CITY OF GREELEY
INVITATION FOR BID

Island Grove Event Center Lighting Upgrade

BID #FD20-06-107

DUE JULY 23, 2020 BEFORE 2:00 P.M.

Serving Our
Community
It's A Tradition

The Office of the Purchasing Manager is a service division established to build effective partnerships through efficient and responsive procurement processes to obtain high quality goods and services for the best value.

SECTION 00110
BID #FD20-06-107

INVITATION FOR BID

The City of Greeley, Colorado is requesting **sealed** bids for the Island Grove Event Center Lighting Upgrade before 2:00pm MST on July 23, 2020. Bids are to be submitted at the Public Works Building, 1001 9th Avenue, Greeley, Colorado 80631 at which time and place all bids will be publicly opened and read aloud. No late or faxed bids will be accepted. It is the responsibility of the vendor to ensure the solicitation documents are delivered to the correct address as noted in the Solicitation Documents. Solicitations delivered to other City of Greeley addresses may be deemed as late and not accepted.

The City of Greeley disseminates all bids through the Rocky Mountain E-Purchasing System site. Go to http://www.RockyMountainBidSystem.com, then "Bid Opportunities" and then select "The City of Greeley". Bids submitted to the City of Greeley must include Sections 00120, 00130, 00140 and 00160. Addenda must be acknowledged in Section 00120 of the bidding documents. Bidders failing to acknowledge any and all addenda may be considered non-responsive.

A pre-bid meeting will be held on July 7, 2020 at 1:30pm at the Island Grove Event Center, 425 N. 15th Avenue, Greeley, CO 80631. Meet outside the main Southeast front door. All Participants will be required to wear masks due to COVID-19. All prospective bidders are encouraged to attend.

Each bid shall be accompanied, by a bidder's bond executed by a surety company authorized to do business in Colorado, made payable to the City of Greeley, Colorado or by a certified check drawn on a bank which is insured by the Federal Deposit Insurance corporation made payable to the City of Greeley, Colorado, in an amount not less than five percent (5%) of the proposal sum as security that the successful bidder will enter into a contract to construct this project in accordance with the plans and specifications, and give bonds in the sum as hereafter provided. Checks accompanying bids not accepted will be returned.

The successful responsive and responsible bidder will be required to furnish a satisfactory performance bond and payment bond in the amount of the contract sum.

No bid shall be withdrawn after the opening of the bids without the consent of the City of Greeley, Colorado, for a period of sixty (60) days after the scheduled time of the receiving the bids.

All proposals will be confidential until a contract is awarded and fully executed. At that time, all proposals and documents pertaining to the proposals will be open for public inspection, except for the material that is proprietary or confidential. However, requests for confidentiality can be submitted to the Purchasing Contact provided that the submission is in accordance with the following procedures. This remains the *sole responsibility* of the offeror. The Purchasing Contact will make no attempt to cure any information that is found to be at a variance with this procedure. The offeror may not be given an opportunity to cure any variances after proposal opening. **Neither a proposal in its entirety, nor proposal price information will be considered confidential/proprietary.** Questions regarding the application of this procedure must be directed to the Purchasing Contact listed in this RFP.

"***Public Viewing Copy***: *The City is a governmental entity subject to the Colorado Open Records Act, C.R.S. §§ 24-72-200.1 et seq. ("CORA"). Any bids/proposals submitted hereunder are subject to public disclosure by the City pursuant to CORA and City ordinances. Vendors may submit one (1) additional complete bid/proposal clearly marked "FOR PUBLIC VIEWING." In this version of the bid/proposal, the Vendor may redact text and/or data that it deems confidential or proprietary pursuant to CORA. Such statement does not necessarily exempt such documentation from public disclosure if required by CORA, by order of a court of appropriate jurisdiction, or other applicable law. Generally, under CORA trade secrets, confidential commercial and financial data information is not required to be disclosed by the City. Bids/Proposals may not be marked "Confidential" or 'Proprietary' in their entirety.* ***All provisions of any contract resulting from this request for proposal will be public information.***"

The City of Greeley retains the right to reject any and all bids and to waive any informality as deemed in the best interest of the city.

Questions pertaining to the project may be directed to Doug Clapp via email: doug.clapp@greeleygov.com or at 970-350-9792. Deadline to receive questions is July 10, 2020 by 3:00pm.

Doug Clapp
Purchasing Manager

Greeley Website
June 22, 2020

Section 00120

BID PROPOSAL

PROJECT: Island Grove Event Center Lighting Upgrade – Bid # FD20-06-107

The Undersigned, having become familiar with the local conditions affecting the cost of the work, plans, drawings, and specifications attached herewith, and with advertisement for bids, the form of bid and proposal, form of bond, all of which are issued and attached and on file in the office of the Project Manager, hereby bid and propose to furnish all the labor, materials, necessary tools, and equipment and all utility and transportation service necessary to perform and complete in a workmanlike manner all of the work required in connection with the construction of the items listed on the bidding schedule in accordance with the plans and specifications as prepared by the City of Greeley, Colorado, for the sums set forth in the Bidding Schedule.

The total bid shall be the basis for establishing the amount of the Performance and Payment Bond for this project. The total bid is based on the quantities shown in the bid proposal form and the dimensions shown on the plans.

The undersigned has carefully checked the Bidding Schedule quantities against the plans and specifications before preparing this proposal and accepts the said quantities as substantially correct, both as to classification and the amounts, and as correctly listing the complete work to be done in accordance with the plans and specifications.

The undersigned, agrees to complete and file a Performance and Payment Bond and further agrees to complete the contract by **December 18, 2020**. Official notice to proceed will not be issued until adequate Performance and Payment Bonds and other required documents are on file with the City of Greeley.

NOTE: Bidders should not add any conditions or qualifying statements to this bid as otherwise the bid may be declared irregular as being non responsive to the Invitation for bids. The following numbered Addenda have been received and the bid, as submitted, reflects any changes resulting from those Addenda: _____

_____ ATTEST

_____ DATE

_____ COMPANY NAME

_____ BY

_____ SIGNATURE

_____ TITLE

IG Eventer Center LED Lighting Up-grade
Greeley, Colorado

BID # FD20-06-107

Bid Form - 00130

City Of Greeley

Bid Item	Description	Quantity	Unit	Unit Cost	Total Cost
1	**Base Bid - Labor/Installation w/o SB fixtures**		Lump sum		
2	**Add Alternate - Labor/Installation**		Lump sum		
3					
4					

Grand Total _____

TOTAL PROPOSAL **dollars**

Total Proposal (Written Out)

This Lump Sum Bid shall include all costs for materials, labor overhead and profit; insurance costs and incidental costs incurred by the Contractor to satisfactorily complete the work in accordance with the Standard General Conditions of the Construction Contract, Summary of Work, Technical Specifications and Plans.

Company Name: _____

Company address: _____

Submitted By: _____

Title: _____

E-mail: _____

Phone #: _____

COOPERATIVE PURCHASING STATEMENT

The City of Greeley encourages and participates in cooperative purchasing endeavors undertaken by or on behalf of other governmental jurisdictions. To the extent, other governmental jurisdictions are legally able to participate in cooperative purchasing endeavors; the City of Greeley supports such cooperative activities. Further, it is a specific requirement of this proposal or Request for Proposal that pricing offered herein to the City of Greeley may be offered by the vendor to any other governmental jurisdiction purchasing the same products. The vendor(s) must deal directly with any governmental agency concerning the placement of purchase orders, contractual disputes, invoicing, and payment. The City of Greeley shall not be liable for any costs or damages incurred by any other entity.

SECTION 00140

BID BOND

KNOW ALL MEN BY THESE PRESENT, that we, the undersigned _____ as Principal, and _____ as Surety, are hereby held and firmly bound unto the City of Greeley, Colorado, as Owner, in the penal sum of _____ for the Payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors, and assigns.

THE CONDITION of this obligation is such that whereas the Principal has submitted to the City of Greeley, Colorado, the accompanying bid and hereby made a part hereof to enter into a Contract Agreement for the construction of City of Greeley Project,

ISLAND GROVE EVENT CENTER LIGHTING UPGRADE – BID # FD20-06-107

WHEREAS, the Owner, as condition for receiving said bid, requires that the Principal to deposit with the Owner as Bid Guaranty equal to five percent (5%) of the amount of said bid.

NOW, THEREFORE,

(a) If said bid shall be rejected; or in the alternate,

(b) If said bid shall be accepted and the Principal shall execute and deliver a Contract Agreement (properly completed in accordance with said bid) and shall furnish a Performance and Payment Bond upon the forms prescribed by the Owner for the faithful performance of said Agreement; and shall in all other respects perform the agreement created by the acceptance of said bid;

then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals this _____ day of _____, 20_____, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

PRINCIPAL	SURETY
Name: _____	_____
Address: _____	_____
By: _____	_____
Title: _____	Attorney_____
In-Fact:	
(Seal)	(Seal)

NOTE: Surety Companies executing bonds must be authorized to transact business in the State of Colorado and be accepted to the Owner.

SECTION 00160

NOTICE OF PRE-BID CONFERENCE

ISLAND GROVE EVENT CENTER LIGHTING UPGRADE – BID # FD20-06-107

A pre-bid conference will be held:

On July 7, 2020 at 11:30 p.m., Island Grove Event Center, 425 N. 15th Avenue, Greeley, CO 80631. Meet outside the main Southeast front door. All Participants will be required to wear masks due to COVID-19.. All bidders are highly encouraged to attend.

Representatives of the City of Greeley will be present to answer questions.

Each bidder shall submit the following declaration of attendance, along with the other bid documents.

****

I have attended the pre-bid conference _____

I have not attended the pre-bid conference _____

_____
Name of Contracting Organization

_____
Authorized Signature Date

SECTION 00210

NOTICE OF AWARD

DATE:

TO:

Re: **ISLAND GROVE EVENT CENTER LIGHTING UPGRADE – BID # FD20-06-107**

Dear Contractor:

The City of Greeley, Colorado (hereinafter called "the Owner") has considered the bids submitted for referenced work in response to its Invitation for Bids. You are hereby notified that your bid has been accepted for items and prices stated in the Bid Schedule in the amount of $_____. You are required to execute the Contract Agreement, provide the necessary insurance certificates, the Performance and Payment Bonds within ten (10) days from the date of this Notice. If you fail to execute said Contract Agreement and furnish the necessary insurance certificates and bonds within the time allotted from this date, the Owner will be entitled to consider your rights arising out of the Owner's acceptance of your bid as abandoned and to demand payment of bid guaranty as damages. The Owner will be entitled to such other rights as may be granted by law. You are required to return an acknowledged copy of this Notice of Award and enclosures to Purchasing.

CITY OF GREELEY, COLORADO

By: Joel Hemesath

Title: Director of Public Works

ACKNOWLEDGMENT: Receipt of the foregoing Notice of Award accompanied with a Performance and Payment Bond form and a signed copy of the Contract Document is hereby acknowledged this _____ day of _____, 20_____.

Bidder: _____

By: _____

SECTION 00310

CONTRACT

THIS AGREEMENT made and entered into this _____ day of _____, 20__, by and between the City of Greeley, Colorado, and under the laws of the state of Colorado, party of the first part, termed in the Contract Documents as the "Owner" and _____ party of the second part, termed in the Contract Documents as "Contractor."

WITNESSETH: In consideration of monetary compensation to be paid by the Owner to the Contractor at the time and in the manner hereinafter provided, the said Contractor has agreed, and does hereby agree, to furnish all labor, tools, equipment and material and to pay for all such items and to construct in every detail, to wit:

PROJECT: **ISLAND GROVE EVENT CENTER LIGHTING UPGRADE – FD20-06-107**

at the price bid on the Proposal Form of $ _____ all to the satisfaction and under the general supervision of the Project Manager for the City of Greeley, Colorado.

The Contract Documents consist of this Agreement, the Conditions of the Contract (General, Supplementary and other Conditions), the Drawings, the Specifications, all Addenda issued prior to and all Modifications issued after execution of this Agreement. These form the Contract, and all are as fully a part of the Contract as if attached to this Agreement or repeated herein.

The Project Manager named herein shall interpret and construe the Contract Documents, reconciling any apparent or alleged conflicts and inconsistencies therein; and all of the work and all details thereof shall be subject to the approval and determination of the Project Manager as to whether or not the work is in accordance with Contract Documents. Said City Project Manager shall be the final arbiter and shall determine any and all questions that may arise concerning the Contract Documents, the performance of the work, the workmanship, quality of materials and the acceptability of the completed project. The decision of the Project Manager on all questions shall be final, conclusive and binding.

