.
 - m. Change Orders.
 - n. Documentation of information for Payment Requests.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION (Not Applicable).

* END OF SECTION 01200 *

SECTION 01700 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:
 - 1. Job Site Inspection procedures.
 - 2. Project record document submittal.
 - 3. Operating and maintenance manual submittal.
 - 4. Submittal of warranties.
 - 5. Final Cleaning.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.
 - 1. In the Application for Payment that coincides with, or first follows, the date of Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
 - a. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
 - 2. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
 - 3. Submit record drawings, maintenance manuals, damage or settlement survey, property survey, and similar final record information.
 - 4. Deliver tools, spare parts, extra stock, and similar items.
 - 5. Complete start-up testing of systems, and instruction of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.
 - 6. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.
- B. Inspection Procedure: On receipt of a request for inspection, the Engineer will either proceed with inspection or advise the Contractor of unfilled requirements. The Engineer will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
 - 1. The Engineer will repeat inspection when requested and assured that the Work has been substantially completed.
 - 2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 FINAL ACCEPTANCE

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

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
 2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
 3. Submit a certified copy of the Engineer's final inspection list of items to be completed or corrected. The certified copy of the list shall state that each item has been completed, or otherwise resolved for acceptance and shall be endorsed and dated by the Engineer.
- B. Reinspection Procedure: The Engineer will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Engineer.
- 1.5 EXTRA STOCK SUBMITTALS
- A. Provide extra stock in original cartons, or packaged with protective coverings, for storage and identified with labels clearly describing contents.
 - B. Turn over extra stock to Owner and place in storage prior to Substantial Completion. Exact location of storage to be determined by the Owner.
 - C. Obtain signed receipt for extra stock materials from the Owner's Facilities Project Manager. Include copy of signed receipt in the Project Operation and Maintenance Manuals.
 - D. Provide the following extra stock of materials to the Owner.
 1. Ceiling Tiles and Grids: refer to Specification Section 09511 - Acoustical Panel Ceilings for required quantities.
 2. Occupancy Sensors: refer to Specification Section 16140 - Outlets and Wiring Devices for required quantities.
 3. Fixture lenses, louvers, diffusers, and lamps: refer to Specification Section 16500 - Lighting for required quantities.
- 1.6 RECORD DOCUMENT SUBMITTALS
- A. General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the Engineer's reference during normal working hours.
 - B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
 1. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
 2. Mark new information that is important to the Owner but was not shown on Contract Drawings or Shop Drawings.
 3. Note related change order numbers where applicable.
 4. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.

1.7 OPERATION & MAINTENANCE MANUALS SUBMITTALS

- A. Provide 4 sets of Operation and Maintenance Manuals unless otherwise directed by the Owner and/or Project Engineer.
- B. Organize operation and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual, heavy-duty, 3-ring, vinyl-covered binders, with pockets folders for folded sheet information, and properly sized for the amount of materials.
 - 1. Folding tab sheet folders are not acceptable.
- C. Include project identification on the front cover of each set to include, but not be limited to, the following information:
 - 1. Project Name as it appears on the contract documents.
 - 2. Owner's Project Number.
 - 3. Contractor's name, address, telephone, fax, and other pertinent information.
 - 4. Project Engineer's name, address, telephone, fax, and other pertinent information.
- D. Include the Project Name as it appears on the contract documents and the Owner's Project Number on the back spine of each set.
- E. Include the following types of information:
 - 1. Emergency instructions.
 - 2. Spare parts list.
 - 3. Copies of warranties.
 - 4. Wiring Diagrams.
 - 5. Recommended "turn around" cycles.
 - 6. Inspection Procedures.
 - 7. Shop Drawings and Product Data.
 - 8. Fixture lamping schedule.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES

- A. Operating and Maintenance Instructions: Arrange for each installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representative if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:
 - 1. Maintenance manuals.
 - 2. Record Documents.
 - 3. Spare Parts and materials.
 - 4. Tools.
 - 5. Identification systems.
 - 6. Control sequences.
 - 7. Hazards.
 - 8. Cleaning.
 - 9. Warranties and Bonds.
 - 10. Maintenance agreements and similar continuing commitments.

B. As part of instruction for operating equipment, demonstrate the following procedures:

1. Startup.
2. Shutdown.
3. Noise and vibration adjustments.
4. Safety Procedures.

3.2 FINAL CLEANING

A. The General Conditions require general cleaning during construction.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

1. Remove labels that are not permanent labels.
2. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
3. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
4. Clean the site including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.

C. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

D. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess material on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.

1. Where extra materials of value remain after completion of associated Work, they become the Owner's property. Dispose of these materials as directed by the Owner.

* END OF SECTION 01700 *

SECTION 09511 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes acoustical panels and exposed suspension systems for ceilings.

1.3 DEFINITIONS

- A. AC: Articulation Class.
- B. CAC: Ceiling Attenuation Class.
- C. LR: Light Reflectance coefficient.
- D. NRC: Noise Reduction Coefficient.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
 - 1. Acoustical Panel: Set of 6-inch-square samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch-long samples of each type, finish, and color.
- C. Qualification Data: For testing agency.
- D. Field quality-control test reports.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each acoustical panel ceiling.
- F. Maintenance Data: For finishes to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system through one source from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.8 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.9 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Panels: Full-size panels equal to 2.0 percent of quantity installed.
 - 2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of quantity installed.

PART 2 - PRODUCTS

2.1 ACOUSTICAL PANELS, GENERAL

- A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.

2.2 ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING

- A. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Non-Fire Resistance-Rated, 2' x 2' panels:
 - a. Armstrong; 3/4" Ultima with reveal edge
 - b. BPB USA; 3/4" "Symphony m" by Capaul with reveal edge.
 - c. USG Interiors, Inc.; 3/4" Mars with reveal edge.
- B. Color: White.
- C. LR: Not less than 0.89.
- D. NRC: Not less than 0.65 to 0.75.
- E. CAC: Not less than 35 to 39.
- F. AC: Not less than 190.
- G. Edge/Joint Detail: Reveal sized to fit flange of exposed suspension system members.

H. Thickness: 3/4 inch.

I. Modular Size: 24 by 24 inches.

2.3 METAL SUSPENSION SYSTEMS, GENERAL

A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.

B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.

C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

1. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.

D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch diameter wire.

E. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

F. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.

G. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.

H. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical panels in-place.

2.4 METAL EDGE MOLDINGS AND TRIM

A. Sheet-Metal Edge Moldings and Trim: Step or "Shadow" type everywhere formed from sheet metal of same material and finish as that used for exposed flanges of suspension system runners.

1. For lay-in panels, provide stepped-edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.

2.5 NON-FIRE-RESISTANCE-RATED, DIRECT-HUNG SUSPENSION SYSTEMS

A. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from prepainted or electrolytic zinc-coated, cold-rolled steel sheet, with prefinished 15/16-inch-wide metal caps on flanges; other characteristics as follows:

1. Structural Classification: Heavy-duty system.
 2. End Condition of Cross Runners: Override (stepped) type.
 3. Cap Material and Finish: Steel sheet painted white.
- B. Available Products: Subject to compliance with requirements, suspension systems that may be incorporated in the Work include, but are not limited to, the following:
- C. Wide-Face, Capped, Double-Web, Steel Suspension Systems:
1. 1200 System/211-219 Main Tee; Chicago Metallic Corporation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636 and seismic design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building's structural members and as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and

appropriate for both structure to which hangers are attached and type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.

6. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 7. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. Arrange directionally patterned acoustical panels as follows:
 - a. Install panels with pattern running in one direction parallel to long axis of space.
 2. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 3. For reveal-edged panels on suspension system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension system surfaces and panel faces flush with bottom face of runners.
 4. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

3.4 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

* END OF SECTION 09511 *

SECTION 09912 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes surface preparation and field painting of the following:
 - 1. Exposed interior items and surfaces.
- B. Paint exposed surfaces which have been damaged and/or repaired as a result of demolition and new electrical work. In general, provide finish and color to match existing conditions or as directed by the Engineer.
 - 1. Extend painting of damaged and repaired surfaces to a logical break point, such as the intersection of wall and ceiling, or corner of wall, such that slight variations in paint color will not be obvious.
- C. Unless otherwise noted, do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
 - 1. Prefinished items include the following factory-finished components:
 - a. Finished electrical equipment and surface metal raceway systems.
 - b. Light fixtures.
 - c. Distribution cabinets.
 - 2. Finished metal surfaces include the following:
 - a. Anodized aluminum.
 - b. Stainless steel.
 - c. Chromium plate.
 - d. Architectural Copper.
 - e. Architectural Bronze and brass.
 - 3. Operating parts include moving parts of operating equipment and the following:
 - a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.
 - 4. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code required labels or equipment name, identification, performance rating, or nomenclature plates.

1.3 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
 - 1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.

2. Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.
3. Satin refers to low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.
4. Semigloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
5. Full gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

1.4 SUBMITTALS

- A. Product Data: For each paint system specified. Include block fillers and primers.
 1. Material List: Provide an inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
 2. Manufacturer's Information: Provide manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use.
 3. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
- B. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for each type of finish-coat material indicated and recommendation to match existing finish colors.
 1. Include summary of paint manufacturer and color selections for inclusion in the project Operation and Maintenance Manuals.

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.
- B. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:
 1. Product name or title of material.
 2. Product description (generic classification or binder type).
 3. Manufacturer's stock number and date of manufacture.
 4. Contents by volume, for pigment and vehicle constituents.
 5. Thinning instructions.
 6. Application instructions.
 7. Color name and number.
 8. VOC content.

- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.
 - 1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.7 PROJECT CONDITIONS

- A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 deg F.
- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 deg F.
- C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
 - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in the paint schedules.
 - 1. PPG Industries, Inc. (PPG).
 - 2. Pratt & Lambert, Inc. (P & L).
 - 3. Sherwin-Williams Co. (S-W).
 - 4. Kwal Howell (KH).

2.2 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.
 - 1. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
 - 2. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

- 1. Notify the Engineer about anticipated problems using the materials specified over substrates primed by others.

3.2 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting.

- 1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

- B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond or the surface smoothness of the various coatings. Remove oil, grease, adhered dirt, dust and debris before cleaning.

- 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

- C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

- 1. Provide barrier coats over incompatible primers or remove and reprime.

- D. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

- 1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.

- 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.

- 3. Use only thinners approved by paint manufacturer and only within recommended limits.

3.3 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

- 1. Paint colors, surface treatments, and finishes are indicated in the schedules.

- 2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.

- 3. Provide finish coats that are compatible with primers used.

- 4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and

provide desired protection.

5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 6. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
 7. Sand lightly between each succeeding enamel or varnish coat.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 2. Omit primer on metal surfaces that have been shop primed and touchup painted.
 3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.
- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
 2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.
- E. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.
- F. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

G. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.

1. Provide satin finish for final coats.

H. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.

I. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

3.5 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by the Engineer.

B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.