AND FOR SAID CONSIDERATION IT IS FURTHER PARTICULARLY AGREED BETWEEN THE PARTIES TO THIS AGREEMENT.

1. That construction and installation of the above enumerated work for the Owner shall be completed and ready for use in accordance with the time of completion described in the Bid form of this Contract. That the above enumerated work shall begin within ten (10) days of the official "Notice to Proceed". (Contract shall become void if work is not started at specified time.)

2. That said work and materials for the project covered by the Contract Documents shall be completely installed and delivered to the Owner, within the time above stated, clear and free from any and all liens, claims, and demands of any kind.

3. The full compensation to be paid the Contractor by the Owner pursuant to the terms of this Contract shall be payable as provided in the Contract Documents.

4. This Contract consists of the following component parts, all of which are as fully a part of the Contract as herein set out verbatim, or if not attached, as if hereto attached:

Section 00110: Invitation for Bid
Section 00120: Bid Proposal
Section 00130: Bid Schedule
Section 00140: Bid Bond
Section 00160: Pre-bid meeting
Section 00210: Notice of Award
Section 00310: Contract
Section 00320: Performance Bond
Section 00330: Payment Bond
Section 00340: Certificate of Insurance
Section 00350: Lien Waiver Release
Section 00360: Debarment/Suspension Certification Statement
Section 00410: Notice to Proceed
Section 00420: Project Manager Notification
Section 00430: Certificate of Substantial Completion
Section 00440: Final Completion
Section 00510: General Conditions of the Contract
Section 00520: Subcontractors List
Section 00620: Special Provisions

Addenda Number _____ Inclusive

Any modifications, including change orders, duly delivered after execution of this Agreement.

IN WITNESS WHEREOF, the parties have caused this instrument to be executed as of the day and year first above written.

City of Greeley, Colorado

Approved as to Substance

_____
City Manager-Roy Otto

Reviewed as to Legal Form
OFFICE OF THE CITY ATTORNEY

By: _____
City Attorney-Doug Marek

Certification of Contract
Funds Availability

_____
Interim Director of Finance-Robert Miller

Contractor_____

_____
Authorized Signature

_____
Printed Name

_____
Title

SECTION 00320

PERFORMANCE BOND

Bond No._____

KNOWN ALL MEN BY THESE PRESENTS: that

(Firm) _____

(Address) _____

(an Individual), (a Partnership), (a Corporation), hereinafter referred to as "the Principal", and

(Firm) _____

(Address) _____

hereinafter referred to as "the Surety", are held and firmly bound unto the CITY OF GREELEY, 1000 10th Street, Greeley, CO. 80631, a Municipal Corporation, hereinafter referred to as "the Owner" in the penal sum of _____ in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors and assigns, jointly and severally, firmly by these present.

THE CONDITIONS OF THIS OBLIGATION are such that whereas the Principal entered into a certain Contract Agreement with the Owner, dated the _____ day of _____, 20_____, a copy of which is hereto attached and made a part hereof for the performance of City of Greeley Project,

ISLAND GROVE EVENT CENTER LIGHTING UPGRADE – BID # FD20-06-107

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions and agreements of said Contract Agreement during the original term thereof, and any extensions thereof which may be granted by the Owner, with or without Notice to the Surety and during the life of the guaranty period, and if he shall satisfy all claims and demands incurred under such Contract Agreement, and shall fully indemnify and save harmless the Owner from all cost and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the Owner all outlay and expense which the Owner may incur in making good any default, and then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract Agreement or to the work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligation on this bond; and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract Agreement or to the work or to the specifications.

IN WITNESS WHEREOF, this instrument is executed this _____ day of _____, 20____.

PROVIDED, FURTHER, that no final settlement between the Owner and Contractor shall abridge the right of any beneficiary hereunder, whose claims may be unsatisfied.

IN PRESENCE OF: PRINCIPAL

_____ By: _____

_____ _____

_____ _____

(Corporate Seal) (Address)

IN PRESENCE OF: OTHER PARTNERS

_____ By: _____

_____ By: _____

By: _____

IN PRESENCE OF: SURETY

_____ By: _____

(Attorney-in-Fact)

_____ _____

_____ _____

(SURETY SEAL) (Address)

NOTE: Date of Bond must not be prior to date of Contract Agreement. If Contractor is Partnership, all partners should execute bond.

IMPORTANT: Surety Company must be authorized to transact business in the State of Colorado and be acceptable to the Owner.

SECTION 00330

PAYMENT BOND

Bond No._____

KNOWN ALL MEN BY THESE PRESENT: that
(Firm) _____

(Address)_____
(an Individual), (a Partnership), (a Corporation), hereinafter referred to as "the Principal", and
(Firm) _____

(Address)_____

hereinafter referred to as "the Surety", are held and firmly bound unto the CITY OF GREELEY, 1000 10th Street, Greeley, Co. 80631, a Municipal Corporation, hereinafter referred to as "the Owner", in the penal sum of
_____ in
lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION are such that whereas the Principal entered into a certain Contract Agreement with the Owner, dated the _____ day of _____, 20_____, a copy of which is hereto attached and made a part hereof for the performance of

ISLAND GROVE EVENT CENTER LIGHTING UPGRADE – BID # FD20-06-107

NOW, THEREFORE, if the Principal shall make payment to all persons, firms, subcontractors and corporations furnishing materials for or performing labor in the prosecution of the work provided for in such Contract Agreement, and any equipment and tools, consumed, rented or used in connection with the construction of such work and all insurance premiums on said work, and for all labor, performed in such work whether by subcontractor or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract Agreement or to the work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligation on this bond; and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract Agreement or to the work or to the specifications.

IN WITNESS WHEREOF, this instrument is executed this _____ day of _____, 20____.

PROVIDED, FURTHER, that no final settlement between the Owner and Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN PRESENCE OF: PRINCIPAL

_____ By: _____

_____ _____

_____ _____
(Corporate Seal) (Address)

IN PRESENCE OF: OTHER PARTNERS

_____ By: _____

_____ By: _____

By: _____

IN PRESENCE OF: SURETY

_____ By: _____
(Attorney-in-Fact)

_____ _____

_____ _____
(SURETY SEAL) (Address)

NOTE: Date of bond must not be prior to date of Contract Agreement. If Contractor is Partnership, all partners should execute Bond.

IMPORTANT: Surety Company must be authorized to transact business in the State of Colorado and be acceptable to the Owner.

Client#: 12170 GRECI

ACORD™ CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 05/14/2013

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
ABC Insurance Company P. O. Box 1234 Anywhere, USA	PHONE (A/C, No, Ext):	FAX (A/C, No):
	E-MAIL ADDRESS:	
	PRODUCER CUSTOMER ID #:	

INSURED	INSURER(S) AFFORDING COVERAGE	NAIC #
Sample Certificate	INSURER A : Financial Rating of A	
	INSURER B :	
	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	GENERAL LIABILITY						EACH OCCURRENCE	$1,000,000
	X COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence)	$100,000
	CLAIMS-MADE X OCCUR						MED EXP (Any one person)	$5,000
							PERSONAL & ADV INJURY	$1,000,000
							GENERAL AGGREGATE	$2,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						PRODUCTS - COMP/OP AGG	$2,000,000
	POLICY PRO-JECT LOC							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$1,000,000
	X ANY AUTO						BODILY INJURY (Per person)	$
	ALL OWNED AUTOS						BODILY INJURY (Per accident)	$
	SCHEDULED AUTOS						PROPERTY DAMAGE (Per accident)	$
	X HIRED AUTOS							$
	X NON-OWNED AUTOS							$
	UMBRELLA LIAB OCCUR						EACH OCCURRENCE	$
	EXCESS LIAB CLAIMS-MADE						AGGREGATE	$
	DEDUCTIBLE							$
	RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N						X WC STATU-TORY LIMITS OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? **(Mandatory in NH)**	N/A					E.L. EACH ACCIDENT	$100,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$100,000
							E.L. DISEASE - POLICY LIMIT	$500,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

City of Greeley is named as Additional Insured on General Liability. Waiver of subrogation is included on Work Compensation. This insurance is primary and noncontributory to insurance policies held by the City.

CERTIFICATE HOLDER

City of Greeley
1000 10th St
Greeley, CO 80631-3808

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

DSM

SECTION 00350

LIEN WAIVER RELEASE

TO: City of Greeley, Colorado (hereinafter referred to as "the OWNER".)

FROM: (hereinafter referred to as “the CONTRACTOR”)

PROJECT: **ISLAND GROVE EVENT CENTER LIGHTING UPGRADE – BID # FD20-06-107**

1. The CONTRACTOR does hereby release all Mechanic's Liens Rights, Miller Act Claim (40 USCA 270), Stop Notice, Equitable Liens and Labor and Material Bond Rights resulting from labor and/or materials, subcontract work, equipment or other work, rents, services or supplies heretofore furnished in and for the construction, design, improvement, alteration, additions to or repair of the above described project.

2. This release is given for and in consideration of the sum of $ and other good and valuable consideration. If no dollar consideration is herein recited, it is acknowledged that other adequate consideration has been received by the CONTRACTOR for this release.

3. In further consideration of the payment made or to be made as above set forth, and to induce the OWNER to make said payment, the CONTRACTOR agrees to defend and hold harmless the OWNER, employees, agents and assigns from any claim or claims hereinafter made by the CONTRACTOR and/or its material suppliers, subcontractors or employees, servants, agents or assigns of such persons against the project. The CONTRACTOR agrees to indemnify or reimburse all persons so relying upon this release for any and all sums, including attorney's fees and costs, which may be incurred as the result of any such claims.

4. It is acknowledged that the designation of the above project constitutes an adequate description of the property and improvements for which the CONTRACTOR has received consideration for this release.

5. It is further warranted and represented that all such claims against the CONTRACTOR or the CONTRACTOR's subcontractors and/or material suppliers have been paid or that arrangements, satisfactory to the OWNER and CONTRACTOR, have been made for such payments.

6. It is acknowledged that this release is for the benefit of and may be relied upon by the OWNER, the CONTRACTOR, and construction lender and the principal and surety on any labor and material bond for the project.

7. In addition to the foregoing, this instrument shall constitute a *** (full, final and complete) ***(partial) release of all rights, claims and demands of the CONTRACTOR against the OWNER arising out of or pertaining to the above referenced project. If partial, all rights and claims on the project are released up to and including the day of Month, 20 .

Dated this _____ day of _____, 20____.

CONTRACTOR

By: _____

Title: _____

STATE OF_____)
)ss.
COUNTY OF_____)

The foregoing instrument was acknowledged before me this _____day of _____,

20___ by _____.

My Commission expires:

_____
Notary Public

***Strike when not applicable

SECTION 00360

ISLAND GROVE EVENT CENTER LIGHTING UPGRADE – BID # FD20-06-107

Debarment/Suspension Certification Statement

The proposer certifies that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from participation in this transaction by any Federal, State, County, Municipal or any other department or agency thereof. The proposer certifies that it will provide immediate written notice to the City if at any time the proposer learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstance.

DUNS # (Optional) _____

Name of Organization_____

Address_____

Authorized Signature_____

Title_____

Date_____

SECTION 00410

NOTICE TO PROCEED

Month , 20

TO: NAME

PROJECT: **ISLAND GROVE EVENT CENTER LIGHTING UPGRADE – BID # FD20-06-107**

To Whom It May Concern:

You are hereby notified to commence work on the above-referenced project in accordance with the Contract Agreement dated Month , 20 .

You are to complete this project by Month , 20

CITY OF GREELEY, COLORADO

By: _____

Title: _____

_____
Signature

SECTION 00420

PROJECT MANAGER NOTIFICATION

_____, 20_____

TO:

PROJECT: **ISLAND GROVE EVENT CENTER LIGHTING UPGRADE – BID # FD20-06-107**

The Owner hereby designates _____ as its Project Manager and authorizes this individual, under the authority of the Director of Public Works to make all necessary and proper decisions with reference to the project. Contract interpretations, change orders and other requests for clarification or instruction shall be directed to the Project Manager. The Director of Public Works shall be authorized to bind the Owner with respect to any decision made in accordance with the contract document.

CITY OF GREELEY, COLORADO

By: _____

Title: _____

SECTION 00430

CERTIFICATE OF SUBSTANTIAL COMPLETION

TO: **CONTRACTOR**

PROJECT: **ISLAND GROVE EVENT CENTER LIGHTING UPGRADE – BID # FD20-06-107**

Project or designated portion shall include: Describe Scope.

The work performed under this contract has been reviewed and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby established as Month , 20 .

The date of commencement of applicable warranties required by the Contract Documents is stipulated in Section 00440 - Certificate of Final Acceptance.

DEFINITION OF DATE OF SUBSTANTIAL COMPLETION

The Date of Substantial Completion of the Work or designated portion thereof is the date certified by the Project Manager when construction is sufficiently complete, in accordance with the Contract Documents, so the Owner can occupy or utilize the Work or designated portion thereof for the use for which it is intended, as expressed in the Contract Documents.

A list of items to be completed or corrected, prepared by the Contractor and verified and amended by the Project Manager is attached hereto. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. The date of commencement of warranties for items on the attached list is as stipulated in Section 00440 – Certificate of Final Acceptance.

The Owner shall operate and maintain the Work or portion of the Work described above from the Date of Substantial Completion and be responsible for all costs associated with the completed work excluding cost related to warrantee work.

The Contractor will complete or correct the Work on the list of items attached hereto within days from the above Date of Substantial Completion.

_____
Contractor

_____
Owner

(Note--Owner's and Contractor's legal and insurance counsel should review and determine insurance requirements and coverage; Contractor shall secure consent of surety company, if any.)

SECTION 00440

CERTIFICATE OF FINAL ACCEPTANCE

TO: **CONTRACTOR**

PROJECT NAME: **ISLAND GROVE EVENT CENTER LIGHTING UPGRADE – FD20-06-107**

The work performed under this contract has been reviewed and found to meet the definition of final acceptance. This Certificate of Final Acceptance applies to the whole of the work.

The Date of Final Acceptance of the Project designated above is hereby established as: Month , 20 at 2:00 pm. This date is also the date of commencement of applicable warranties associated with the Project described above and as required by the Contract Documents.

DEFINITION OF DATE OF FINAL ACCEPTANCE

The Date of Final Acceptance of the Work is the date certified by the City of Greeley's Project Manager when the work is 100% complete, in accordance with the Contract Documents, as amended by change order(s), or as amended below:

Amendment to the Certificate of Final Completion (if any): Decribe Ammendments.

The Contractor and/or the City Of Greeley shall define any claims or requests for additional compensation above (or as attachments to this document).

Final Acceptance shall not be achieved until the Contractor provides the City Of Greeley with all contract specified Contractor and Sub-contractor close out documents including final lien waivers, releases, insurances, manuals, training, test results, warranties, and other documents required by the Contract Documents, as amended.

Upon issuance of the Certificate of Final Acceptance the Contractor may submit an application for payment requesting final payment for the entire Work. Liquidated damages (if any) will be assessed at this time.

Contractor's acceptance of the final payment shall constitute a waiver by the Contractor of all claims arising out of or relating to the Work; except as noted under 'Amendment to the Certificate of Final Acceptance' above.

Agreed:

_____	_____20	_____	_____20
Contractor's Representative	DATE	Project Manager (COG)	DATE

SECTION 00510

CITY OF GREELEY
GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION
(REVISED MAY 2020)

ARTICLE 1
DEFINITIONS

1.1 **Bidder**: An architect, engineer, individual, firm, partnership, corporation or combination thereof, submitting a Bid for the Work.

1.2 **Change Notice**: A document issued to the Contractor specifying a proposed change to the Contract Documents. Unless otherwise expressly stated on the face of the Change Notice, a Change Notice is a proposal which may result in a Change Order.

1.3 **Change Order**: A document issued to the Contractor modifying the Contract.

1.4 **Construction Contract**: The Contract Documents, including the Contract for construction (hereinafter "the contract") executed by the Contractor and the Owner covering the performance of the Work including the furnishing of labor, superintendence, materials, tools and equipment as indicated in the Contract Documents.

1.5 **Contract Documents**: Documents applicable to and specific to the construction of an individual Project, including the Contract and all other documents executed by the Contractor and Owner covering the performance of the work including but not limited to Specifications, Insurance Requirements, Contract Drawings, Conditions of the Contract (General and Supplementary), Owner Contractor Agreement, all Addenda, all change orders issued after execution of the Contract, Performance and Payment Bonds, and any other special provisions.

1.6 **Contract Drawings(Project Drawings)**: Contract drawings, The plans, to include but not limited to plans, profiles, typical cross sections, general cross-sections, elevations, schedules, schematics, notes and details which show locations, character, dimensions, and details of the Work.

1.7 **Contractor:** The individual, firm, partnership, or corporation, or combination thereof, private, municipal, or public, including joint ventures, which, as an independent contractor, has entered into a contract with the Owner, who is referred to throughout the Contract Documents by singular number and masculine gender.

1.8 **Days**: Unless otherwise designated, days mean calendar days.

1.9 **Extra Work**: Work not provided for in the Contract as awarded but found to be essential to the satisfactory completion of the Contract, within its intended scope. Reimbursement for extra work is governed by Article 28, CHANGES, or Article 31, CONTRACTOR PROPOSALS.

1.10 **Field Order**: A written order issued to a contractor by the Owner, or Project Manager, effecting a minor change or clarification with instructions to perform work not included in the contract. The work will eventually become a Change Order. A field Order is an expedient process used in an emergency or need situation that in many cases does not involve an adjustment to the contract sum or an extension of the contract sum or an extension of the contract time.

1.11 **Final Acceptance**: The formal written acceptance by the Owner of the completed Work.

1.12 **Force Account**: A method of payment, other than lump sum or unit price, for Work ordered by Change Order or by written notice from the Owner. Reimbursement for force account work is governed by Article 36, FORCE ACCOUNT WORK.

1.13 **Furnishing**: Manufacturing, fabricating and delivering to the site of the Work materials, plant, power, tools, patterns, supplies, appliances, vehicles and conveyances necessary or required for the completion of the Work.

1.14 **General Conditions (GC)**: A section of the Contract Documents which specifies, in general, the contractual conditions.

1.15 **General Terms**: Directed, required, permitted, ordered, designated, selected, prescribed or words of like import shall be understood to mean the direction, requirement, permission, order, designation, selection or prescription of the Project Manager. Approved, satisfactory, equal, necessary or words of like import shall be understood to mean approved by, acceptable to, satisfactory to, equal, necessary in the opinion of the Project Manager.

1.16 **Indicated**: A term meaning as shown on the Contract Drawings, or as specified and detailed in the Contract Documents.

1.17 **Installation, Install, or Installing**: Completely assembling, erecting and connecting material, parts, components, appliances, supplies and related equipment specified or required for the completion of the Work.

1.18 **Limit of Work**: Boundary within which the Work, excepting utility and drainage work in Public Right Of Way and Easements, is to be performed.

1.19 **Notice to Proceed**: Written notice from the Owner to the Contractor to proceed with the Work.

1.20 **Notice of Termination**: Written notice from the Owner to the Contractor to stop work under the Contract on the date and to the extent specified in the Notice of Termination.

1.21 **Owner**: The City of Greeley.

1.22 **Permanent Drainage Easement**: Area required to construct and maintain permanent drainage facilities for retention, release, and passage of surface water.

1.23 **Permanent Utility Easement**: Area required to construct and maintain utility facilities.

1.24 **Project**: That specific portion of the Work indicated in the Contract Documents.

1.25 **Project Manager**: The Owner's designated representative. The Project Manager has the authority to delegate portions of his responsibilities to others.

1.26 **Provide**: In reference to work to be performed by the Contractor, provide means furnish and install completely in place.

1.27 **Punch List**: Work determined to be incomplete or unacceptable at time of inspection for substantial completion.

1.28 **Samples**: Physical examples which illustrate materials, equipment, fixtures and workmanship which establish standards by which the Work will be judged.

1.29 **Schedule**: Acceptable schedules are BAR or GANTT Chart or CPM schedule.

1.30 **Shop Drawings**: Documents furnished by the Contractor to illustrate specific portions of the Work. Shop Drawings include drawings, diagrams, illustrations, schedules, charts, brochures, tables and other data describing fabrication and installation of specific portions of the Work.

1.31 **Specifications**: A document applicable to construction contracts containing the Technical Provisions.

1.32 **Subcontractor**: Any person, firm or corporation, other than the employees of the Contractor, who contracts with the Contractor to furnish labor, material or labor and materials, under this Contract.

1.33 **Special Provisions**: Provisions especially applicable to this Contract which invoke, modify and supplement the General Conditions which are included in the Contract Documents.

1.34 **Substantial Completion**: The state in the progress of Work when the Work, or a designated portion thereof, is sufficiently complete in accordance with the Contract Documents, so that Owner may access, occupy, use, and enjoy the Project, or designated portion thereof, for its intended purpose. Substantial Completion shall not occur until a temporary or permanent Certificate of Occupancy is issued and only minor punch list items remain for such Work.

1.35 **Technical Provisions**: Those provisions which specify the materials and execution of construction for work entering into the project.

1.36 **Work**: The construction, labor, materials, equipment, and contractual requirements as indicated in the Contract Documents, including alterations, amendments, or extensions thereto made by authorized changes.

1.37 **Work Site**: The area enclosed by the Limit of Work indicated in the Project Drawings and boundaries of local streets and public easements in which the Contractor is to perform work under the Contract. It shall also include areas obtained by the Contractor for use in connection with the Contract, when contiguous to the Limit of Work.

ARTICLE 2
INTERPRETATION

2.1 The documents comprising the Contract Documents are complementary and indicate the construction and completion of the Work. Anything mentioned in the Contract Specifications and not shown on the Contract Drawings, or shown on the Contract Drawings and not mentioned in the Contract Specifications, shall be of like effect as if shown or mentioned in both.

2.2 Where "as indicated", "as detailed", or words of similar import are used, it shall be understood that the reference is made to the specifications or drawings accompanying this Contract unless stated otherwise.

2.3 References to Articles or Sections include sub articles or subsections under the Article Reference (for example, a reference to Article 2 is also a reference to 2.1 through 2.9, and references to paragraphs similarly include references to subparagraphs).

2.4 Referenced Standards: Material and workmanship specified by the number, symbol, or title of a referenced standard shall comply with the latest edition or revision thereof and amendments and supplements thereto in effect on the date of the Invitation to Bid except where a particular issue is indicated.

2.5 Precedence of Contract Documents: Except as provided by Paragraph 2.1 of this Article, the Construction Contract governs over other Contract Documents, except that a Change Order governs over the Contract and previously issued Change Orders. The Contract Conditions govern over the General Conditions.

2.6 Explanations: Should it appear that the Work to be done or any of the matters relative thereto are not sufficiently detailed or explained in the Contract Documents, the Contractor shall apply to the Owner for such explanation provided as part of the Contract. Disputes over questions of fact which are not settled by agreement shall be decided by Owner. Such decision thereon will be final, subject to remedies under Article 35, DISPUTES.

2.7 Should there be any conflict, detailed instructions govern over general instructions, detail drawings have precedence over small scale drawings, and dimensions have precedence over scale.

2.8 Omissions and Misdescriptions: The Contractor shall carefully study and compare all drawings, specifications, Contract Documents and other instructions; shall verify all dimensions on the Contract Drawings before laying out the Work; shall notify the Project Manager of all errors, inconsistencies or omissions which he may discover; and obtain specific instructions in writing before proceeding with the Work. The Contractor shall not take advantage of apparent errors or omissions which may be found in the Contract Documents, but the Project Manager shall be entitled to make such corrections therein and interpretations thereof as he may deem necessary for the fulfillment of their intent. The Contractor shall be responsible for all errors in construction which could have been avoided by such examination and notification, subject to remedies under Article 35, Disputes.

ARTICLE 3
ENTITY OF CONTRACTOR

3.1 If the Contractor hereunder is comprised of more than one legal entity, each such entity shall be jointly and severally liable hereunder.

ARTICLE 4
LIABILITY AND INDEMNIFICATION

4.1 It is agreed that the Contractor assumes responsibility and liability for damages, loss or injury of any kind or nature whatever to persons or property caused by or resulting from or in connection with any act, action, neglect, omission, or failure to act when under a duty to act on the part of the Contractor or any of his officers, agents, employees, or subcontractors in his or their performance of the Work. The Contractor shall indemnify and hold harmless the Government, the State, the Owner and the Project Manager and their members, officers, agents, or employees from claims, losses, damages, charges, costs, or expenses, including attorney's fees, whether direct or indirect, to which they or any of them may be put or subjected to by reason of any such loss or injury.