1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.6 INTERIOR PAINT SCHEDULE

A. Concrete Masonry Units: Provide the following finish systems over interior concrete masonry block units:

1. Low-Luster, Acrylic-Enamel Finish: 2 finish coats over a block filler.

a. Block Filler: High-performance, latex-based, block filler applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 5.0 mils.

(1) PPG:6-7 Speedhide Interior/Exterior Masonry Latex Block Filler.

(2) P & L:Z 98 Pro-Hide Plus Latex Block Filler.

b. First and Second Coats: Low-luster (eggshell or satin), acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.8 mils.

(1) PPG:89 Line Manor Hall Eggshell Latex Wall and Trim Enamel.

(2) P & L:Z/F 4000 Series Accolade Interior Velvet.

- B. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces:
1. Low-Luster, Acrylic-Enamel Finish: 2 finish coats over a primer.
 - a. Primer: Latex-based, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils.
 - (1) PPG:17-10 Quick-Drying Interior Latex Primer-Sealer.
 - (2) P & L:Z/F 1004 Suprime "4" Interior Latex Wall Primer.
 - b. First and Second Coats: Low-luster (eggshell or satin), acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.8 mils.
 - (1) PPG:89 Line Manor Hall Eggshell Latex Wall and Trim Enamel.
 - (2) P & L:Z/F 4000 Series Accolade Interior Velvet.
- C. Ferrous Metal: Provide the following finish systems over ferrous metal:
1. Semigloss, Alkyd-Enamel Finish: One finish coat over an enamel undercoater and a primer.
 - a. Primer: Quick-drying, rust-inhibitive, alkyd-based or epoxy-metal primer, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.5 mils.
 - (1) PPG:6-208 Speedhide Interior/Exterior Rust Inhibitive Steel Primer.
 - (2) P & L:S 4551 Tech-Gard High Performance Rust Inhibitor Primer.
 - (3) S-W:Kem Kromik Metal Primer B50N2/B50W1.
 - b. Undercoat: Alkyd, interior enamel undercoat or semigloss, interior, alkyd-enamel finish coat, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils.
 - (1) PPG:6-6 Speedhide Interior Quick-Drying Enamel Undercoater.
 - (2) P & L:S/D 1011 Suprime "11" Interior Alkyd Wood Primer.
 - (3) S-W:ProMar 200 Interior Alkyd Semi-Gloss Enamel B34W200.
 - c. Finish Coat: Odorless, semigloss, alkyd, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.4 mils.
 - (1) PPG:27 Line Wallhide Low Odor Interior Enamel Wall and Trim Semi-Gloss Oil.
 - (2) P & L:S/D 5700 Cellu-Tone Alkyd Satin Enamel.
 - (3) S-W:Classic 99 Interior/Exterior Semi-Gloss Alkyd Enamel A-40 Series.

* END OF SECTION 09912 *

SECTION 16000 - GENERAL PROVISIONS, ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions and Division 1 Specification Sections apply to work of this section and all other Division 16 specification sections.
- B. This section applies to all Division 16 specification sections.

1.2 SUMMARY

- A. This section includes general administrative and procedural requirements for electrical installations to expand the requirements of the General Conditions and Division 1 Specification Sections.

1.3 STANDARDS

- A. The following industry standards are considered minimum requirements for electrical work and are made a part of the contract documents:
 - 1. National Electrical Code, 2008 Edition (NEC)
 - 2. Electrical Ordinances of Local Governing Authority
 - 3. Utah State (Local) Fire Marshal's Rules and Regulations
 - 4. International Building Code
 - 5. International Fire Code
 - 6. Underwriters Laboratories (UL) Standards
 - 7. American National Standards Institute (ANSI)
 - 8. National Electrical Manufacturer's Association (NEMA)
 - 9. National Fire Protection Association (NFPA) Standards
 - 10. Regulations of American Standards Association
- B. If any conflict occurs between these rules and the contract documents or between the plans and specifications, notify the Engineer promptly in writing. Do not proceed with any work in conflict until a solution is approved in writing by the Engineer.

1.4 WORKMANSHIP

- A. All Electrical Work of any nature shall be performed by qualified electricians, experienced in the type of work to be performed and licensed with the State of Utah. Electricians shall show their license upon request of the Owner, Engineer and/or their representatives.

1.5 CODE INSPECTIONS

- A. Code inspections will be conducted by an inspection agency hired by the Owner.
- B. Contractor is responsible to schedule inspections with the inspection agency.

1.6 ELECTRICAL WORK INCLUDED

- A. The basic contract work includes all labor, material, tools, transportation, equipment, and superintendence specified, indicated on the drawings or necessary to make a complete installation of, but not limited to, the following:
 - 1. Appliances, apparatus and materials not specifically noted on drawings or mentioned herein,

but which are necessary to make a complete working installation of all electrical systems required for the project.

2. Hangers, anchors, sleeves, chases, supports and fittings as may be required and as indicated.
3. New electric service with main distribution panel, distribution system, branch panels and branch circuits for power and lighting with raceway system and outlet boxes.
4. All luminaires, wall switches, receptacles, etc. as indicated on drawings.
5. Exterior building lighting, and controls.
6. New Fire Alarm System complete with all equipment in operative condition, to replace the existing building fire alarm system.

1.7 SUBSTITUTIONS

- A. Material or products specified by name of manufacturer, brand or trade name or catalogue reference will be the basis of the bid and furnished under the contract unless changed in writing by the Engineer. Where two or more materials are named, the choice of these will be optional with the Contractor.
- B. Submit requests for substitution in writing to the Engineer not less than 5 working days prior to bid opening or as otherwise required by Division 1 Specifications and the General Conditions.

1.8 ACCURACY OF DATA

- A. Data given herein and on the drawings are as exact as could be secured, but their absolute accuracy is not guaranteed. Specifications and drawings are for the assistance and guidance of the Contractor.
- B. Electrical drawings are diagrammatic, but will be followed as closely as existing building conditions will permit. All deviations from the drawings required to make the Electrical Work conform to the existing building will be made by the Contractor as approved by the Engineer.

1.9 VISIT THE SITE

- A. Contractors are assumed to have visited the site and thoroughly acquainted themselves with conditions affecting the proposed work. Verify existing conditions and measurements at the building before beginning work and immediately notify the Engineer of any discrepancies which may adversely affect completion of the work.

1.10 TEMPORARY POWER

- A. Provide temporary power for reasonable convenience during construction in accordance with the General Conditions.
- B. Provide GFCI Protection for all temporary power outlets.
- C. Use temporary power for construction purposes only. Do not use temporary power for electric space heating, etc..

1.11 SHOP DRAWING SUBMITTALS

- A. As soon as possible after contract award, submit shop drawings for review in accordance with the General Conditions and Division 1 Specifications.

- B. Submit shop drawings in three ring loose-leaf binder.
- C. Divide Electrical equipment into subsections of common equipment with an index tab for each section. Provide a complete equipment list at the beginning of each subsection.
- D. Provide manufacturers' catalogue and/or descriptive literature indicating specific model and/or catalog numbers, options, accessories and modifications for the following items:
 - 1. Wiring Devices and Occupancy Sensors
 - 2. Surface Raceway System
 - 3. Metering Equipment
 - 4. Panelboards
 - 5. Light Fixtures
 - 6. Exterior Lighting Controls
 - 7. Fire Alarm System
- E. Above list is considered minimum. Additional items may be required to be submitted for review.
- F. Refer to individual Specification Sections for additional Shop Drawing Submittal requirements.

1. 12 RECORD DRAWINGS

- A. Provide As-Built Record Drawings in accordance with the General Conditions and Division 1 Specifications.
- B. Indicate all changes made to the drawings such as changes in fixture and outlet location, changes in circuit routing and circuit numbering, etc. Include all changes by Addenda, Change Order, Supplemental Instruction or verbal instruction.
- C. Refer to individual Specification Sections for additional Record Drawing requirements.

1. 13 OPERATION AND MAINTENANCE MANUALS

- A. Provide Operation and Maintenance Manuals in accordance with the General Conditions and Division 1 Specifications.
- B. Include manufacturers' catalog and/or descriptive literature of equipment actually installed. Clearly indicate on literature the specific model and/or catalog numbers of equipment installed, including all options, accessories and/or modifications.
- C. All copies of literature will be new, clean and clearly legible. Sheets used for shop drawing submittals with review stamp, remarks, etc., will not be acceptable.
- D. Divide Electrical equipment into subsections of common equipment with an index tab for each section. Provide a complete equipment list, and recommended maintenance schedule if required, at the beginning of each subsection.
- E. Refer to individual Specification Sections for additional Operation and Maintenance Manual requirements.

1. 14 WARRANTY

- A. Provide Warranty for Electrical Work in accordance with the General Conditions and Division 1 Specifications.
- B. Provide manufacturer's warranty for all equipment which the manufacturer normally provides a

warranty in excess of twelve months. Refer to individual Specification Sections for extended warranty requirements.

1. 15 EXTRA MATERIAL STOCK

- A. Provide extra material stock in original cartons, or packaged with protective coverings, for storage and identified with labels clearly describing contents.
- B. Turn over extra stock to Owner and place in storage prior to Substantial Completion. Exact location of storage to be determined by the Owner.
- C. Obtain signed receipt for extra stock materials from the Owner's Project Manager. Include copy of signed receipt in the Project Operation and Maintenance Manuals.
 - 1. Receipt shall include description and quantity of all material.
- D. Provide the following extra stock of materials to the Owner.
 - 1. Occupancy sensors: refer to Specification Section 16140 - Outlets and Wiring Devices for required quantities.
 - 2. Fixture lenses, diffusers, and lamps: refer to Specification Section 16500 - Lighting for required quantities.
 - 3. Fire Alarm System keys and devices: refer to Specification Section 16720 - Fire Alarm System for required quantities.

PART 2 - PRODUCTS

2. 1 MATERIALS

- A. All materials and equipment for which U.L. Standards have been established, will be listed by and bear the label of Underwriters Laboratories, Inc..
- B. All materials will be new and bear the manufacturer's name, trade name and catalog or model numbers. Similar items will be of the same manufacturer.

PART 3 - EXECUTION

3. 1 INSTALLATION

- A. Installation of materials will comply with all codes and be accomplished with good workmanship in the judgement of the Engineer.

3. 2 MATERIAL HANDLING

- A. Use all means necessary to protect materials before, during and after installation and to protect the installed work and materials of all other trades.
- B. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

3. 3 CUTTING AND REPAIRING

- A. Provide all required digging, cutting, etc. incidental to the Electrical Work. Make required repairs thereafter to the satisfaction of the Engineer.

- B. Do not cut into any major structural element, beam or column, without written approval of the Engineer.
- C. Install the Electrical Work to proceed with other trades in order to avoid unnecessary cutting of the construction.