ARTICLE 5
PROTECTION OF EXISTING VEGETATION, STRUCTURES, UTILITIES, AND IMPROVEMENTS AND LAND SURVEY MONUMENTS

5.1 A Contractor shall preserve and protect existing vegetation such as trees, shrubs, and grass on or adjacent to the work site which are not indicated to be removed and which do not unreasonably interfere with the construction work and he shall replace in kind any vegetation, shrubs and grass damaged by him at his own expense.

5.2 The Contractor shall protect from damage all utilities, structures, or improvements on or near the site of the Work and shall repair or restore any damage to such utilities, structures, or improvements resulting from failure to comply with the requirements of the Contract or the failure to exercise reasonable care in the performance of the Work. If the Contractor fails or refuses to repair

any such damage promptly, the Owner may have the necessary work performed and charge the cost thereof to the Contractor.

5.3 All land survey monuments shall be protected from any damage by any work and/or shall be replaced by a licensed land surveyor licensed in the state of Colorado at the contractor's expense before final acceptance is issued.

ARTICLE 6
CONTRACTUAL RELATIONSHIPS

6.1 No contractual relationship will be recognized under the Contract other than the contractual relationship between the Owner and the Contractor.

ARTICLE 7
ASSIGNMENT

7.1 The performance of the Work under the Contract shall not be assigned except upon written consent of the Owner. Consent will not be given to any proposed assignment which would relieve the Contractor or his surety of their responsibilities under the Contract. The Contractor shall not assign any monies due or to become due to him under the Contract without the previous written consent of the Owner.

ARTICLE 8
SUBCONTRACTORS

8.1 Unless otherwise required by the Contract Documents or the Bidding Documents, the Contractor, as soon as practicable after the award of the Contract, not to exceed 3 days, shall furnish to the Owner and the Project Manager, in writing the names of the subcontractors, persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work. The Project Manager will promptly reply to the Contractor in writing whether or not the Owner or the Project Manager, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or Project Manager to reply promptly shall constitute notice of no reasonable objections.

ARTICLE 9
CONDITIONS AFFECTING THE WORK

9.1 The Contractor shall be responsible for taking steps reasonably necessary to ascertain the nature and location of the Work, and the general and local conditions which can affect the Work or the cost thereof. Failure by the Contractor to do so will not relieve him from responsibility for successfully performing work without additional expense to the Owner. The Owner will not be responsible for any understanding or representations concerning conditions, unless such understanding or representations are expressly stated in the Contract.

ARTICLE 10
GRATUITIES AND CONFLICTS OF INTEREST

10.1 The Owner may, by written notice to the Contractor terminate the right of the Contractor to proceed under this Contract if it is found that gratuities (in the form of entertainment, gifts, or otherwise) were offered or given by the Contractor, or any agent or representative of the Contractor or any director, officer or employee of the Owner or its Project Manager with a view toward securing a contract or securing favorable treatment with respect to the awarding or amending, or the making of any determinations with respect to the performance of such contract. The Owner's determination shall be final subject only to judicial review.

10.2 In the event this Contract is terminated for any reason, the Owner shall be entitled to pursue the same remedies against the Contractor as it could pursue in the event of a breach of the Contract by the Contractor.

10.3 No member, officer or employee of the Owner or of a local public body during his tenure or for one year thereafter shall have any interest, direct or indirect, in this Contract or the proceeds thereof. "Local public body" means the State, any political subdivision of the State, or any agency of the State or any political subdivision thereof.

10.4 The rights and remedies of the Owner provided in this article are not exclusive and are in addition to any other rights and remedies provided by law or under the Contract.

ARTICLE 11
WARRANTY OF WORK

11.1 Except where longer periods of warranty are indicated for certain items, the Contractor warrants work under the Contract to be free from faulty materials and workmanship for a period of not less than two years from date of Final Acceptance, which two year period shall be covered by the Performance Bond and Payment Bond as specified in this Contract. The Contractor shall immediately remedy, repair, or replace, without cost to the Owner and to the entire satisfaction of the Owner, defects, damages, or imperfections due to faulty materials or workmanship appearing in said work within said period of not less than two years. Remedied work shall carry the same warranty as the original work starting with the date of acceptance of the replacement or repair. Payment to the Contractor will not relieve him of any obligation under this Contract.

11.2 The Contractor, at no additional expense to the Owner, shall also remedy damage to equipment, the site, or the building or the contents thereof which is the result of any failure or defect in the Work, and restore any work damaged in fulfilling the requirements of the Contract. Should the Contractor fail to remedy any such failure or defect within a reasonable time but no longer than ten (10) days after receipt of notice thereof, the Owner will have the right to replace, repair, or otherwise remedy such failure or defect at the Contractor's expense.

11.3 Subcontractors', manufacturers', and suppliers' warranties and guarantees, expressed or implied, respecting any part of the Work and any material used therein shall be deemed obtained and

shall be enforced by the Contractor for the Benefit of the Owner without the necessity of separate transfer or assignment thereof.

11.4 The rights and remedies of the Owner provided in this Article are in addition to and do not limit any rights and remedies afforded by the Contract or by law.

ARTICLE 12
MATERIAL

12.1 Unless otherwise indicated in this Contract, equipment, material and products incorporated in the Work covered by this Contract shall be new and of the grade specified in the Contract for the purpose intended. Unless otherwise specifically indicated, reference to equipment, material, product or patented process by trade names, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition, and the Contractor may, at his option, use any equipment, material, article, or process which is equivalent to that named, subject to the requirements of Paragraph 12.2 of this Article.

12.2 Within the scope of his authority, the Project Manager shall be the sole judge of the quality and suitability of proposed alternative equipment, material, article or process. The burden of proving the quality and suitability of the alternative shall be upon the Contractor. Information required by the Project Manager in judging an alternative shall be submitted for approval by the Contractor at the Contractor's expense prior to installation.

12.3 Where use of an alternative material involves redesign of or changes to other parts of the Work, the cost and the time required to affect such redesign or change will be considered in evaluating the suitability of the alternative material. Redesign and changes in other parts of the Work shall be at the Contractor's expense.

12.4 No action relating to the approval of alternative materials will be taken by the Project Manager until the request for substitution is made in writing by the Contractor accompanied by complete data as to the quality and suitability of the materials proposed. Such request shall be made in ample time to permit approval without delaying the Work.

12.5 Disposal of material outside the Work Site: The Contractor shall make his own arrangements for legally disposing of waste and excess materials outside the Work Site and he shall pay costs therefore.

12.6 Property rights in materials: The Contractor shall have no property right in materials after they have been attached or affixed to the Work or the soil, or after payment has been made by the Owner to the Contractor for materials delivered to the site of the Work, or stored subject to or under the control of the Owner as provided in Article 24, PROGRESS PAYMENTS.

ARTICLE 13
WORKMANSHIP AND UNAUTHORIZED WORK

13.1 Work under this Contract shall be performed in a skillful and workmanlike manner. The Project Manager may, in writing, require the Contractor to remove from the work any employee the Project Manager determines incompetent, careless or otherwise objectionable.

13.2 Unauthorized work: Work performed beyond the lines and grades shown on the Contract Drawings, approved Working and Shop Drawings and Extra work done without written authorization, will be considered as unauthorized work, and the Contractor will receive no compensation therefore. If required by the Owner, unauthorized work shall be remedied, removed, or replaced by the Contractor at the Contractor's expense. Upon failure of the Contractor to remedy, remove or replace unauthorized work, the Owner may take courses of action set out in Paragraph 15.3 of Article 15, INSPECTION.

ARTICLE 14
SUPERINTENDENCE BY CONTRACTOR

14.1 The Contractor shall give his personal superintendence to the Work or have a competent foreman or superintendent, hereinafter designated his authorized representative, satisfactory to the Owner, on the Work Site at all times during progress, with authority to act for him. There shall be provided at all times, a reasonable method of communication directly to the Contractor if the Owner experiences any problems or difficulties with the Superintendent.

ARTICLE 15
INSPECTION/TESTING

15.1 Work (which term includes but is not restricted to materials, workmanship and manufacture and fabrication of components) will be subject to inspection and test by the Project Manager at all reasonable times and at all places prior to acceptance. Such inspection and test is for the sole benefit of the Owner and shall not relieve the Contractor of the responsibility of providing quality control measures to assure that the Work strictly complies with the Contract Documents. No inspection or test by the Project Manager shall be construed as constituting or implying acceptance. Inspection or test shall not relieve the Contractor of responsibility for damage to or loss of the material prior to acceptance, nor in any way affect the continuing rights of the Owner after acceptance of the completed Work.

15.2 The Contractor shall, at his own expense, replace any material or correct any workmanship found not to conform to the contract requirements, unless the Owner consents in writing to accept such material or workmanship with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises at his own expense.

15.3 If the Contractor does not promptly replace rejected material or correct the rejected workmanship, the Owner (1) may, by separate contract or otherwise, replace such material or correct such workmanship and charge the cost thereof to the Contractor, or (2) may terminate the Contractor's right to proceed in accordance with Article 38, TERMINATION FOR DEFAULT-DAMAGES FOR DELAY--TIME EXTENSIONS.

15.4 The Contractor shall give the Project Manager ample notification of inspections and tests, and the Project Manager will perform, except as otherwise specifically provided, said inspections and tests in such manner as not to unnecessarily delay the work. The Owner will have the right to charge to the Contractor any additional cost of inspection or test or when reinspection or retest is necessitated by prior rejection.

15.5 Should it be considered necessary, before acceptance of the entire work, to make an examination of work already completed by removing or tearing out same, the Contractor shall on request promptly furnish all necessary facilities, labor and material therefore. If such work is found to be defective or nonconforming in any material respect, due to the fault of the Contractor or his subcontractors, he shall defray the expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, an equitable adjustment will be made in the contract price to compensate the Contractor for the additional services involved in such examination and reconstruction. If completion for the work has been delayed thereby, he will, in addition, be granted an equitable extension of time.

15.6 The Project Manager shall have access to the work during its construction. Work done and materials provided will be subject to the Project Manager's on-site and off-site inspection and approval. When work is to be performed during hours other than during his normal schedule, the Contractor shall so advise the Project Manager not less than 24 hours in advance. The Contractor shall provide access to the work for authorized representatives of the Owner.

15.7 The Project Manager's inspection and approval of work or materials shall not relieve the Contractor of any of his obligations to fulfill the requirements of the Contract Documents. Work and materials not meeting the requirements of the Contract shall not be incorporated in the Work. Unsuitable or substandard work or materials may be rejected by the Project Manager, notwithstanding that such work or materials may have been previously inspected by the Project Manager, or that payment therefore has been included in a progress payment.

ARTICLE 16
PERMITS AND COMPLIANCE WITH LAWS

16.1 The Contractor shall without additional expense to the Owner be responsible for obtaining necessary licenses and permits and for complying with applicable Federal, State, County and Municipal laws, codes and regulations in connection with the commencement of the work. The Contractor is required to supply the Project Manager with complete and final copies of license and permits including final inspection documentation. The Contractor shall be required to obtain permits at his own expense. The Contractor shall protect, indemnify and hold harmless the Owner and the Project Manager and their members, officers, agents and employees against claims and liabilities arising from or based on the violation of requirements of law or permits whether by the Contractor, his employees, agents or subcontractors.

ARTICLE 17
RIGHTS IN LAND IMPROVEMENT

17.1 The Contractor shall make no arrangements with any person to permit occupancy or use of any land, structure or building within the work site for any purpose whatsoever, either with or without compensation, in conflict with any agreement between the Owner and any owner, former owner or tenant of such land, structure or building. The Contractor shall not occupy Owner property outside the work site without obtaining prior written approval from the Owner.

ARTICLE 18
DAMAGE TO THE WORK AND RESPONSIBILITY FOR MATERIALS

18.1 The Contractor shall be responsible for materials delivered and work performed until completion and final acceptance of the entire construction thereof.

18.2 The Contractor shall bear the risk of injury, loss or damage to any and all parts of the work for whatever cause, whether arising from the execution or from the non-execution of work. The Contractor shall rebuild, repair or restore work and materials which have been damaged or destroyed from any cause before completion and acceptance of the work and shall bear the expense thereof. The Contractor shall provide security and drainage and erect temporary structures as necessary to protect the work and materials from damage.

18.3 The Contractor shall be responsible for materials not delivered to the site for which any progress payment has been made to the same extent as if the materials were so delivered.

ARTICLE 19
EMERGENCIES

19.1 In an emergency affecting the safety of life, the work, or adjacent property, the Contractor shall notify the Project Manager as early as possible that an emergency exists. In the meantime, without special instruction from the Project Manager as to the manner of dealing with the emergency, the Contractor shall act at his own discretion to prevent such threatened loss or injury. As emergency work proceeds, the Project Manager may issue instruction, which the Contractor shall follow. The amount of compensation to which Contractor is entitled on account of emergency work will be determined in accordance with Article 28, CHANGES.

ARTICLE 20
NOTICE TO PROCEED

20.1 The Owner will issue a Notice to Proceed to the Contractor within 15 days after the Contractor has executed the Contract and has delivered the specified bonds and Certificates of Insurance as required by the Owner. Except as specifically authorized in writing by the Owner, the Contractor is not authorized to perform work under the Contract until the effective date of the Notice to Proceed. Within 10 days after the effective date of such Notice to Proceed, the Contractor shall

commence work and shall diligently prosecute the Work to completion within the time limits specified. These time periods may be modified by mutual written agreement of both the Owner and Contractor.

ARTICLE 21
PROGRESS SCHEDULE AND REQUIREMENTS FOR MAINTAINING PROGRESS

21.1 The Contractor shall, at the pre-construction meeting, prepare and submit to the Project Manager for approval a practicable schedule, showing the order in which the Contractor proposes to carry on the work, the date on which he will start the several salient features (including procurement of materials, plant and equipment) and the contemplated dates for completing the same. The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion at any time. The Contractor shall update the chart with the actual progress monthly or at such intervals as directed by the Project Manager, and shall immediately deliver three copies thereof. If the Contractor fails to submit a progress schedule within the time herein prescribed, the Project Manager may withhold approval of progress payment estimates until such time as the Contractor submits the required progress schedule.

21.2 The Contractor shall prosecute the work in accordance with the latest approved Progress Schedule. In the event, that the progress of items along the critical path is delayed, the Contractor shall revise his planning to include additional forces, equipment, shifts or hours as necessary to meet the time or times of completion specified in this Contract. Additional costs resulting therefrom will be borne by the Contractor. The Contractor shall make such changes when his progress at any check period does not meet at least one of the following two tests:

21.2.1 The percentage of dollar value of completed work with respect to the total amount of the Contract is within ten percentage points of the percentage of the Contract time elapsed, or;

21.2.2 The percentage of dollar value of completed work is within ten percentage points of the dollar value which should have been performed according to the Contractors own network analysis previously approved by the Project Manager.

21.3 Failure of the Contractor to comply with the requirements under this provision will be grounds for determination that the Contractor is not prosecuting the work with such diligence as will ensure completion within the time of completion specified in this Contract. Upon such determination, the Owner may terminate the Contractor's right to proceed with the work, or any separate part thereof, in accordance with Article 38, TERMINATION FOR DEFAULT--DAMAGES FOR DELAY-TIME EXTENSIONS of these General Conditions.

ARTICLE 22
SUSPENSION OF WORK

22.1 The Owner reserves the right to suspend, delay or interrupt execution of the whole or any part of the work for such period of time as he may determine to be appropriate for his convenience.

22.2 If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted by an act of the Owner in the administration of this Contract or by his failure to act within the time specified in this Contract (or if no time is specified, within a reasonable time), an adjustment shall be made for any increase in the cost of performance of this Contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent (1) that performance would have been so suspended, delayed or interrupted by any other cause, including the fault or negligence of the Contractor or (2) for which an equitable adjustment is provided for or excluded under any other provision of this Contract.

22.3 No claim under this clause shall be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Owner in writing of the act of failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order), and (2) unless the claim, in an amount stated is asserted in writing as soon as practicable after the termination of such suspension, delay, or interruption, but not later than the date of final payment under the Contract.

ARTICLE 23
FINAL INSPECTION AND ACCEPTANCE

23.1 Final inspection: When the Contractor notifies the Project Manager in writing that the work has been completed, the Owner will make the final inspection for the purpose of ascertaining that the work has been completed in accordance with the requirements of the Contract Documents.

23.2 Acceptance of the work: When the Owner has made the final inspection and has determined that the work has been completed in accordance with the Contract Documents, the Owner will accept the work. Immediately upon and after Final Acceptance, the Contractor will be relieved of the duty of maintaining and protecting the work as a whole. The Contractor will be relieved of his responsibility for injury to persons or property or damage to the work which occurs after Final Acceptance, except that the Contractor will not be relieved of his responsibility for injury to persons or property arising from his duties and obligations under Article 4, LIABILITY AND INDEMNIFICATION.

23.3 Final Acceptance shall be final and conclusive, and no further performance of work shall be required except with regards to latent defects, fraud or such gross mistakes as may amount to fraud, or with regard to the Owner's rights under any warranty or guarantee. All punch list items must be completed and building permits provided to Owner before final acceptance is issued.

23.4 Date of Substantial Completion for all Work shall be within the number of calendar days bid by the Contractor on the Bid proposal.

23.5 Date of Final Completion shall be the date specified on the Certificate of Final Completion.

ARTICLE 24
PROGRESS PAYMENTS

24.1 The Owner will make progress payments monthly as the work proceeds, on estimates approved by the Project Manager. Payment will be made within 15 days after progress estimates are approved by the Project Manager and Department Head. On request of the Project Manager, the Contractor shall furnish a detailed estimate of the total contract price each showing the amount included therein for each principal category of the work, to provide a basis for determining the amount of progress payments. In the preparation of estimates, the Owner, at its sole discretion, may authorize material delivered on the site and preparatory work done to be taken into consideration which is to be submitted at the pre-construction meeting.

24.2 In making such progress payments, five percent of the estimated amount will be retained until Final Acceptance of the Contract work; in addition, the Owner shall retain from all Progress payments an amount equal to all statutory claims filed against the Contractor. Also, whenever the work is substantially complete, the Owner if it considers the amount retained to be in excess of the amount adequate for its protection, may release to the Contractor all or a portion of such excess amount. Substantial completion as used in this Paragraph 24.2 shall mean the following: Substantial completion of the work or a portion thereof shall be when, as determined by both the Project Manager and the Owner, the construction is sufficiently completed in accordance with the Contract Documents and any modification thereto as provided in the Contract to permit the Owner to occupy the work or a portion of the work for the use which it is intended.

24.3 Material and work covered by progress payments shall become the sole property of the Owner. This provision shall not be construed as relieving the Contractor from the sole responsibility for material and work upon which payments have been made, the restoration of damaged work or as waiving the right of the Owner to require the fulfillment of the terms of the Contract.

ARTICLE 25
PAYMENT TO SUBCONTRACTORS

25.1 The Contractor shall pay all subcontractors for and on account of work performed by such subcontractors in accordance with the terms of their respective subcontract. Prior to final payment an unconditional lien waiver release form will be required by the Owner.

ARTICLE 26
PAYMENT OF TAXES

26.1 The price or prices for the work will include full compensation for taxes that the Contractor is or may be required to pay. The Contractor shall bear the risk of any added or increased taxes occurring during the prosecution of the work. A change in taxes shall under no circumstances entitle the Contractor to an adjustment under the Contract.

26.2 The Contractor's attention is directed to the fact that this project is exempt from payment of City of Greeley Sales and Use taxes, and such taxes must not be included in the amount of bid.

26.3 The Contractor shall pay all sales and use taxes required to be paid, shall maintain such records in respect of his work, which shall be separate and distinct from all other records maintained by the Contractor and shall be available for inspection by the Owner at any and all reasonable times, and shall furnish the Owner with such data, as may be necessary to enable the Owner to obtain any refunds of such taxes which may be available to the Owner under the laws, ordinances, rules or regulations applicable to such taxes. The Contractor shall require each of his subcontractors to pay all sales and use taxes required to be paid and to maintain such records and furnish the Contractor with such data as may be necessary to enable the Owner to obtain a refund of the taxes paid by such subcontractors.

ARTICLE 27
FINAL PAYMENT

27.1 After the Work has been accepted by the Owner, subject to the provisions of Article 11, WARRANTY OF WORK and Article 23, FINAL INSPECTION AND ACCEPTANCE of these General Conditions, a final payment due the Contractor under this Contract shall be paid upon the presentation of properly executed voucher and after the Contractor shall have furnished the Owner with a release of all claims against the Owner arising by virtue of this Contract, other than claims in stated amounts as may be specifically excepted by the Contractor from the operation of the release. If the Contractor's claim to amounts payable under the contract has been assigned under the assignment of Claims Act of 1940, as amended (31 U.S.C. 203, 41 U.S.C. 15), a release may also be required of the assignee.

27.2 If any mechanic's or material man’s lien or notice of claim of such lien is filed or recorded against the project for labor, materials, supplies or equipment claimed to have been furnished to or incorporated into the Work, or for other alleged contribution thereto, the Owner will have the right to retain from payments otherwise due the Contractor, in addition to other amounts properly withheld under this Article or under other provisions of the Contract, an amount equal to such lien or liens claimed.

27.3 Further, the Owner will have the right to retain from final payment an amount equal to all liquidated damages claimed by the Owner.

27.4 Retainages held by the Owner for any state or federal statutory claim arising out of the project will be held by the Owner in addition to all retainages held under the provisions of the Contract.

ARTICLE 28
CHANGES

28.1 The Owner may, at any time, without notice to the sureties, by written notice or order designated or indicated to be a Change Notice or Change Order, make any change in the work within the general scope of the Contract in accordance with all of the Owner's processes and procedures whether or not set forth herein, including but not limited to changes:

28.1.1 In the Contract (including drawings and designs);

28.1.2 In the method or manner of performance of the work;

28.1.3 In Owner furnished facilities, equipment, materials, services, or site; or

28.1.4 Directing acceleration in performance of the work.

28.2 Any other order (which terms as used in Paragraph 28.2 of this Article shall include direction, instruction, interpretation, or determination) from the Project Manager, which causes any change, shall be treated as a Change Notice under this Article provided that the Contractor gives the Project Manager written notice stating the date, circumstances and source of the order, and that the Contractor regards the order as a Change Notice. The Contractor shall notify the Project Manager when he receives direction, instruction, interpretation or determination from any source which may cause any change in the work. Such notification shall be given to the Project Manager before the Contractor acts on said direction, instruction, interpretation or determination.

28.3 Except as herein provided, no order, statement, or conduct of the Architect/ Project Manager or any other person shall be treated as a change under this Article or entitle the Contractor to an equitable adjustment hereunder.

28.4 If any change under this Article causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the Work under this Contract, whether or not changed by an order, an equitable adjustment will be made and the Contract modified accordingly by a written Change Order; provided, however, that except for claims based on errors in the Contract Documents, no claim for change under Paragraph 28.2 of this Article will be allowed for costs incurred more than 20 days before the Contractor gives written notice as herein required; and provided that in the case of errors in the Contract Documents for which the Owner is responsible, the adjustment will include increased cost, reasonably incurred by the Contractor in attempting to comply with such errors in the Contract Documents. No claim shall be made for the type of errors in the Contract Documents which are set forth in Article 2, INTERPRETATION.

28.5 If the Contractor intends to assert a claim for an equitable adjustment under this Article, he shall, within 30 days after receipt of a written Change Order under Paragraph 28.1 of this Article or the furnishing of a written notice under Paragraph 28.2 of this Article, submit to the Project Manager a written statement setting forth the general nature and monetary extent of such claim, unless this period is extended in writing by the Owner. The statement of claim hereunder may be included in the notice under Paragraph 28.2 of this Article.

28.6 No claim by the Contractor for an equitable adjustment hereunder will be allowed unless asserted as described in Paragraphs 28.4 and 28.5 above.
28.7 Payment will not be made under the provisions of this Article for such work or materials which are so required to be done or furnished in or about or for the performance of the Work and which are not mentioned, specified or indicated or otherwise provided for in this Contract or in the Contract Documents so far as such work or materials may be, in the opinion of the Project Manager, susceptible of classification under or reasonably inferred to be included in the Bid Items of the Bid Form.