3.4 CONSTRUCTION REVIEW

- A. The Owner and/or Engineer will perform construction review throughout the construction of the project. The construction review does not relieve the contractor from the responsibility of providing all materials and performing the work in accordance with the Contract Documents.
- B. Notify the Engineer in writing, giving ample notice, at the following stages of construction and allow the Owner and/or Engineer to review the installed work.
 - 1. When all electrical rough-in is complete, but not covered.
 - 2. Pre-Final, upon completion of all electrical work.
 - 3. Final, upon completion of all items noted in the Pre-Final Construction Review Report.
- C. Prerequisite for Final Electrical Construction Review:
 - 1. Engineer must be present.
 - 2. Electrical Contractor's job foreman must be present.
 - 3. Owner's Representative must be present.
 - 4. Service Disconnect and all new panelboard enclosures must be open.
 - 5. Clear access must be provided to all devices and equipment.
 - 6. All panels, disconnects, etc. must be labeled and typed panel index cards installed.
 - 7. All light fixtures, outlets, equipment, etc., must be energized and operable.
 - 8. Contractor must have pad and pencil to list all deficient items.
 - 9. Make all corrections and adjustments after the Final Construction Review, not during. Items requiring correction will appear on the Final Construction Field Report.
 - 10. Contractor must have all required keys to provide access to all panels and doors.
- D. Test all systems and equipment provided and/or connected under the Contract for short circuits, ground faults, proper neutral connections and proper operation in the presence of the Owner and/or Engineer.
- E. The entire construction will be installed in accordance with the contract documents and be free of mechanical and electrical defects prior to final acceptance of the work.

* END OF SECTION 16000 *

SECTION 16060 - MINOR ELECTRICAL DEMOLITION FOR REMODELING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

- A. Remove electrical equipment and wiring systems and make required extensions and reconnections as shown on Drawings and specified herein.
- B. Repair all damage resulting from demolition and extension work.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Provide new materials and equipment for patching and extending work as specified in the appropriate Specification Section for the materials and equipment involved.
- B. Where materials or methods not included in the Specifications are required, provide materials and methods in accordance with normal construction industry standards and as approved by the Engineer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Field verify existing measurements and circuiting arrangements are as shown on Drawings.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition Drawings are based on field observation of existing surface conditions and available existing building electrical drawings. Report discrepancies to Engineer before disturbing existing installation.
- D. All demolition and extension work is not necessarily indicated on Drawings. Include all such work without additional cost to Owner.

3.2 PREPARATION

- A. Coordinate utility service outages with Owner's Facilities Project Manager.
- B. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use electricians experienced in such operations.
- C. Protect all existing electrical equipment to remain from damage during demolition and new construction. Survey all existing equipment prior to beginning work and document in writing and/or by photograph any existing equipment damage.

3.3 DEMOLITION

- A. Coordinate with Owner for equipment and materials to be removed by Owner or salvaged by the contractor for Owner. Place salvaged equipment and materials in storage at the project site as directed by the Owner.
- B. Legally dispose of all removed equipment and materials not salvaged for the Owner.
 - 1. Existing fluorescent lamp ballasts are assumed to be free of PCBs. The contractor shall verify that ballasts are free of PCBs with the ballast manufacturer prior to disposal. Any additional cost for hazardous material disposal will be negotiated under the change order provisions of the contract, or the Owner will assume responsibility for legal disposal of the ballasts.
- C. Remove abandoned wiring to source of supply, i.e. panelboard, circuit breaker, etc..
- D. Remove accessible abandoned conduit, cables, junction boxes, etc., including above accessible ceilings. Cut conduit flush with walls and floors.
- E. Disconnect abandoned outlets and remove devices. Remove abandoned outlet boxes and conduit servicing them where indicated on drawings. Provide blank cover for abandoned outlets which are not indicated to be removed.

3.4 EXTENSION OF EXISTING ELECTRICAL WORK

- A. Reconnect existing equipment where demolition interrupts existing circuits.
- B. Repair adjacent construction and finishes damaged during demolition and extension work to match surrounding surfaces.
- C. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.
- D. Extend existing installations using materials and methods as specified for new work. Remove and replace existing installations which are not compatible with new work.

3.5 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment which remain or are to be reused.

3.6 INSTALLATION

- A. Install relocated materials and equipment as required for new materials and equipment.

3.7 OUTAGES

- A. Maintain Existing Electrical Systems in service until new systems are complete and ready for service. Disable systems only to make switchovers and connections. Minimize outage duration.
- B. Obtain permission from Owner's Facility Project Manager before partially or completely disabling systems in accordance with Division 1 Specification Sections.

* END OF SECTION 16060 *

SECTION 16110 - RACEWAYS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

- A. Provide a complete raceway system for all wiring as shown on the drawings and as specified herein.

PART 2 - PRODUCTS

2.1 WIRING METHODS

- A. Single conductor wiring in approved raceways as specified herein may be used in all locations.
- B. Type 'MC' Metal Clad Cable may be used for branch circuits only where concealed within ceiling and walls and not subject to damage.
 - 1. Provide metal clad cable with colored conductor insulation to identify voltage and phase as specified in Section 16120 - Conductors.
 - 2. Provide conduit from the panelboard to an accessible junction box for all metal clad cable branch circuit homeruns.
 - 3. Support metal clad cable from building structure in accordance with NEC requirements.
 - 4. Do not use metal clad cable for through wiring to lay-in type light fixtures or similar elements designed to allow movement or relocation.
- C. Do not use aluminum conduit, BX cable, Flexible Non-metallic Tubing, NM cable, Direct Burial Cable or any other wiring methods not allowed by this specification unless approved in writing by the Engineer.

2.2 ABOVEGROUND RACEWAYS

- A. Provide minimum 1/2" trade diameter conduit for aboveground raceways.
- B. Provide Electrical Metallic Tubing (EMT), galvanized inside and out, for raceways not subject to permanent moisture or damage.
- C. Provide Galvanized Rigid Steel Conduit (GRC) where raceways are subject to permanent moisture such as underground, or damage such as vehicular traffic, etc..

2.3 SURFACE METAL RACEWAYS

- A. Provide Wiremold V/G 2000 Series, or equal surface metal raceway system UL Listed for power wiring, in finished areas where ceilings or walls are not accessible for installation of other raceway systems as indicated on the drawings.
- B. Provide surface raceway with gray finish for installation on wood ceilings or with ivory finish for installation on walls, to match color of existing surface raceway systems.

- C. Provide suitable fittings for connection to outlet boxes, fixtures, etc., which maintain the mechanical integrity of the surface raceway system.

2.4 FLEXIBLE RACEWAY CONNECTIONS

- A. Provide Flexible Steel Conduit for where required for movement or vibration.
 - 1. Connect to lay-in light fixtures with minimum 1/2" flexible steel conduit or 3/8" factory fabricated fixture whips not to exceed 6 feet in length.
- B. Provide liquid-tight flexible steel conduit outside and in wet, humid, corrosive and oily locations.
 - 1. Provide Sunlight Resistant liquid-tight flexible steel conduit outdoors.
- C. Provide an equipment ground conductor in all flexible steel conduit.
- D. Flexible Steel Conduit may be used where misalignment or cramped quarters exist only with prior approval of the Engineer.
- E. Flexible Steel Conduit may be used to fish through existing walls and ceilings only with prior approval of the Engineer.

2.5 CONDUIT FITTINGS

- A. Provide steel compression type or steel set screw type fittings for Electrical Metallic Tubing.
- B. Provide malleable iron clamp type fittings for Flexible Steel Conduit.
- C. Provide steel compression type fittings for Liquid-Tight Flexible Steel Conduit.
- D. Provide steel rain-tight, compression type fittings for all conduit installed outside and in wet, humid, corrosive and oily locations.
 - 1. Provide Meyers Hubs or equal protection where exterior conduits are terminated on the top or sides of enclosures.
- E. Provide insulated throat connectors or equal type insulating bushings for all conduit terminations.
- F. Provide Grounding Bushings bonded to the electrical system ground:
 - 1. On each end of all service conduits.
 - 2. On each end of all feeder conduits in which a separate ground conductor is installed.
 - 3. On each end of all conduits used to protect ground conductors.
 - 4. On all conduit terminations installed in concentric or eccentric knockouts or where reducing washers have been installed.
- G. Do not use the following except as approved by the Engineer:
 - 1. Cast metal or indenter type fittings.
 - 2. Screw-in type fittings for Flexible Steel Conduit.

2.6 RACEWAY SEALS

- A. Seal all conduit penetrations through fire rated walls, ceilings and floors with a UL classified fire barrier system as manufactured by Scotch 3M or Nelson Electric which will provide an immediate fire seal, require no curing time, and emit no hazardous or toxic fumes.
- B. Seal all conduit penetrations through airtight spaces and plenums with an approved mastic compound acceptable to the Engineer to prevent air leakage.

2.7 PULL BOXES

- A. Provide pull boxes or conduit bodies in accessible locations where required to reduce the number of bends in the conduit run to less than 360 degrees.

- 1. Indicate exact location of pull boxes and conduit bodies on the As-Built Record Drawings.

2.8 PULL STRING

- A. Provide a nylon or polypropylene pull string with not less than 200 lb tensile strength in all spare conduits and conduits installed for use by others. Provide a hard cardboard tag for each raceway to indicate location of the opposite end of the raceway.

PART 3 - EXECUTION

3.1 SUPPORTS

- A. Securely support all raceways and cables with pipe straps, hangers, or ceiling trapeze directly from building structure such as roof trusses, beams, floor joists, etc., in accordance with Specification Section 16190 - Supporting Devices.

- 1. Do not support raceways from other electrical systems or mechanical systems.

- B. Provide support spacing in accordance with NEC requirements for the type of raceway or cable system installed. Provide additional supports where necessary such that raceway are held rigidly in place.

- 1. Install supports at vertical to horizontal conduit bends on the upper side of the bend.

- C. Secure surface raceway system to structure at points not more than 5 feet on center or as recommended by the manufacturer, whichever is less.

3.2 INSTALLATION

- A. Raceway layouts on the drawings are generally diagrammatic and the exact routing of raceways will be governed by structural conditions and the work of other contractors.

- B. Install raceways concealed within finished ceilings, walls and floors except where exposed raceways are specifically shown on the drawings or permitted by the Engineer.

- C. Install exposed conduit and surface metal raceway parallel with or perpendicular to walls and ceilings, with right angle turns consisting of symmetrical bends or conduit bodies equal to Crouse-Hinds "Condulet". Avoid all bends and offsets where possible.

- 1. Paint exposed raceways to match surrounding surfaces, except raceways in unfinished areas such as mechanical rooms and electrical rooms will not be required to be painted.

- D. Install raceways minimum 12" from insulation of hot water piping, steam piping and other systems or equipment with temperatures in excess of 104° F (40° C).
- E. Make all field bends and offsets with a radius not less than allowed by the National Electrical Code for the type of raceway system.
 - 1. Do not install bends or offsets which are flattened, kinked, rippled or which destroy the smooth internal bore or surface of the conduit.
- F. Cap the open ends of raceways during construction to prevent the accumulation of water, dirt or concrete in the raceways. Thoroughly clean raceways in which water or other foreign matter has been permitted to accumulate or replace the raceway where such accumulation cannot be removed by a method approved by the Engineer.
- G. Do not install raceways which have been crushed or deformed in any manner.
- H. Do not install wiring until work which might cause damage to the wires or raceways has been completed.

* END OF SECTION 16110 *

SECTION 16120 - CONDUCTORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

- A. Provide all conductors for power and lighting as shown on drawings and as specified herein.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Provide Copper building wire, minimum #12 AWG, with type THHN/THWN or XHHW 600 volt insulation, except as otherwise noted on the drawings or required by NEC.
- B. Provide stranded conductors for wires #8 AWG and larger and for terminal connections to all motors. Stranded or solid conductors may be used for sizes smaller than #8 AWG at the contractor's option.
- C. Provide conductors rated 90° C minimum in wiring channels of Fluorescent and High Intensity Discharge lighting fixtures. Provide higher rated wiring were required by the fixture labeling, or the manufacturer's installation instructions.
- D. Provide conductors with surface printed identification showing conductor size and material, insulation type, voltage rating and approvals at regularly spaced intervals of 24".
- E. Do not use sizes smaller than #12 AWG in branch circuits carrying load. Circuits requiring larger sizes to meet voltage drop conditions, etc., are indicated on the drawings.
 - 1. Where branch circuit homeruns indicate conductor size, use that size conductor for the entire branch circuit, including switch legs, etc.
- F. Do not use aluminum conductors.

2.2 SPLICES

- A. Provide Ideal wrenuts or Scotchlock spring connectors for all conductor splices #8 AWG and smaller. Provide split-bolt or compression type connectors for all conductor splices larger than #8 AWG.
- B. Provide splices which are UL listed for the type, quantity and size of the conductors to be spliced.
- C. Provide all splices with insulation at least equal to that of the conductor.
- D. Provide watertight splices in junction or outlet boxes located outside and in wet locations. Provide heat shrink insulating kits or use connectors pre-potted with an approved waterproof compound.
- E. Splice conductors only in approved boxes.
- F. Do not splice conductors in conduit bodies, panelboard enclosures, switchboard enclosures, or similar locations.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install all conductors in approved raceway systems.
- B. Install branch circuit conductors continuous without splice from panelboards to fixture outlet boxes, device terminals, etc..
 - 1. Provide suitable pull boxes in readily accessible locations where necessary at intermediate points of branch circuits. Indicate exact location of all boxes on the As-Built Record Drawings.
- C. Do not install wiring until work which might cause damage to the wires has been completed.

3.2 COLOR CODING AND IDENTIFICATION

- A. Color code all wiring at each enclosure and box where conductors are accessible and at each splice, tap or termination by means of colored conductor insulation.
 - 1. For conductors #6 AWG and larger, colored self-adhesive tape with the appropriate color designations may be used.
- B. Color code each conductor of each circuit as follows.
 - 1. Ground: Green or Bare Copper
 - 2. 120/240 Volt, 1 Phase, 3 Wire System
 - a. Phase A - Black
 - b. Phase B - Red
 - c. Neutral - White
 - 3. Match existing conductor color coding if different than above.
- C. Color code switch legs and travelers according to phase with colors other than used for phase conductors, to be consistent throughout the project.

3.3 IDENTIFICATION

- A. Provide conductor identification in accordance with Specification Section 16195 - Electrical Identification.

3.4 MULTI-WIRE BRANCH CIRCUITS

- A. In general do not install new multi-wire branch circuits. Provide a separate neutral for each new branch circuit unless specifically indicated otherwise on the drawing.
 - 1. Existing multi-wire branch circuits may be extended or reconnected as required for new construction. Provide circuit breaker handle ties for modified multi-wire circuits as required by NEC 210.4 (B).
 - 2. Where a common neutral is run for multi-wire branch circuits, connect phase conductors to separate phases such that the neutral conductor will carry only the unbalanced current. Use a neutral conductor one size larger than the phase conductors.

- B. Do not install more than three phase conductors in any raceway except where specifically shown on the drawings or approved by the Engineer.

3.5 PHASE ROTATION

- A. Phase rotation for Single Phase System will be A leads B from front to back, from left to right or from top to bottom as viewed from the front of the enclosure.

* END OF SECTION 16120 *

SECTION 16130 - ELECTRICAL BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

- A. Provide junction boxes and outlet boxes at each outlet, fixture and other device location as shown on drawings and as specified herein.

PART 2 - PRODUCTS

2.1 OUTLET AND DEVICE BOXES

- A. Provide galvanized or cadmium plated sheet steel electrical boxes in indoor dry locations, of the most suitable size and shape for the conditions encountered and in accordance with NEC requirements for the number of conductors allowed.
- B. Provide cast metal boxes outside, in wet, humid or corrosive locations and where exposed to damage such as vehicular traffic.
- C. Confer with the various equipment suppliers and either use or properly provide for boxes which are furnished with the equipment, such as speakers, horns, bells, etc..
- D. Do not use "THRU-THE-WALL" boxes, sectional (gangable) boxes or non-metallic boxes.

2.2 JUNCTION BOXES

- A. Provide junction boxes as specified for outlet and device boxes except that boxes 6" square and larger may be painted sheet steel.

2.3 BOX ACCESSORIES

- A. Provide fittings, plaster rings, cover plates and other accessories suitable for the purpose and location of each box.
- B. Provide plaster rings which are minimum 1/8" deeper than wall covering for flush mounted boxes (i.e. use 3/4" plaster ring for 5/8" gypsum board wall covering) such that plaster ring will be flush with finished face of wall.
- C. Provide industrial raised covers for surface mounted outlet and device boxes.

PART 3 - EXECUTION

3.1 SUPPORTS

- A. Support each box from the building structure independent of the raceway system.
- B. Support flush mounted wall boxes with metal bar hangers or metal stud backing behind the box secured to wall studs.
- C. Support flush mounted ceiling boxes with metal bar hangers secured to ceiling support system or

threaded rod hangers secured to structure.

- D. Secure surface mounted boxes to building structure with minimum of 2 screws or bolts as required.
- E. Do not use side mounted boxes or brackets.

3.2 INSTALLATION

- A. Install flush mounted boxes, after being equipped with extensions, accessories, etc., flush with finished face of wall, ceiling or floor.
 - 1. Replace or repair all boxes not installed flush with finished surfaces to the satisfaction of the Engineer.
- B. Install outlet boxes for light switches on the strike side of door openings.
- C. Seal around the perimeter of all switch and outlet boxes with plaster or grout as required to close any opening between the outlet box and the wall finish.
- D. Install boxes level and plumb.

3.3 LOCATIONS

- A. The wiring system layouts on the drawings are generally diagrammatic and the location of outlets and equipment are approximate.
- B. Study all available drawing details, shop drawings, equipment drawings, building conditions and materials surrounding each outlet and device box prior to installing the box to ascertain the exact location required for each box.
- C. Rough in the electrical work such that electrical outlets, fixtures and other fittings are properly fitted to the work of other trades.
- D. Do not install boxes inside cupboards, behind drawers, or otherwise so located, as to be inaccessible or unsuited for the purpose intended.
- E. The right is reserved to make any reasonable change in the location of the outlets before roughing in, without involving additional expense.

3.4 MOUNTING HEIGHT

- A. Install outlet and device boxes at the heights shown on the drawings or as directed by the Engineer. In general, mount outlets as follows.

1. Receptacles	18"
2. Wall Switch	46"
3. Exit Lights	8'-0"
- B. All mounting heights, including mounting heights indicated on drawings, are to the center of the outlet box above finished floor or grade unless noted otherwise.
- C. Refer to applicable Specification Sections for mounting heights of devices and equipment not included above or install at heights as directed by the Engineer.

* END OF SECTION 16130 *

SECTION 16140 - OUTLETS AND WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

- A. Provide all wiring devices complete with coverplates and necessary accessories as shown on the drawings and as specified herein.

1.3 SUBMITTALS

- A. Provide submittals for each type of wiring device to be used on the project in accordance with Division 1 Specifications and Section 16000 - General Provisions, Electrical to verify compliance with the contract documents.

PART 2 - PRODUCTS

2.1 WIRING DEVICES

- A. Provide wiring devices rated 20 amps minimum, as specified below, or equivalent of Bryant, Eagle, General Electric, Hubbell, Leviton, or Pass & Seymour.

1. Switch, Single Pole	Bryant 4901
2. Switch, 3 - Way	Bryant 4903
3. Combination Switch - 2 Single Pole	Leviton 5627
4. Receptacle, duplex convenience, 3-wire	Bryant 5352
5. Receptacle, duplex, GFCI protected	Bryant GFR53FT

- B. Color of devices in finished areas will be as selected by the Engineer from the manufacturer's standard colors to compliment the color of architectural finishes.
- C. Provide convenience outlets with GFCI protection in accordance with NEC requirements, where installed outside or within 6 feet of any sink and as indicated on the drawings.
 - 1. Provide a self-adhesive printed label stating "GFCI PROTECTED" for each outlet protected by feed-through GFCI receptacles or GFCI circuit breakers.
 - 2. Use feed-through GFCI outlets only to protect other outlets within sight of the GFCI protected outlet.

2.2 COVERPLATES

- A. Provide a cover plate for each outlet and box suitable for the location and function of the outlet and box.
- B. Provide blank cover plates for junction boxes and outlet boxes not used.
- C. Provide Stainless Steel coverplates for outlets and boxes installed in finished areas.
- D. Provide UV Stabilized Polycarbonate, "Raintight While In Use" coverplates with spring return lids and suitable gasket as manufactured by Eagle or Taymac for all devices installed outside or in wet

locations.

2.3 OCCUPANCY SENSORS

- A. Provide dual technology, ultrasonic and passive infrared, occupancy sensors, as specified below, to control lighting in rooms as indicated on the drawings.

1. 360° Ceiling Sensor, Line Voltage, 120 Volt: Hubbell CUI5002000P120

- a. Coverage up to 2,000 Square Feet.
- b. Contact rating: 2,400 Watts at 120 VAC

2. Wall switch Hubbell LHMTS1

- a. Coverage up to 2,000 Square Feet.
- b. 120/277 dual voltage rating.
- c. Contact ratings: 1,000 Watts Fluorescent at 120 VAC

3. Wall Switch, Dual Level Hubbell LHMTD2

- a. Coverage up to 2,000 Square Feet.
- b. 120/277 dual voltage rating.
- c. Contact ratings: 1,000 Watts Fluorescent at 120 VAC
- d. Two switches for separate control of two loads.

- B. Other acceptable manufacturers, subject to compliance with the contract documents are Honeywell, Leviton, Lightolier, Novitas, Pass & Seymour, Tork, Uneco and Watt Stopper.