28.8 In case the Contractor is ordered to perform work under this Article for which payments are not determined under Paragraph 28.7 of this Article, which in the opinion of the Owner it is impracticable to have performed by the Contractor's own employees, the Contractor will, subject to the approval of the Owner, be paid the actual cost to him of such work and, in addition thereto, a negotiated amount to cover the Contractor's superintendence, administration and other overhead expenses. The terms and conditions of any subcontract which the Contractor may propose to enter into in connection with work under the provision of this Article shall be subject to the written approval of the Project Manager before such subcontract is made. The contractor shall be responsible for the work of the subcontractors and shall be liable therefore as if he had performed the work directly.

28.9 In cases other than those described in Paragraphs 28.7 and 28.8 above, the Owner and the Contractor (on his own behalf and on behalf of his subcontractors) shall endeavor to negotiate a reasonable contract price and line adjustment in a Change Order on terms appropriate to the changed work. The Contractor will be required to submit a sufficiently detailed price proposal supported with sufficient documentation that (1) the Owner can determine that the proposal reflects all impacts on the Contract from work additions, deletions and modifications shown in the Change Notice being priced, (2) the proposed prices are set out in such a way that their reasonableness can be evaluated against prices based on adequate price competition, bid unit prices, established catalog or market prices of commercial items sold in substantial quantities to the general public, prices set by law or regulation, recognized published price lists and indices, independently developed cost estimates and other appropriate price comparisons, and (3) contract provisions relating to Contract changes costing over $100,000.00 are complied with. If any prices or other aspects are conditional, such as on firm orders being made by a certain date or the occurrence or nonoccurrence of an event, the Contractor shall identify these aspects in his proposal. A negotiated Change Order shall set out prices, scheduling requirements, time extensions and all costs of any nature arising out of the issuance of a Change Notice except for those cost and time aspects explicitly reserved on the face of the Change Order. Except for these explicit reservations, the execution of a Change Order by both parties will be deemed accord and satisfaction of all claims of any nature arising from the issuance of the Change Notice negotiated.

28.10 In the event the Contractor and the Owner are unable to agree upon the Contractor's entitlement to an equitable adjustment or upon the amount thereof, or in the event that it is in the best interest of the Owner to have the Work proceed pending negotiation of amount of an equitable adjustment, the Owner may direct the Contractor to perform the Work in accordance with the Owner order, direction, instruction, interpretation, or determination, with any Contract price adjustments and progress payments for the Work to be determined on a Force Account basis in accordance with

Article 36. The Contractor shall continue diligently to perform the Contract in accordance with the Owner's order, direction, instruction, interpretation, or determination during negotiations with respect to the Contractor's entitlement to an equitable adjustment hereunder or to the amount of any Contract price adjustment or time extension. The Contractor and the Owner may agree on certain aspects of an equitable adjustment and take those aspects out of operation of Force Account provisions. In the event a mutually agreeable equitable adjustment cannot be made, the Contractor shall continue diligently to perform the orders as he proceeds with his remedies under Article 35, DISPUTES, and shall continue to receive compensation on a Force Account basis.

28.11 For contract changes, the Owner, State and Government or their representative shall have the audit and inspection rights as described below:

28.11.1 Where the agreed payment method for any contract changes is to be by cost reimbursement, time and material, labor hours or any combination thereof, the Contractor shall maintain and the Owner or its representatives shall have the right to examine books, records, documents and other evidence and accounting principles and practices sufficient to reflect properly all direct and indirect costs of whatever nature claimed to have been incurred and anticipated to be incurred for the performance of the contract changes under this sub article.

28.11.2 Contract changes exceeding $100,000.00 in cost: For submitted cost and pricing data in connection with pricing a contract modification referred to in this sub article, unless such pricing is based on bid unit prices, adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the public, or prices set by law or regulation, the Owner or his representatives and the Comptroller General of the United States and his representatives who are employees of the United States shall have the right to examine all books, records, documents and other data of the Contractor related to the negotiation of or performance under the contract Change Orders for the purpose of evaluating the accuracy, completeness and currency of the cost or pricing data submitted. The right of examination shall extend to all documents necessary to permit adequate evaluation of the cost or pricing data submitted, along with the computations and projections used therein.

28.11.3 Contract changes exceeding $10,000.00 but not $100,000.00 in cost: The Owner or his representatives prior to the execution of any contract Change Order in this sub article or for a period of twelve months after execution shall, unless such pricing is based on bid unit prices, adequate price competition, established catalog of market prices or commercial items sold in substantial quantities to the public, or prices set by law or regulation, have the right to examine all books, records, documents, and other data of the Contractor relating to the negotiation and contract Change Order for the purpose of evaluating the accuracy, completeness, and currency of the data is submitted upon which negotiation is or has been based. To the extent the examination reveals inaccurate, incomplete or noncurrent data, the Project Manager may renegotiate the contract Change Order price based on such data.

28.11.4 Contract changes of less than $10,000.00 in cost: The Owner may require from the Contractor appropriate documentation to support the prices being negotiated for contract changes

under this sub article, and may refuse to complete negotiations until satisfactory documentation is submitted.

28.11.5 Availability: The materials described in Paragraphs 28.11.1 and 28.11.2 above shall be available at the office of the Contractor at all reasonable times for inspection, audit or reproduction until three years from the date of final payment under this Contract and for records which relate to Article 35, DISPUTES, or litigations or the settlement of claims arising out of the negotiation or the performance of contract changes over 100,000.00, records shall be made available until such litigations or claims have been resolved.
28.11.6 The Contractor shall insert a clause containing all the provisions in this Paragraph 28.11, including this subparagraph 28.11.6, in all subcontracts hereunder except altered as necessary for proper identification of the contracting parties and Owner.

28.11.7 For the purposes of Paragraph 28.11 of this Article, costs shall include liquidated damages which would be assessed if extension(s) of time were not granted by contract Change Order.

28.11.8 The requirements of this audits and records article are in addition to other audit, inspection and record keeping provisions elsewhere in the Contract Documents.

28.12 Changes involving aggregate increases and decreases in excess of $100,000.00 shall be subject to the following:

28.12.1 A change involves aggregate increases and decreases in excess of $100,000.00 if the total value of work affected, without regard to the arithmetic sign, exceeds this amount; for example, a change order adding work in the amount of $75,000.00 and deleting work in the amount of $50,000.00 will be considered to involve aggregate increases and decreases of $125,000.00.

28.12.2 The Contractor shall submit in support of all items not based upon unit prices or lump sum prices contained in the Contract or upon the established prices at which commercial items are sold in substantial quantities to the public, statements by his vendors that the prices charged the Contractor are not greater than the prices charged by the respective vendors to their most favored customers for the same items in similar quantities.

28.12.3 Price reductions for Defective Cost or Pricing Data--Pricing Adjustments: If any price, including profit and fee, negotiated in connection with any price adjustment was increased by any significant sums because:

28.12.3.1 The Contractor furnished cost or pricing data which were not complete, accurate, and current as certified in the Contractor's Certificate of Current Cost or Pricing Data;

28.12.3.2 A subcontractor, pursuant to Paragraph 28.13 of this Article entitled Subcontractor Cost or Pricing Data--Pricing Adjustments or any subcontract provision therein required, furnished costs or pricing data which were not complete, accurate, and current as certified in the Subcontractor's Certificate of Current Cost or Pricing Data;

28.12.3.3 The subcontractor or his prospective subcontractor furnished cost or pricing data which were required to be complete, accurate, and current and to be submitted to support a subcontract cost estimate furnished by the Contractor but which were not complete, accurate, and current as of the date certified in the Contractor's Certificate of Current Cost or Pricing Data; or

28.12.3.4 The Contractor or a subcontractor or his prospective subcontractor furnished any data, not within subparagraphs 28.12.3.1, 28.12.3.2, or 28.12.3.3 above, which were not complete, accurate, and current as submitted, the price shall be reduced accordingly and the Contract shall be modified in writing as may be necessary to reflect such reduction. Any reduction in the Contract Price due to defective subcontract data of a prospective subcontractor, when the subcontract was not subsequently awarded to such subcontractor, will be limited to the amount (plus applicable overhead and profit markup) by which the actual subcontract, or actual cost to the Contractor if there was no subcontract, was less than the prospective subcontract cost estimate submitted by the Contractor, provided the actual subcontract price was not affected by defective cost or pricing data.

28.13 Subcontract Cost of Pricing Data-- Pricing Adjustment:

28.13.1 When negotiating a change involving increases or decreases in excess of $100,000.00, the Contractor shall require subcontractors hereunder to submit cost or pricing data under the following circumstances. Prior to award of any cost-reimbursement type, incentive or price redeterminable subcontract;

28.13.1.2 Prior to the award of any subcontract the price of which is expected to exceed $100,000.00;

28.13.1.3 Prior to the pricing of any subcontract change modifications for which the price is expected to exceed $100,000.00, except in the case of 28.13.1.2 and 28.13.1.3 where the price is based on adequate price competition, established catalog or market prices, commercial items sold in substantial quantities to the general public, or prices set by law or regulation.

28.13.2 The Contractor shall require subcontractors to certify to the best of their knowledge and belief that the cost and pricing data submitted under subparagraph 28.13.1 of this Article are accurate, complete, and current as of the date of execution, which date shall be as close as possible to the date of agreement on the negotiated price of the contract Change Order.

28.13.3 The Contractor shall insert the substance of Paragraph 28.13 of this Article, including this subparagraph 28.13.3, in each subcontract hereunder which exceeds $100,000.00.

ARTICLE 29
PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

29.1 The Contractor shall furnish a Performance Bond in the amount equal to one hundred percent (100%) of the Contract Sum as security for the faithful performance of this Contract and also a Labor and Material Payment Bond in an amount not less than one hundred percent (100%) of the

Contract Sum or in a penal sum not less than that prescribed by State, or local law, as security for the payment of all persons performing labor on the Project under this Contract and furnishing materials in connection with this Contract. The Performance Bond and the Labor and Material Payment Bond may be in one or in separate instruments in accordance with local law and shall be delivered to the Owner not later than the date of execution of the Contract.

29.2 Performance Bonds, Labor and Material Payment Bonds and other such sureties shall provide that the surety and the Contractor are both jointly and severally liable and obligated under respective Bond or other surety agreement and shall incorporate acknowledge of applicable provisions of state law into all documents furnished in connection with the project.

ARTICLE 30
DIFFERING SITE CONDITIONS

30.1 The Contractor shall within 10 days of actual or constructive notice of a differing site condition, promptly, and before such conditions are disturbed, notify the Project Manager in writing of: (1) subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents, or (2) unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract. The Project Manager will promptly investigate the conditions, and if such conditions materially differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performance of any part of the work under the Contract, whether or not changed as a result of such conditions, an equitable adjustment may be made subject to Owner's approval and the Contract modified in writing accordingly.

30.2 No claim of the Contractor under this Article will be allowed unless the Contractor has given the notice required in Paragraph 30.1 of this Article.

30.3 No claim by the Contractor for an equitable adjustment hereunder will be allowed if asserted after final payment under this Contract.

ARTICLE 31
CONTRACTOR PROPOSALS

31.1 The Contractor may at any time submit to the Project Manager for his review proposed modifications to the Contract Documents, supported by a cost/price proposal. Upon acceptance of the proposed modifications by the Owner, a Change Order will be issued. Denial of the proposed modification will neither provide the Contractor with any basis for claim for damages nor release the Contractor from contractual responsibilities. An equitable adjustment in the form of a contract price reduction will be made if the change results in a reduction of the cost of performance and the Contractor will not be entitled to share in said savings unless the proposal is made under Paragraph 31.2 of this Article. Except as provided in Paragraph 31.2 of this Article, the Contractor will not be compensated for any direct, incidental or collateral benefits or savings the Owner receives as a result of the proposal.

31.2 Value Engineering Change Proposals: The Contractor may submit to the Project Manager one or more cost reduction proposals for changing the Contract requirements. The Proposals shall be based upon a sound study made by the Contractor indicating that the proposal:

31.2.1 Will result in a net reduction in the Total Contract amount;

31.2.2 Will not impair any essential function or characteristic of the Work such as safety, service life, reliability, economy of operation, ease of maintenance and necessary standardized features.