1. Coverage areas indicated on the drawings are based on the use of the above specified occupancy sensors. Other acceptable manufacturers which require additional sensors for coverage areas indicated shall provide additional sensors without additional cost to the Owner.

2.4 ACCESSORIES

- A. Equip each outlet with devices suitable for the purpose of the outlet and with means of properly connecting the equipment served, whether or not such devices are specifically mentioned.

2.5 EXTRA STOCK

- A. Provide the following extra stock of materials to the Owner.

1. Occupancy Sensors: 10% , but not less than 1 of each type used on the project.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Properly locate each outlet to fulfill its particular purpose. Do not install receptacles or boxes inside cupboards, behind drawers, or otherwise so located, as to be inaccessible or unsuited for the purpose intended.

- B. Install all outlets and wiring devices flush with face of coverplate, with the coverplate in contact with the finished face of the wall and with mounting strap of device in contact with the outlet box.

* END OF SECTION 16140 *

SECTION 16190 - SUPPORTING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

- A. Provide suitable supporting devices for all electrical equipment, raceways and components as specified herein and as shown on the drawings.
- B. Refer to individual specification sections for additional supporting requirements.

PART 2 - PRODUCTS

2.1 SUPPORTING DEVICES

- A. Provide support anchors which will support in tension a minimum of 4 times the weight of the equipment to be supported but not less than 100 lbs.
- B. Provide wood screws in wood; toggle bolts in hollow masonry units; expansion bolts with zinc shield or shot anchors in concrete and brick; and machine screws, threaded 'C' clamps or spring-tension clamps on steel work.
- C. Do not use tie wire for support unless specifically called for in individual specification sections.
- D. Do not use threaded C Clamps on tapered steel sections.
- E. Do not weld supports, equipment, boxes, raceways, etc., to steel structures.
- F. Do not use wooden plugs or plastic inserts as a base for supports.
- G. Do not use shot anchors or drilled anchors of any kind in prestressed or post-tensioned concrete slabs and beams except as approved in writing by the Engineer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Secure supporting devices to building structure.
- B. Do not install supporting devices with sheetrock or plaster as the sole means of support. Provide proper blocking behind the sheetrock or plaster as required to support equipment.

* END OF SECTION 16190 *

SECTION 16195 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

- A. Provide identification of all electrical equipment, devices, enclosures, conductors, cables, etc., as shown on the drawings and as specified herein.
- B. Refer to individual specification sections for additional identification requirements.

PART 2 - PRODUCTS

2.1 NAMEPLATES

- A. Provide engraved laminated micarta or plastic nameplates to identify each panelboard, cabinet, motor starter, disconnect, etc., with the following minimum lettering heights:
 - 1. Panelboards, etc. - 3/8"
 - 2. Time switches, lighting contactors, etc. - 3/16"
- B. Provide Black Nameplates with White Lettering unless noted otherwise, or required to contrast with equipment enclosures.
- C. Do not use Dynamo Labels, printed labels, etc., unless specifically called for in other specification sections or approved by the Engineer.

2.2 PANELBOARD IDENTIFICATION

- A. Provide one engraved nameplate on the exterior trim of each Panelboard, visible without opening the door, to include the Panel Designation and the System Voltage.
 - 1. Example: PANEL 'A'
 120/240 V, 1Ø
- B. Provide nameplates on each Branch Breaker of Distribution Panelboards to indicate the Panel or Equipment served by the Branch Breaker.
 - 1. Example: PANEL 'A'
 - 2. Install the branch breaker nameplates on the wireway cover trim of panelboards. Do not install the nameplates on interchangeable dead-front trims.

2.3 CONDUCTOR IDENTIFICATION

- A. Identify each branch circuit and each feeder conductor at each outlet box, pull box, or other accessible location with hand lettering in black India ink in the enclosure to indicate panel and circuit numbers of all conductors in the enclosure.
- B. Identify individual conductors with self adhesive printed markers equal to Thomas & Betts "E-Z Code" markers in outlet boxes, pull boxes, or other accessible location according to the circuit

number in outlet boxes, pull boxes, etc., at the following locations:

1. Where circuit number of individual conductors cannot be determined by color coding, such as two or more conductors on the same phase.
2. Where more than one neutral conductor occurs, or where the neutral conductor is not common to all phase conductors, identify the neutral conductor according the associated phase conductor(s) circuit number(s).

2.4 PANELBOARD CIRCUIT INDEX

- A. Provide a neatly typed index, to include type of load served and the specific location of the load for each branch circuit of each panelboard.
 1. Provide a new typed index for each existing panelboard in which branch circuits are added, removed, or modified to reflect all changes in circuiting.
- B. Examples
 1. Lighting, Southwest Conference Room
 2. Lighting, 2nd Floor Conf. Rm and Office 208
 3. Receptacles, SW Conf. Rm, west and north walls
- C. Do not use room numbers shown on plans, use room numbers or nomenclature assigned to rooms by the Owner. Do not use remarks from panel schedules on drawing, the remarks are for the Contractor's reference only.
- D. Include the panel designation and location of feeder breaker serving the panelboard at the top of the circuit index.
 1. Example: PANEL 'A'
 FED FROM PANEL 'M'

2.5 WIRING DEVICE CIRCUIT IDENTIFICATION

- A. Identify the branch circuit serving each receptacles, switch, and other wiring devices, by means of 10 point Kroy labels installed on the device coverplate, or by equal method acceptable to the Engineer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install nameplates to be visible from normal viewing angles.
- B. Attach nameplates to equipment enclosures with stainless steel screws or rivets. Adhesives are not acceptable.
- C. Install panel index behind protective plastic covering.

* END OF SECTION 16195 *

SECTION 16400 - SECONDARY SERVICE AND DISTRIBUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.
- B. Section 16110 - Raceways
- C. Section 16120 - Conductors

1.2 SCOPE

- A. Provide complete electrical service as shown on drawings and as specified herein.

1.3 SUBMITTALS

- A. Provide shop drawing submittals for Metering Equipment in accordance with Division 1 Specifications and Section 16000 - General Provision, Electrical to verify compliance with the Contract Documents.
- B. Include Manufacturer's standard published literature for Metering Equipment. Clearly indicate all options, accessories, finishes, etc., to be provided.
- C. Include literature to verify compliance with referenced EUSERC, ANSI and UL Standards.

PART 2 - PRODUCTS

2.1 SYSTEM

- A. The Existing Secondary Electrical Distribution System is 120/240 Volt, Single Phase, Three Wire, 60 Cycle for Lighting, Appliances and Outlets; and 240 Volt, Three Phase, Three Wire, 60 Cycle for Equipment.

2.2 SERVICE ENTRANCE

- A. Existing single phase underground electrical service is to remain. Reconnect to new service disconnect and new single phase distribution panel as indicated on drawings.
- B. Existing three phase underground electrical service is to remain.

2.3 METERING

- A. Provide new electronic kilowatthour / demand meter as indicated on the drawings.

2.4 FEEDERS

- A. Sizes and connection of feeders are shown on the Power Riser Diagram. Feeders are sized to handle rated loads and to meet voltage drop conditions.
- B. Do not install conductors of different sizes or types in the same conduits.

PART 3 - EXECUTION

3.1 COORDINATION

- A. Coordinate electrical service and metering with Owner prior to beginning work.

3.2 FEEDERS

- A. Before or during final job site observation, check each panel feeder and main feeder for balance of load on each phase, and make necessary adjustments to insure acceptable balance.

3.3 POWER OUTAGES

- A. Power outages to any portion of the existing building will not be allowed except on weekends, holidays and/or as directed by the Owner.

- 1. Submit written requests for power outages to the Owner not less than Seven (7) working days prior to all proposed outages.
- 2. Do not take any power outages without the Owners permission.

* END OF SECTION 16400 *

SECTION 16450 - SECONDARY GROUNDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

- A. Ground all non-current carrying metallic parts of electrical equipment, raceway systems and the neutral conductor of the wiring system as shown on the drawings and specified herein.

PART 2 - PRODUCTS

2.1 GROUND CONDUCTORS

- A. Provide copper ground electrode conductors, minimum No. 8 AWG solid. Stranded conductors may be used for sizes No. 2 AWG and larger.
- B. Provide an insulated equipment ground conductor in all raceways on the load side of the service disconnect.

2.2 GROUND CONNECTIONS

- A. Make the electrical service ground connection at the main service equipment and connect to existing metallic water service, and ground rods as shown on the drawings and in accordance with NEC Article 250, Part III.
- B. Bond the neutral conductor to electrical service ground system at the main transformer and the main service equipment only.
- C. Bond all interior metallic piping systems to the electrical service ground system.
- D. Make above ground connections by means of pressure connectors, compression connectors, clamps or other means which are UL Listed and classified as suitable for purpose.
- E. Make all underground connections by means of an exothermic welding process equal to Cadweld or Thermoweld, in strict accordance with manufacturer's written instructions and recommendations.

2.3 GROUND RODS

- A. Provide copper ground rods, minimum 3/4" diameter and 10'-0" long, which conform to UL 467, Grounding and Bonding Equipment where indicated on the drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Leave ground connections accessible for inspection.
- B. Install ground rods minimum 8 feet into earth. Space adjacent ground rods minimum 6 feet apart.

- C. Provide a separate ground terminal for each ground conductor in each panelboard, switchboard, and similar electrical equipment enclosures.
- D. Install all grounding in accordance with the latest edition of the National Electrical Code.

3.2 GROUND RESISTANCE MEASUREMENTS

- A. Measure the resistance to ground using the fall-of-potential method described in IEEE No. 81. The resistance values, soil conditions at the time of measurement and the location of each ground rod shall be recorded and forwarded to the Engineer.
- B. If a ground resistance of 25 Ohms or less cannot be obtained with the indicated ground electrodes, provide a supplementary ground electrode consisting of 3/4" x 10'-0" copper ground rods or deep driven sectional ground rods until a resistance of 25 Ohms or less is obtained. Total length of additional ground rods will not be required to exceed 30 feet. Space additional ground rods as evenly as possible and at least 6 feet from any other ground rods.

* END OF SECTION 16450 *

SECTION 16470 - PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

- A. Provide new panelboards complete with all necessary accessories as shown on drawings and as specified herein.

1.3 SUBMITTALS

- A. Provide shop drawing submittals for each Panelboard in accordance with Division 1 Specifications and Section 16000 - General Provision, Electrical to verify compliance with the Contract Documents.
- B. Include dimensioned construction drawings for each Panelboard. Clearly indicate voltage, ampacities, breaker types, conduit entrance areas, materials, options, accessories, finishes, etc., to be provided with each Panelboard. Include Series-Rated verification where required.

PART 2 - PRODUCTS

2.1 PANELBOARDS

- A. Provide dead front safety type panelboards, constructed in accordance with NEMA and UL standards, with plated aluminum or copper bus bars.
- B. Provide each panelboard with main circuit breaker, single lugs or double lugs for attaching feeder conductors and/or sub-feeder conductors as shown on the drawings.
- C. All panelboards to be 20" wide minimum.
- D. Provide panelboards with NEMA 1 enclosures unless indicated otherwise on the drawings.
- E. Arrange circuit breakers in double vertical row configuration with bolted bus connections.
- F. Provide panelboard fronts with concealed indicating trim clamps, concealed steel door hinges and a flush mounted combination latch and lock. Key all locks alike for all panelboards furnished for the project.
- G. Provide each panelboard with an approved circuit index holder with transparent protective cover on the inside of panelboard door.
- H. Provide a ground bus in each panelboard with a separate terminal for connection of each feeder and each branch circuit ground conductor.
- I. Panelboard schedules as shown on drawings.

2.2 CIRCUIT BREAKERS

- A. Provide thermal-magnetic type circuit breakers unless noted otherwise.

- B. Provide multi-pole breakers with trip elements in each pole and common trip handle.
- C. Provide "HACR" rated circuit breakers to serve heating, ventilating and air conditioning equipment branch circuits.
- D. Provide "SWD" rated circuit breakers to serve all lighting and outlet branch circuits.
- E. Provide new circuit breakers in existing panelboards of the same type and interrupting ratings as the existing circuit breakers. Provide new mounting hardware, connectors, dead front covers, etc., as required to install the new circuit breakers.
- F. Plug-in breakers are not acceptable for use in panelboards.

2.3 INTERRUPTING RATING

- A. Provide panelboards with minimum short circuit current interrupting ratings as shown on the drawings.
- B. The interrupting rating of circuit breakers shall be at least equal to the available short circuit current at the line terminals of the circuit breaker and correspond to the UL listed integrated short circuit current rating specified for the panelboards.
- C. The minimum interrupting ratings of circuit breakers used as feeders and branches may be in accordance with UL 489 tested and certified series-connected circuit breaker combinations. All electrical equipment using the Series Rated circuit breaker combinations shall be clearly marked on the panel nameplate and feeder breaker indicating the same.

2.4 ACCEPTABLE MANUFACTURERS

- A. Acceptable panelboard manufacturers, subject to compliance with the contract documents, are Cutler Hammer, General Electric, Siemens, and Square 'D'.

PART 3 - EXECUTION

3.1 SUPPORTS

- A. Provide a minimum of four supports, located at each corner of each panelboard. Where the enclosure exceeds 36 inches in any dimension, provide additional supports at 24 inches on center maximum.

3.2 MOUNTING HEIGHT

- A. In general, mount panelboards 6 feet above finished floor or grade to top of panel.
- B. Where panelboard exceeds 6 feet in height, arrange the panelboard so that the top operating handle does not exceed 6'-6" above finished floor or grade.

3.3 IDENTIFICATION

- A. Provide nameplates and neatly typed circuit index for each panelboard in accordance with Section 16195 - Electrical Identification.

* END OF SECTION 16470 *

SECTION 16500 - LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

- A. Provide all lighting fixtures, as shown on drawings and as described herein, complete with all necessary wiring, sockets, lamps, auxiliaries, supports, etc..

1.3 SUBMITTALS

- A. Provide shop drawing submittals for each Fixture and Ballast type in accordance with Division 1 Specifications and Section 16000 - General Provision, Electrical to verify compliance with the Contract Documents.
- B. Include Manufacturer's standard published literature for each fixture type. Clearly indicate all options, accessories, finishes, etc., to be provided with each fixture type.
- C. Include Manufacturer's standard published literature for each ballast type to be used on the project. Provide literature for each ballast manufacturer which the fixture manufacturer may use depending upon availability at the time the fixtures are manufactured.

PART 2 - PRODUCTS

2.1 FIXTURES

- A. Provide fixtures which comply with the appropriate Underwriters Laboratories (UL) Standards for the fixture type and which are UL Listed and UL Labeled.
- B. Acceptable fixture manufacturers and types are indicated on the Fixture Schedule included with the Drawings.
 - 1. Listing of the manufacturer's catalog numbers on the Fixture Schedule is intended to establish the general fixture type required and does not relieve the contractor and/or supplier from the responsibility to provide all accessories and options included in the fixture description nor from meeting the requirements of this specification.
- C. Provide all recessed light fixtures with thermal protection in compliance with NEC Article 410-65 (c) and UL Test Standard 1571.
- D. Provide individual fixtures with multiple ballasts as required to meet lamp switching requirements shown on the drawings.

2.2 FLUORESCENT BALLASTS

- A. Provide UL Listed, CBM-Certified by ETL, Premium Class 'P', Solid State Electronic, fluorescent ballasts with Class 'A' sound rating which meet the energy efficient requirements of the current Public Law, and Energy Conservation requirements for the lamp types to be served by the ballast.
- B. Electronic Ballasts shall operate lamps at a frequency of 42 to 52 KHz with no detectable lamp flicker, shall comply with FCC and NEMA limits governing EMI and RFI, and shall not interfere

with the operation of other normal electric and electronic equipment.

- C. Ballasts shall be potted, in a steel case and contain no PCBs.
- D. Provide fluorescent ballasts with the proper lamp circuit voltage and rating for the lamp types to be served by the ballast and with the following operating characteristics:
 - 1. Minimum Ballast Factor 0.75
 - 2. Minimum Power Factor 98%
 - 3. Maximum Total Harmonic Distortion (THD) 10%
- E. Ballasts shall be marked with manufacturer's name, part number, supply voltage, power factor, open circuit voltage, current draw for each lamp type, UL listing, CBM Certification and Date of Manufacture Code.
- F. Electronic Ballast Warranty shall be 5 Years from the "Date of Manufacture" Code on the ballast.
- G. Fluorescent Ballasts shall be of U.S. Manufacture. Acceptable Manufacturers, subject to compliance with Contract Documents, are Advance, Magnetek and Sylvania.

2.3 HIGH INTENSITY DISCHARGE (HID) BALLASTS

- A. Provide UL Listed, High Power Factor, High Intensity Discharge (HID) Ballasts which conform to the applicable ANSI Designation for the wattage and type of lamp served.
- B. Ballasts shall be marked with manufacturer's name, part number, supply voltage, power factor, open circuit voltage, current draw for each lamp type, UL listing and Date of Manufacture Code.
- C. HID Ballasts shall contain no PCB's.
- D. HID Ballast Warranty shall be 2 Years from the "Date of Manufacture" Code on the ballast.

2.4 LAMPS

- A. Provide lamps of the Wattages, Types, and with color characteristics as indicated on the Fixture Schedule included with the Drawings.
- B. Provide incandescent lamps rated for 120 volt unless otherwise specified.
- C. Provide fluorescent lamps which conform to the applicable ANSI Designations for the lamp wattage and type.
- D. Provide new fluorescent lamps with reduced mercury content, such as Phillips "Alto" Series Fluorescent Lamps, to meet the requirements of the EPA Resource Conservation Recovery Act for Toxic Characteristic Leaching Procedure.
- E. Provide High Intensity Discharge (HID) lamps suitable for the installed burning position which conform to the applicable ANSI designations for the wattage and type of lamps specified on the drawings.
- F. Acceptable Lamp Manufacturers, subject to compliance with the Contract Documents are General Electric, Phillips, Sylvania and Venture.

2.5 EMERGENCY FLUORESCENT BATTERY PACKS

- A. Provide emergency battery pack in fluorescent fixtures where indicated on drawings. Connect battery packs to the same branch circuit as the fixture, ahead of any local switches.

- B. The emergency battery packs shall consist of a high temperature nickel cadmium battery, battery charger and electronic circuitry contained in a single case furnished with charging indicator light and test switch for field installation in the fixture housing.
- C. The emergency battery pack shall be capable of operating with either a magnetic or electronic fluorescent ballast, produce between 1,100 and 1,400 initial lumens from one or two lamps and provide a minimum of 90 minutes of emergency illumination.
- D. The emergency battery pack shall have UL Component Recognition and be UL listed.
- E. The emergency battery pack shall be fully guaranteed for five years.
- F. Acceptable Manufacturers, subject to compliance with the Contract Documents:
 - 1. Bodine B50
 - 2. Iota I-80
 - 3. Lithonia PS1400
 - 4. Sure-Lights FBP240H

2.6 EXTRA STOCK

- A. Provide the following extra stock of materials to the Owner.
 - 1. Lamps: 10% , but not less than 2 of each type used on the project.
 - 2. Fixtures lenses and louvers: 10%, but not less than 1 of each type used on the project.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Properly center fixtures in each room. Where multiple fixtures occur, space them uniformly and in straight lines with each other.
- B. Locate recessed ceiling light fixtures to center on a single tile.
- C. Carefully lay out all openings required for recessed lighting units. Cooperate with other contractors and make provisions for openings of exact dimensions required and provide all required plaster rings and ground frames to be inserted in openings.
- D. Where lighting fixtures are shown to conflict with locations of structural members and mechanical or other equipment, provide adequate supports and wiring to clear same.

3.2 SUPPORTS

- A. Provide all necessary connectors, straps, etc., for secure mounting of all fixtures.
- B. Secure fixtures in suspended grid type ceilings to the grid members using a device capable of holding 100% of the fixture weight acting in any direction. Provide 12 gauge galvanized steel ceiling support wires attached to grid members within 3" of each corner of the fixture. Tandem fixtures may utilize common grid member support wires.
 - 1. Fixtures weighing less than 56 pounds in suspended grid type ceilings shall also be secured to building structure independent of the ceiling support system with a 12 gauge galvanized steel wire or #10 jack chain located at diagonally opposite corners of the fixture. These wires or chains may be slack.

- a. Provide recessed can type fixtures with metal bar hangers attached to the ceiling grid system. Secure fixtures to the building structure as specified above.
 - b. Support surface mounted fluorescent fixtures installed on suspended grid type ceilings from the building structure by means of independent support clips equal to Caddy No. IDS with proper stud length for fixture installed, and minimum of two 12 gauge galvanized steel support wires.
2. Fixture weighing 56 pounds or more in suspended grid type ceilings shall be supported directly from the structure above by approved hangers.
- C. Support recessed fixtures installed in gypsum board ceilings to the ceiling support system with metal bar hangers or suitable brackets.
 - D. Support surface mounted fluorescent fixtures installed on gypsum board or concrete ceilings from the ceiling with proper anchors at each corner of the fixture.
 - E. Fixtures designed to be supported from the outlet box will not require any additional support. Provide proper outlet box with fixture stud or plaster ring suitable to support the fixture. Secure the outlet box to the building structure with suitable anchors capable of supporting not less than 200 lbs or 4 times the fixture weight, whichever is greater.
- 3.3 LAMP BURN-IN
- A. Burn-in all fluorescent and HID lamps for a minimum of 100 hours prior to completion of the project and replace all defective lamps.
- 3.4 COORDINATION
- A. Verify existing ceiling types and compatibility with fixture mounting provisions prior to ordering fixtures. Immediately notify the Engineer in writing of any discrepancies between existing ceiling types and specified fixture types.
 - B. Coordinate fixture locations with existing conditions to provide adequate clearance between fixtures and ductwork, piping, structural members, etc., for proper installation of fixtures and to provide access for maintenance or replacement of the fixtures and nearby equipment.