31.2.3 Will not require an unacceptable extension of the contract completion time; and

31.2.4 Will require a change in the Contract Documents and such change is not already under consideration by the Owner.

31.3 The Owner may accept in whole or in part any proposal submitted pursuant to the previous Paragraph 31.2 by issuing a Change Order which will identify the proposal on which it is based. The Change Order will provide for an equitable adjustment in the Contract Price and will revise any other affected provisions of the Contract Documents. The equitable adjustment in the Contract price will be established by determining the net savings resulting from the accepted change. The net savings resulting from the change will be shared between the Contractor and the Owner on the basis of 50 percent for the Contractor and 50 percent for the Owner and will be limited to this contract for any one Value Engineering Change Proposal. Net savings will be determined by deducting from the estimated gross savings, the Contractor's costs of developing and implementing the proposal (including any amount attributable to a subcontractor) and the estimated amount of increased costs to the Owner resulting from the change, such as evaluation, implementation, inspection, related items, and the Owner-furnished material. Estimated gross savings will include Contractor's labor, material, equipment, overhead, profit and bond. The Contract price will be reduced by the sum of the Owner's costs and share of the net savings. For the purpose of this Article, the applicable provisions of Article 28, CHANGES, shall be used to determine the equitable adjustment to the Contract price.

31.4 The Owner will not be liable for delay in acting upon, or for failure to act upon, any proposal submitted pursuant to Paragraph 31.2 of this Article. The decision of the Owner as to the Acceptance or rejection of any such proposal under the Contract will be final. The submission of a proposal by the Contractor will not in itself affect the rights or obligations of either party under the Contract.

31.5 The Contractor shall have the right to withdraw part or all of any proposal he may make under Paragraph 31.2 of this Article at any time prior to acceptance by the Owner. Such withdrawal shall be made in writing to the Project Manager. Each such proposal shall remain valid for a period of 60 days from the date submitted. If the Contractor wishes to withdraw the proposal prior to the expiration of the 60-day period, he will be liable for the cost incurred by the Owner in reviewing the proposal.

31.6 The Contractor shall specifically identify any proposals under Paragraph 31.2 of this Article with the heading "Value Engineering Change Proposal", or the proposal will be considered as made under Paragraph 31.1 of this Article.

31.7 The Contractor, in connection with each proposal he makes for a Contract Change Notice under this Article shall furnish the following information:

31.7.1 a description of the difference between the existing Contract requirement and the proposed change, and the comparative advantages and disadvantages of each, justification when a function or characteristic of an item is being altered, and the effect of the change on the performance of the end item;

31.7.2 an analysis and itemization of the requirements of the Contract which must be changed if the Value Engineering Change Proposal is accepted and a recommendation as to how to make each such change (e.g., a suggested specification revision);

31.7.3 a separate detailed cost estimate for both the existing Contract requirement and the proposed change to provide an estimate of the reduction in costs, if any, that will result from acceptance of the Value Engineering Change Proposal taking into account the costs of development and implementation by the Contractor;

31.7.4 a prediction of any effects the proposed change would have on collateral costs to the Owner such Government-furnished property costs, costs of related items, and costs of maintenance and operation;

31.7.5 a statement of the time by which a contract modification accepting the Value Engineering Change Proposal must be issued so as to obtain the maximum cost reduction, noting any effect on the contract completion time or delivery schedule; and

31.7.6 identification of any previous submission of the Value Engineering Change Proposal to the Owner, including the dates submitted, the numbers of contracts involved, and the previous actions by the Owner, if known.

ARTICLE 32
EXTENSION OF TIME

32.1 In addition to the provisions stated in Article 38, the Contractor will be granted an extension of time and will not be assessed liquidated damages for any portion of the delay in completion of the Work, performed under the latest approved progress schedule, arising from acts of God, war, fires, floods, epidemics, quarantine restrictions, freight embargoes, or weather more severe than the norm, provided that the aforesaid causes were not foreseeable and did not result from the fault or negligence of the Contractor, and provided further that the Contractor has taken reasonable precautions to prevent further delays owing to such causes, and has notified the Project Manager in writing of the cause or causes of delay within five days from the beginning of any such delay. Within 15 days after the end of the delay, the Contractor shall furnish the Project Manager with detailed

information concerning the circumstances of the delay, the number of days actually delayed, the appropriate Contract Document references, and the measures to be taken to prevent or minimize the delay. Failure to submit such information will be sufficient cause for denying the delay claims. The Owner will ascertain the facts and the extent of the delay, and its findings thereon will be final and conclusive to provisions under Article 35, DISPUTES. The extension of time granted for these reasons shall not be the basis for additional compensation for any costs incurred during the time of delay.

32.1.1 Every effort shall be made by the Contractor to complete the project within the "Contract Time". The "Contract Time" anticipates "Normal" weather and climate. The Contractor's schedule must anticipate normal adverse weather delays on all weather dependent activities. The following specifies the procedure for determining time extensions for unusually severe weather. Listed below are the anticipated numbers of calendar days lost to normal adverse weather for each month.

Monthly Anticipated Calendar Days Lost to Adverse Weather Conditions

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC (7) (4) (4) (4) (6) (3) (4) (2) (3) (3) (2) (5)

The above schedule of anticipated adverse weather days will constitute the base line for monthly (or portion thereof) weather time evaluations. It is assumed that the work will be carried out Mondays through Fridays (holidays excepted) unless and approved construction schedule or written authorization from the Owner indicates otherwise.

An actual adverse weather day must prevent work for 50 percent or more of the Contractor's workday. When the Contractor anticipates documenting a weather day, he/she shall first notify the Project Manager or his/her designee observing the construction to determine whether or not work can proceed or if work is delayed due to adverse weather or the effects thereof. If in agreement, the Contractor shall formally request a weather day in writing to the Owner's Project Manager or his/her designee. The Contractor shall also notify the Owner's Project Manager in writing or his/her designee of any disagreement as to whether or not work could have proceeded on a given date within 2 calendar days of that date. The final decision regarding an adverse weather day will be made by the Project Manager or his/her designee.

The number of workdays delayed due to adverse weather or the effects thereof will then be converted to Calendar Days. Weekends and holidays will only count as calendar day delays if a workday delayed due to adverse weather is counted before and after the weekend/holiday. The number of calendar days of delay due to adverse weather or the impact thereof will then be compared to the monthly adverse weather schedule above. The Contract time period will then be increased by change order for the number of calendar days that are in excess of the above schedule and a new Contract Completion day and date will be set.

32.1.2 An extension of time will not be granted for a delay caused by a shortage of materials, except Owner-furnished materials, unless the Contractor furnishes to the Project Manager documentary

proof that he has diligently made every effort to obtain such materials from every known source within reasonable reach of the Work. The Contractor shall also submit proof that the inability to obtain such materials when originally planned did in fact cause a delay in final completion of the Work which could not be compensated for by revising the sequence of his operations. Only the physical shortage of material will be considered under these provisions as a cause for extension of time. No consideration will be given to any claim that material could not be obtained at reasonable, practical, or economical costs, unless it is shown to satisfaction of the Project Manager that such material could have been obtained only at exorbitant prices, entirely inconsistent with current rates taking into account the quantities involved and the usual practices in obtaining such quantities.

32.2 A Change Order will be furnished to the Contractor within a reasonable period of time after approval of a request for extension of time, specifying the number of days allowed, if any, and the new date for completion of the Work or specified portions of the Work.

32.3 See also Article 38, TERMINATION FOR DEFAULT--DAMAGES FOR DELAY--TIME EXTENSIONS.

ARTICLE 33
NOTICE OF POTENTIAL CLAIM

33.1 The Contractor will not be entitled to additional compensation otherwise payable for an act or failure to act by the Owner, the happening of any event or occurrence, or any other cause, unless he shall have given the Project Manager a written notice of potential claim therefore as specified in this Article.

33.2 The written notice of potential claim shall set forth the reasons for which the Contractor believes additional compensation will or may be due, the nature of the costs involved, and insofar as possible, the amount of the potential claim. If based on an act or failure to act by the Owner, such notice shall be given to the Project Manager prior to the time that the Contractor has started performance of work giving rise to the potential claim for additional compensation. Notice shall be given within five days after the happening of the event or occurrence giving rise to the potential claim.

33.3 It is the intention of this Article that differences between the parties arising under and by virtue of the contract shall be brought to the attention of the Project Manager at the earliest possible time in order that such matters may be settled, if possible, or other appropriate action promptly taken.
33.4 The notice requirements of this Article are in addition to those required in other Articles of the General Conditions.

ARTICLE 34
SUBMITTAL OF CLAIMS

34.1 Claims filed by the Contractor shall contain sufficient detail to enable the Owner to ascertain the basis and amount of said claims. The Owner will review and evaluate the Contractor's claims. It will be the responsibility of the Contractor to furnish when requested by the Project

Manager such further information and details as may be required to determine the facts or contention involved in his claims. Failure to submit such information and details will be sufficient cause for denying the Contractor's claims.

34.2 Each claim the Contractor may make for equitable adjustment on account of delay for any cause shall be accompanied by a progress schedule reflecting the effects of the delay and proposals to minimize these effects. If no progress schedule has been submitted to the Project Manager reflecting conditions prior to the delay for which relief is sought, then a progress schedule so reflecting these conditions shall be prepared and submitted with the claim.

34.3 Depending upon the grounds for relief and the nature of relief sought, additional submittals and conditions upon submitting claims may be required elsewhere in these General Conditions.

34.4 In no event shall claims be made after final payment is made under Article 27, FINAL PAYMENT, of these General Conditions.

34.5 Inasmuch as notice of potential claim requirements of Article 33, NOTICE OF POTENTIAL CLAIM, are intended to enable the Project Manager to investigate while facts are fresh and to take action to minimize or avoid a claim which might be filed thereafter, the Contractor's failure to make the required notice on time is likely to disadvantage the Owner. Therefore no claim for which a notice of potential claim is required will be considered unless the Contractor has complied with the notice of Article 33, NOTICE OF POTENTIAL CLAIM.

ARTICLE 35
DISPUTES

35.1 General: Notwithstanding any other provisions of this Contract, disputes and disagreements by and between the Owner and the Contractor shall be resolved through progressive, sequential process of negotiation, mediation, and in certain cases, arbitration. For contracts which are for $250,000 or less, amounts in dispute which are less than $10,000 shall not progress beyond negotiation and shall ultimately be decided by the Owner if not by mutual agreement. For contracts which are for more than $250,000, amounts in dispute which are less than $25,000 should not progress beyond negotiation. For all contracts, amounts in dispute greater than those amounts set forth above, but less than $100,000 shall be resolved through a sequential process of negotiation, mediation, and binding arbitration. Amounts in dispute which are $100,000 or more shall be resolved through a sequential process of negotiation, mediation, and thence either arbitration or litigation.

35.2 Negotiation: In the event of disputes, unsettled claims, questions or disagreements between the contractor and the City relating to or arising out of the provisions of this Contract, the representatives of those parties shall meet promptly in recognition of mutual interests and in a good faith effort to resolve the dispute. Either the Contractor or the City shall arrange for this meeting at a time and place within the City of Greeley, mutually acceptable to both parties, within fifteen (15) days of notification of the dispute, unsettled claim, question, or disagreement between the parties. Seven (7) days prior to the meeting, the initiating party shall deliver to the other party, a written and complete

summary of the evidence and arguments substantiating its claim. If the parties do not reach a solution within thirty (30) days after said initial meeting, then upon notice of either party to the other, the dispute, claim, question, or difference, may be referred to a mediator pursuant to Section 35.3. The parties can extend the negotiation period by mutual written agreement.

35.3 Mediation: If the dispute, claim, question, or difference is not resolved by negotiation within thirty (30) days after the initial meeting between the parties or within the extended period agreed upon, the parties agree to next request that the American Arbitration Association provide a mediator to assist the Owner and Contractor in resolving the dispute, claim, question, or difference. The rules of mediation shall be the Construction Industry Mediation Rules of the American Arbitration Association. A different mediation/dispute resolution agency may be selected for mediation upon the mutual written agreement between the parties. The dispute resolution agency shall select a qualified mediator who shall have a background in construction. The selected mediator may be rejected by the parties only for bias. The mediator shall have thirty (30) days from the time of appointment to meet with the parties and sixty (60) days from the time of the appointment to resolve the dispute unless the parties mutually consent to an extension of the sixty day deadline. All reasonable fees, costs, and expenses of the mediator, the mediator's association and the mediation agency, shall be borne equally by the parties. Each party shall bear the expense of its own counsel, experts, witnesses, and preparation and presentation of proofs at mediation.