* END OF SECTION 16500 *

SECTION 16720 - FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.
- B. The work covered by this section is to be coordinated with related work as specified elsewhere in the specifications. Requirements of the following sections apply:
 - 1. Section 16110: "Raceways"
 - 2. Section 16140: "Electrical Boxes"

1.2 SCOPE

- A. Provide microprocessor controlled, intelligent reporting fire alarm equipment as required to form a complete, operative, coordinated system to include, but not be limited to, fire alarm control panel, alarm initiating devices, alarm notification appliances, fire safety function control devices, and wiring as specified herein.
 - 1. Provide the system with minimum 15% spare capacity.
- B. Remove existing fire alarm system control panel and addressable devices for replacement with new control panel and devices. Provide additional new devices where indicated on the drawings.

1.3 STANDARDS

- A. The applicable provisions of the following industry standards are considered minimum requirements for fire alarm system work and are made a part of the contract documents:
 - 1. National Electrical Code, NFPA 70-2008
 - 2. National Fire Alarm Code, NFPA 72-2007
 - 3. International Fire Code, 2006
 - 4. International Building Code, 2006
 - 5. International Mechanical Code, 2006
 - 6. Rules, regulations and/or ordinances of local Authority Having Jurisdiction (AHJ) who is the Utah State Fire Marshal.
- B. If any conflict occurs between these rules and the contract documents or between the plans and specifications, notify the Engineer promptly in writing. Do not proceed with any work in conflict until a solution is approved in writing by the Engineer.

1.4 QUALIFICATIONS OF PERSONNEL

- A. Supervision of the fire alarm system installation, final connections, programming, and testing will be provided by personnel who are qualified and experienced in the installation, inspection, and testing of fire alarm systems. Qualified personnel shall be:
 - 1. Trained and certified by the fire alarm system manufacturer.
 - 2. Be Fire Alarm Level II certified by National Institute of Certification in Engineering Technologies (NICET).
 - 3. Be licensed by the State of Utah to perform Fire Alarm System work.

1.5 SUBMITTALS

- A. Provide submittals for the Fire Alarm System in accordance with Division 1 Specifications and Section 16000 - General Provisions, Electrical to verify compliance with the Contract Documents and the above referenced standards.
- B. Provide complete submittals in accordance with the International Fire Code, Section 907.1.1 to include, but not be limited to, the following:
 - 1. Building floor plan drawings showing location of the main fire alarm control panel, auxiliary control panels, initiating devices, notification appliances, control relays, pullboxes, wiring, etc., and connections to the fire alarm system.
 - a. The fire alarm system drawings included with the contract documents will be made available to fire alarm system supplier in electronic format, Autocad or DXF, as requested.
 - 2. Battery calculations to verify specified back up period.
 - 3. Voltage drop calculations to verify all devices will operate within the device voltage limits.
 - 4. Typical wiring diagrams for signaling line circuits, initiating device circuits, notification appliance circuits, fire safety function control circuits, and central station transmitter wiring.
 - 5. Provide manufacturer's standard catalog literature for all Fire Alarm System Equipment and Devices. Indicate specific item and options to be furnished where more than one item or option is included in the catalog literature.
- C. Submit qualifications and certifications of personnel who will be responsible for supervision of installation, system programming, final connections, and testing.
- D. In addition to routine submission of the above material, make an identical submission to the local Authority Having Jurisdiction for review. Upon receipt of comments from the Authority, resubmit if required to make clarifications or revisions to obtain approval.
 - 1. Approval of the AHJ is required prior to removing any part of the existing fire alarm system or installing any part of the new fire alarm system.

1.6 RECORD DRAWINGS

- A. Update fire alarm system submittal drawings upon completion of the installation for use as Record Drawings of the fire alarm system equipment and wiring as installed.
- B. Provide blue or black line prints of the record drawings in the Operation and Maintenance manuals along with required maintenance material. Leave one set of prints inside the main control panel or suitably protected and available in the vicinity of the main control panel.
- C. Provide an electronic copy of the record drawing in portable document format (.pdf), AutoCad, or .dxf as approved by the Engineer and Owner.

1.7 OPERATION AND MAINTENANCE MANUALS

- A. Provide complete operation and maintenance manuals listing the manufacturer's name(s) and service organizations complete with addresses, telephone numbers and other pertinent information.
- B. Provide technical data sheets for the control panel and each device including all features and

operating sequences, both automatic and manual. Indicate specific model(s) provide where more than one model is included on the data sheets. Indicate all options and accessories provided for each item.

- C. Provide wiring diagrams to indicate internal wiring for each device and the interconnections between the items of equipment.
- D. Provide a clear and concise operating instructions that give, in detail, the information required to properly operate the equipment and system.
- E. Provide record of field tests of system.

1.8 EXTRA MATERIALS

- A. General: Furnish extra materials, packaged with protective covering for storage, and identified with labels clearly describing contents as follows:
 - 1. Keys for Manual Stations: Furnish quantity equal to 15 percent of the number of manual stations installed; minimum of 6 keys.
 - 2. Replaceable Plug-in LED's: Furnish quantity equal to 5 percent of the number of units installed, but not less than one.
 - 3. Automatic Detectors: Furnish quantity equal to 5 percent of the number of units of each type installed but not less than one of each type.
 - 4. Detector Bases: Furnish quantity equal to 2 percent of the number of units of each type installed but not less than one of each type.
- B. Turn over extra materials to the Owner during or prior to Final Testing. Obtain written receipt for the materials, submit copy to Engineer and include a copy in the operation and maintenance manuals.

1.9 WARRANTY AND MAINTENANCE SERVICE CONTRACT

- A. Provide a general 1 Year Warranty for the fire alarm system in accordance with the General Conditions and Division 1 Specifications.
- B. Provide manufacturer's standard warranty for all equipment which has a warranty in excess of 1 year.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURES

- A. Provide a fire alarm system from a non-proprietary fire alarm system manufacturer which will allow system installation, testing, and maintenance by any suitably licensed and certified fire alarm company.

- 1. Silent Knight - IntelliKnight 5808

2.2 UL LISTING

- A. All items of the fire alarm system shall be listed as a product of a the fire alarm system manufacturer under the appropriate category by the Underwriters Laboratories, Inc. (UL), shall bear the "UL" label and shall display the manufacturer's name on each component.

- B. All control equipment must have transient protection devices to comply with UL864 requirements.

2.3 BASIC SYSTEM REQUIREMENTS

- A. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded onto NFPA Class A Style 6 Signaling Line Circuits (SLC).
- B. Notification Appliance Circuits (NAC) shall be wired NFPA Class A.
- C. Power for initiating devices must be from the main fire alarm control panel.
- D. Power for notification appliances may be from the main fire alarm control panel or a notification appliance circuit panel supervised by the main fire alarm control panel.
- E. A single ground or open on any system signaling line circuit or notification appliance circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.
- F. Pre-signal and alarm verification type system functions will not be allowed except as approved writing by the Authority Having Jurisdiction.

2.4 FIRE ALARM CONTROL PANEL (FACP)

- A. The FACP shall contain a microprocessor-based central processing unit (CPU) to communicate with and control devices and equipment used with the system including, but not limited to, addressable detectors, addressable modules, local operator terminals, printers, annunciators, emergency voice communication systems, and other system controlled devices.
 - 1. Software: The fire alarm system shall allow for loading and editing instructions and operating sequences as necessary. The system shall be capable of on-site programming to accommodate system expansion and facilitate changes in operation. All software operations shall be stored in a non-volatile programmable memory within the fire alarm control unit. Loss of primary and secondary power shall not erase the instructions stored in memory.
 - 2. History Logs: The system shall provide a means to recall alarms and trouble conditions in chronological order for the purpose of recreating an event history. Separate alarm and trouble logs shall be provided. Logs shall be accessible through the control panel annunciation panel or by connection to a remote printer.
- B. The FACP shall perform the following functions:
 - 1. Supervise and monitor all addressable detectors, monitor modules and control modules connected to the system for normal, trouble and alarm conditions.
 - 2. Supervise all initiating device, signaling line, and notification appliance circuits throughout the facility.
 - 3. Detect the activation of any initiating device and the location of the alarm condition.
 - 4. Operate all notification appliances and fire safety functions as programmed.
 - 5. Visually and audibly indicate trouble, supervisory, or alarm conditions.
- C. Provide the FACP with a full featured operator interface control and annunciation panel consisting of a backlit Liquid Crystal Display (LCD), individual color coded system status LEDs, and an alpha-numeric keypad for field programming and control of the system.
 - 1. The LCD shall indicate system status under normal conditions. Under alarm conditions, the

LCD shall display address number and the specific location of the initiating device in alarm. Under other abnormal conditions, the LCD shall display the type of condition and device or circuit which is not in a normal operating state.

2. The control panel shall include separate LED indicators for "AC Power On", "Alarm", "Trouble", "Supervisory", and "Silence".
 3. The control panel shall include separate switches for "Alarm Acknowledge", "Alarm Silence", "System Reset", and "Drill". The switches shall be accessible only by entering a locked control cabinet. The lock shall be keyed the same all other system keys.
- D. The FACP CPU shall communicate with, monitor, and control all other modules within the control panel. Removal, disconnection or failure of any module shall be detected and reported to the system annunciation panel by the CPU.

2.5 POWER SUPPLY

- A. Connect the FACP to 120 VAC power via a dedicated circuit. The FACP shall include necessary power supplies to provide 24 VDC power for the control system and equipment.
1. Provide a lock-on device for the circuit breaker serving the fire alarm system and paint the circuit breaker red in color.
 2. All circuits requiring system operation power shall be 24 VDC and shall be individually fused at the control panel.
- B. Provide each system with maintenance free, gelled electrolyte, batteries with sufficient capacity to operate the entire system upon loss of normal 120 VAC power in a normal supervisory mode for a period of twenty-four (24) hours with 5 minutes of alarm operation at the end of this period. The system shall automatically transfer to the standby batteries upon normal power failure. All battery charging and recharging operations shall be automatic and supervised.

2.6 DIGITAL ALARM COMMUNICATION TRANSMITTER

- A. Provide a Digital Alarm Communication Transmitter (DACT) meeting the requirements of NFPA 72 for connection to a remote supervising station or central station alarm company to be selected by the Owner.
1. Coordinate transmission protocols and requirements with the Owner's Alarm Company prior to purchasing the DACT.
- B. The DACT shall be capable of transmitting separate and distinct alarm, trouble, and supervisory signals or where connected to a compatible receiver, shall be able to annunciate each addressable point at the alarm company receiver.

2.7 INITIATING DEVICES

- A. All initiating devices shall be addressable and connected to the FACP signaling line circuit with two wires and receive necessary operating power from the signaling line circuit.

2.8 ADDRESSABLE DETECTORS

- A. Smoke detectors and thermal detectors shall be capable of being replaced without disconnecting any wires or wire connectors from the base or the detectors. Install each detectors on a separate base. The detector base shall be capable of receiving a photoelectric, ionization, or electronic thermal detector. Removal of any detector head from the base shall cause a trouble signal to be sounded at the main fire alarm control panel.

- B. Provide smoke and thermal detectors with alarm and power/polling LED which shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel. The LED shall be placed into steady illumination when an alarm condition has been detected. If required, the LED flash shall have the ability to be removed from the system program.
- C. Detectors which automatically compensate for dust accumulation and other slow environmental changes that may affect their performance shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA 72.
- D. Detectors shall store an internal identifying type code that the control panel shall use to identify the type of device, i.e. ionization, photoelectric or thermal detector.
- E. Photoelectric detectors shall use the light-scattering principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.

2.9 ADDRESSABLE MANUAL PULL STATIONS

- A. Provide dual action, non-breakglass type, manual pull stations with clearly visible operating instructions on the cover. The word FIRE shall appear on the front of the stations in raised letters.
- B. Provide each pull station with a key operated test-reset lock designed so that after actual emergency operation, use of a key is required to restore the pull station to normal use, and to allow use of the key lock to test the pull station without operating the handle. Pull stations shall use the same key as the main fire alarm control panel.
- C. All operated stations shall have a positive, visual indication of operation.
- D. Provide addressable pull stations with an addressable communication module for connection to a signaling line circuit. The module shall, on command from the control panel, send data to the panel representing the state of the manual switch and the communication module status.

2.10 ADDRESSABLE CONTROL MODULE

- A. Provide addressable control modules where required to supervise and control the operation of the protected premises fire safety functions as indicated on the drawings. Control modules shall receive operating power from a signaling line circuit.
- B. Provide control modules capable of being set to operate as a single pole, double throw dry contact relay with the following minimum ratings:
 - 1. 2.0 amps at 30 VDC, resistive (1.0 power factor)
 - 2. 0.6 amps at 30 VDC, inductive (0.60 power factor)
 - 3. 0.3 amps at 120 VAC, pilot duty (0.35 power factor)
- C. Provide control modules with an off-white impact resistant thermoplastic or lexan cover suitable for mounting in a standard 4-inch square x 2-1/8 inch deep electrical box.
- D. Provide control modules with a LED that shall flash under normal conditions, indicating that the control module is operational and in regular communication with the control panel. If required, the LED flash shall have the ability to be removed from the system program.

2.11 FIRE SAFETY FUNCTION CONTROL RELAYS

- A. Provide relays where required to control the protected premises fire safety functions such as fan shut down, door release, etc., as indicated on the drawings.

- B. Provide control relays with single pole double throw contacts rated minimum 10 amps at 120 VAC resistive. Provide relays with higher rated contacts where indicated on the drawings or required by the controlled equipment.
- C. Provide relays with multi-voltage coil suitable for operation at 24 VDC, 24 VAC, 120 VAC or 240 VAC. Connect the relay coil to a normally closed auxiliary contact in the fire alarm control panel or through an addressable control relay such that the relay will be normally energized and loss of power will cause the fire safety function occur.
- D. Provide control relays in a separate enclosure within 3 feet of the controlled equipment, or inside the equipment control panel as indicated on the drawings.
- E. Connect the controlled equipment control circuit to the control relay output contacts so that the required fire safety function (fan shut down, door release, etc.,) will occur upon general fire alarm or upon loss of power. Connect the equipment control circuit ahead of any local control switches such that the fire safety function will occur regardless of the equipment control settings.

2.12 ALARM NOTIFICATION APPLIANCES

- A. Provide Notification Appliances to meet the requirements of NFPA 72, UL 1971, ANSI S3.41 and ANSI 117.1. Provide combination devices where indicated on the drawings.
- B. Provide horns to produce minimum 86 dB at 10 feet and to produce a temporal code pattern in accordance with ANSI S3.41.
- C. Provide Xenon strobe lights with lexan lens with the word "FIRE" in red letters, meeting ADA, UL 1971 and NFPA-72 requirements, and with minimum effective candlepower ratings for coverage areas indicated on the drawings. Strobes shall be synchronized where two or more are located in the same area or room.
- D. Provide suitable backboxes as recommended by the manufacturer for each notification appliance. Appliances will be semi-flush mounted to a flush mounted outlet boxes except where surface mounted appliances are specifically indicated on the drawings or approved by the Engineer.

2.13 WIRING

- A. Install all fire alarm system wiring in surface non-metallic raceway system or metallic raceways as specified for power wiring to match existing fire alarm wiring methods.
 - 1. Use only metallic raceways in mechanical rooms, boiler room, electrical rooms and similar spaces.
- B. Provide size and type of wiring as required by the fire alarm system manufacturer. In general provide solid conductors except where stranded conductors are specifically required by the fire alarm system manufacturer.

2.14 SYSTEM OPERATION

- A. Actuation of any manual station, smoke detector, heat detector or fire suppression system shall cause the following operations to occur unless otherwise specified:
 - 1. Transmit alarm signal to the Owner's Alarm Company via the Digital Alarm Communication Transmitter.
 - 2. Activate all horns until silenced at the main control panel.

3. Activate all strobe units until the main control panel is reset.
 4. Shut down all air handling fans.
- B. Alarm signals may be reset or silenced only by authorized personnel by entering a locked control cabinet and operating the proper silencing switch.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

- A. Install the fire alarm system in strict accordance with the applicable sections of the National Fire Alarm Code, National Electrical Code, other applicable NFPA Standards, Regulation of the Local Authority Having Jurisdiction (AHJ), the Contract Documents and the Manufacturer's written instructions and recommendations.
1. The fire alarm system drawings included with the contract documents are intended only to indicate minimum system requirements. Install the fire alarm system according to submittal drawings which have been reviewed and approved by the Authority Having Jurisdiction.
- B. Install all wiring in strict compliance with all the provisions of NEC Article 760 A and C, for Power-Limited Fire Alarm Circuits or if required may be reclassified as non-power limited and wired in accordance with NEC Article 760 A and B. Upon completion, the contractor shall so certify compliance in writing to the owner.
- C. Clean all spatters, spots, dirt and debris from the inside and the outside of all fire alarm equipment and devices upon completion of the installation using methods and materials recommended by the fire alarm system manufacturer.

3.2 WIRING INSTALLATION

- A. Install all cables or raceways concealed within ceilings or walls. Exposed cables or raceways will not be permitted unless specifically shown on the drawings or approved in writing by the Engineer.
- B. Support raceways, outlet boxes, etc., in accordance with the appropriate Division 16 Specification Section.
- C. Color code fire alarm system wiring as recommended by the manufacturer. Identify individual conductors in each outlet box, pull box or other accessible location according to the circuit type with self adhesive printed markers equal to Thomas & Betts "E-Z Code" markers.
- D. Paint all fire alarm system junction boxes, pull boxes, etc. red with identification of circuits served indicated on the device or box.
- E. Do not install fire alarm system wiring in raceways or enclosures with any other wiring systems.

3.3 IDENTIFICATION

- A. Identify all control panel switches, indicator lights, etc., by means of engraved laminated plastic nameplates or other permanent means acceptable the Owner and AHJ.
- B. Identify each initiating device with address number by means of 25 point Kroy labels.
- C. Provide a building map at the fire alarm control panel to show building floor plan with location of all initiating devices and address number of each device.
1. Orientation of the building map shall match the building orientation when viewed from the

control panel, i.e., devices on the left of the map will be to the left of the control panel.

2. Install the building maps behind a tamper resistant tempered glass or Lexan cover not obscuring any control or indicating device, or in separately mounted frame..

D. Hand written labels and nameplates of any kind are not acceptable.

3.4 TESTS

A. Conduct a complete operational tests of the completed fire alarm system in accordance with NFPA-72 in the presence of the Owner, Engineer and the AHJ to demonstrate that the system functions properly in every respect.

B. Testing and adjustment of the system shall be performed by the qualified person(s) who have supervised the installation of the system as required in paragraph "Qualification of Personnel".

C. Determine through pretesting, conformance of the system to the requirements of the contract documents and the approved submittal installation drawings.

1. Correct deficiencies observed in pretesting.

2. Replace malfunctioning or damaged items with new and retest until satisfactory performance and conditions are achieved.

3. Adjust horn taps to provide acceptable sound levels and voice intelligibility in all areas of the building.

D. Final Test Notice: Provide a minimum 10-day notice in writing when the system is ready for final acceptance testing. Schedule the final test at a time acceptable to the Owner, Engineer, and the Authority Having Jurisdiction.

1. Minimum System Tests: Test the system according to the procedures outlined in NFPA 72.

2. Put the complete Fire Alarm System on battery power not less than 24 hours prior to time of testing. Initiate an alarm and operate all Notification Appliances for not less than 5 minutes on battery power prior to restoring normal power.

3. Verify receipt of alarm, trouble and supervisory signals at the Owner's Alarm Company.

4. Open and short signaling line circuits and verify that the trouble signal actuates.

5. Open and short Notification Appliance Circuits and verify that trouble signal actuates.

6. Ground all circuits and verify response of trouble signals.

7. Check presence and audibility of all audible notification appliances throughout the protected premises.

8. Check presence, visibility and synchronization of all visible alarm notification appliances.

9. Check installation, supervision, and operation of all automatic detectors.

10. Introduce each of the alarm conditions that the system is required to detect onto the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.

11. When the system is equipped with optional features, the manufacturer's manual should be

consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.

- E. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system complies with applicable standards and the contract documents.
- F. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log. Submit copy to Engineer and include copies of test reports in the Operation and Maintenance Manuals.
- G. Certificate of Completion and Certificate of Occupancy:
 - 1. Test the system as required by the Authority Having Jurisdiction in order to obtain a certificate of occupancy.
 - 2. Certify in writing to the Owner and the AHJ that the fire alarm system has been installed in accordance with the approved fire alarm system drawings and applicable Codes.

3.5 TRAINING

- A. Provide the services of a factory-authorized service representative to demonstrate the system and train Owner's maintenance and operating personnel who will be in charge of the system.
 - 1. Provide instruction to the Owner's operating and maintenance personnel in the basic theories of operation of fire alarm systems with hands on training of the system operation.
 - 2. Provide instruction to the Owner's maintenance personnel in the procedures and schedules involved in troubleshooting, servicing, and preventive maintenance of the system.
 - 3. Provide a minimum of 4 hours, but not more than 8 hours, of training to be completed prior to Substantial Completion.
 - 4. Schedule training with the Owner at least seven days in advance at a time and place acceptable to the Owner.

3.6 OCCUPANCY ADJUSTMENTS

- A. When requested within one year of final testing and acceptance, provide on-site assistance in adjusting sound levels and adjusting controls and sensitivities to suit actual occupied conditions. Provide up to three visits to the site for this purpose.

* END OF SECTION 16720 *