The Contractor shall not cause a delay of work during mediation proceedings except by mutual agreement. All mediation proceedings shall be conducted in the City of Greeley, unless an alternate location is agreed upon in writing by the Owner and the Contractor.

Amounts in dispute which are less than $10,000 shall not progress beyond mediation.

35.4 Litigation prerequisites: The procedures enumerated in Sections 35.2 and 35.3 shall be a prerequisite to the filing of any litigation between the parties to the Contract. Failure of the Contractor to follow the provisions of Section 35.2 and Section 35.3 shall be a complete defense, and grounds for immediate dismissal of any litigation filed prior to Contractor engaging in negotiation and mediation with the City of Greeley as provided above. Litigation may be filed only if the amount in dispute is $100,000 or more. In the event litigation is filed by and between the parties after mediation, venue and jurisdiction of any and all suits and causes of action in connection with this Contract shall lie exclusively in Weld County, Colorado.

35.5 Arbitration: After mediation, instead of litigation, any remaining unresolved controversy or claim arising out of or relating to this Contract or the performance or breach thereof, may be settled by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association. For amounts in dispute which are $100,000 or more, arbitration shall be engaged only upon mutual written agreement by the Owner and the Contractor, and the written agreement shall specify whether the arbitration shall be binding or nonbinding; however, amounts in dispute which are less than $100,000 shall necessarily be settled by binding arbitration. The sole arbitrator shall be appointed by the Arbitration Association, unless a different arbitrator or dispute resolution agency is mutually agreed upon. The award of the arbitrator shall be accompanied by a

reasoned opinion, and shall include findings of fact and conclusions. All fees and expenses of the arbitration, including the expense of each party's counsel, experts, witnesses, and preparation and presentation of proofs, shall be borne by the party against whom arbitration judgment is made.

35.6 Litigation: Each party shall bear its own litigation fees and expenses, including the expense of its counsel, experts, witnesses, and preparation and presentation of proofs, regardless of the prevailing party.

ARTICLE 36
FORCE ACCOUNT WORK

36.1 This Article shall become operative upon failure of the Contractor and the Owner to arrive at an amount of compensation under Article 28, CHANGES. In the event that no equitable adjustment is arrived at either by mutual agreement or pursuant to the Article 35, DISPUTES, the compensation paid hereunder will be the total compensation.

36.2 Work Performed by or for Contractor: The Contractor will be paid for labor, materials, and equipment as hereinafter provided, except where agreement has been reached to pay in accordance with Paragraph 36.3 of this Article. The following percentages, as full compensation for profit, overhead and small tools, will be added to the totals computed as provided in subparagraphs 36.2.1 through 36.2.3 of this Article.

Labor 25 percent
Materials 20 percent
Equipment 10 percent

Labor, materials, and equipment shall be furnished by the Contractor or by a subcontractor. When work paid on a force account basis is performed by forces other than the Contractor's, the Contractor shall reach agreement with such other forces as to the distribution of the payment made by the Owner for such work and, except as specified herein, no additional payment therefore will be made by the Owner by reason of performance of work by a subcontractor or by others. In addition to the markups, if any, for labor, equipment, and materials, for subcontracted work, the Contractor may add an additional five percent markup. The cost of subcontracted work will be the actual cost to the contractor for work performed by a subcontractor as computed in accordance with this Paragraph 36.2 and its subparagraphs 36.2.1, 36.2.2, and 36.2.3.

36.2.1 Labor: The cost of labor used in performing the work, whether the employer is the Contractor or a subcontractor, will be the sum as determined on the basis of the following three subparagraphs:

36.2.1.1 The gross actual wages, including income tax withholdings but not including employer payments to or on behalf of workmen for health and welfare, pension, vacation, insurance and similar purposes.

36.2.1.2 To the gross actual wages, as defined in the previous subparagraph,

36.2.1.1, will be added a percentage based upon current State and Federal laws and applicable labor contracts concerning payments made to or on behalf of workmen other than actual wages, which percentage will constitute full compensation for all payments imposed by State and Federal laws and for all other payments made to or on behalf of the workmen, other than actual wages as defined in the previous subparagraph 36.2.1.1 and the subsistence and travel allowance as specified in the following subparagraphs 36.2.1.3. The Contractor shall compute a separate percentage for each craft, or a composite percentage for all crafts, if so approved by the Owner. Computed percentages shall be submitted to the Project Manager for approval by the Owner.

36.2.1.3 Subsistence and travel allowance paid to workmen as required by established agreements.

36.2.1.4 The charges for labor shall include all classifications up to but not including foremen, and when authorized by the Owner, shall include foremen engaged in the actual and direct performance of the work. Labor charges shall not include charges for assistant superintendents, office personnel, timekeepers, and maintenance mechanics, unless authorized by the Owner in advance of the start of work.

36.2.2 Materials: The cost of materials required for the accomplishment of the work will be delivered cost to the purchaser, whether contractor or subcontractor, from the supplier thereof, except as the following are applicable:

36.2.2.1 If a cash or trade discount by the actual supplier is offered or available to the Contractor, it shall be credited to the Owner notwithstanding the fact that such discount may not have been taken.

36.2.2.2 If materials are procured by the Contractor by a method which is not a direct purchase from and a direct purchase from and a direct billing by the actual supplier, the cost of such materials will be deemed to be the price paid to the actual supplier, as determined by the Owner. No additional markup for supplier work will be allowed except to the extent of actual cost to the Contractor in handling the material, not to exceed five percent of the price paid to actual supplier.

36.2.2.3 If the materials are obtained from a supply or source owned wholly or in part by the Contractor, payment therefore will not exceed the price paid for similar materials furnished from said source on Contract Items or the current wholesale price for such materials delivered to the work site, whichever price is lower.

36.2.2.4 If the cost of the materials is, in the opinion of Owner, excessive, then the cost of such materials will be deemed to be the lowest current wholesale price at which such materials are available in the quantities concerned, delivered to the job site, less discounts as provided in subparagraph 36.2.2.1 of this Article.

36.2.2.5 If the Contractor does not furnish satisfactory evidence of the cost of such materials from the actual supplier thereof, the cost will be determined in accordance with subparagraph 36.2.2.4 of this Article.

36.2.2.6 The Contractor shall have no claims for costs and profit on Owner-furnished materials.

36.2.3 Equipment: The Contractor will be paid for the use of contractor-owned or rented equipment at the rental rates shown in the Colorado State Department of Highways Construction Equipment Rental Rate Schedule, except as modified below, which edition shall be the latest edition in effect at the time of commencement of the Force Account work. For equipment used in excess of eight hours per day, the rental rate shall be 60 percent of the listed hourly rate. If it is deemed necessary by the Contractor to use equipment not listed in the C.D.O.H. Construction Equipment Rental Rate Schedule, the Contractor shall furnish the necessary cost data and paid invoices to the Project Manager for his use in establishment of such rental rate.

36.2.3.1 The rates paid as above provided will include the cost of fuel, oil, lubricants, supplies, small tools, necessary attachments, repairs and maintenance, depreciation, storage, insurance and incidentals.

36.2.3.2 Equipment operators will be paid for as stipulated in subparagraph 36.2.1 of this Article.

36.2.3.3 Equipment shall be in good working condition and suitable for the purpose for which the equipment is to be used.

36.2.3.4 Unless otherwise specified, manufacturer-approved modifications shall be used to classify equipment for the determination of applicable rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer of that equipment.

36.2.3.5 Individual pieces of equipment or tools having a net individual value of $300 or less, whether or not consumed by use, will be considered to be small tools and no payment will be made therefore.

36.2.3.6 Compensation will not be allowed while equipment is inoperative due to breakdown. Except as specified in paragraph 36.2.3.7 of this Article, time will be computed in half and full hours. In computing the time for use of equipment, less than 30 minutes shall be considered one half hour.

36.2.3.7 Equipment at the Work Site: The time to be paid for use of equipment on the work site will be the time the equipment is in operation on the force account work being performed. The time will include the time required to move the equipment to location of the force account work and return it to the original location or to another location requiring no more time than that required to return it to its original location. Moving time will not be paid for if the equipment is used at the site of the force account work on other than such force account work. Loading and transporting costs will be allowed, in lieu of moving time, when the equipment is moved by means other than its own power. No

payment for loading and transporting will be made if the equipment is used at the site of the force account work on other than such force account work.

36.3 Special Items of Work: If the Owner and the Contractor, by agreement, determine that (a) an item of force account work does not represent a significant portion of the total Contract price, and (b) such items of work cannot be performed by the forces of the Contractor or the forces of any of his subcontractors, and (c) it is not in accordance with the established practice of the industry involved to keep the records which the procedure outlined in Paragraph 36.2 of this Article would require, charges for such special force account work items may be made on the basis of invoices for such work without complete itemization of labor, materials, and equipment rental costs. To such invoiced price, less a credit to the Owner for any cash or trade discount offered or available, will be added five percent of the discounted price, in lieu of the percentages provided in Paragraph 36.2 of this Article. In no event will the price paid exceed the current fair market value of such work plus five percent.

6.4 Records: The Contractor shall maintain his records to provide a clear distinction between the direct costs of work paid for on a force account basis and costs of other operations.

36.4.1 The Contractor shall prepare and furnish to the Project Manager, on the following work day, report sheets in duplicate of each day's work paid for on a force account basis. The daily report sheets shall itemize the materials used and shall cover the direct cost of labor and the charges for equipment, whether furnished by the Contractor, subcontractor, or other forces, except for charges described in Paragraph 36.3 of this Article. The daily report sheets shall provide names or identifications and classifications of workmen and the hourly rate of pay and hours worked. In addition, a report of the size, type and identification number of equipment and hours operated shall be furnished to the Project Manager. Daily report sheets shall be signed by the Contractor or his authorized agent.

36.4.2 Material changes shall be substantiated by valid copies of vendor's invoices or conformed copies, certified true by the Contractor. Such invoices shall be submitted with the daily report sheets. Should the vendor's invoices not be submitted within 20 days after the date of delivery of the material or 15 days after acceptance of the work, whichever comes first, the Owner reserves the right to establish the cost of such materials at the lower current wholesale prices at which such materials are available in the quantities concerned delivered to the location of the work, less any discounts provided in subparagraph 36.2.1. of this Article.

36.4.3 The Project Manager will compare his records with the daily report sheets furnished by the Contractor, make any necessary adjustment and compile the costs of work paid for on a force account basis on daily force account work report forms. When these daily reports are agreed upon and signed by the Project Manager, they shall become the basis of payment for the work performed, but shall not preclude subsequent adjustment based on a later audit.

36.4.4 The Contractor's original cost records pertaining to work paid for a on a force account basis shall be retained and shall be open to inspection and audit as required by Article 28, CHANGES, and any other provisions of the Contract.

36.5 If, in the Project Manager's opinion, the Contractor or any of his subcontractors, in performing Force Account work, is not making efficient use of labor, material or equipment or is proceeding in a manner which makes Force Account work unnecessarily more expensive to the Owner, the Project Manager may, in whole or part, direct the Contractor in the deployment of labor, material and equipment. By way of illustration, inefficiency may arise in the following ways: (1) the timing of the work, (2) the use of unnecessary labor or equipment, (3) the use of a higher percentage of apprentices than in non-force account work, (4) failure to procure materials at the lowest price, or (5) using materials of quality higher than necessary.

ARTICLE 37
TERMINATION FOR CONVENIENCE OF THE OWNER

37.1 The performance of Work under this contract may be terminated by the Owner in accordance with this Article in whole, or from time to time in part, whenever such termination is in the best interest of the Owner. Such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which performance of work under the Contract is terminated, and the date upon which such termination becomes effective.

37.2 After receipt of a Notice of Termination, and except as otherwise directed by the Owner, the Contractor shall:

37.2.1 Stop work under the Contract on the date and to the extent specified in the Notice of Termination.

37.2.2 Place no further orders or subcontracts for materials, services or facilities, except as may be necessary for completion of such portion of the work under the Contract as is not terminated;

37.2.3 Terminate all orders and subcontracts to the extent that they relate to the performance of work terminated by the Notice of Termination;

37.2.4 Assign to the Owner in the manner, at the times, and to the extent directed by it, all of the rights, title and interest of the Contractor under the orders and subcontracts so terminated, in which case the Owner will have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts;

37.2.5 Settle outstanding liabilities and claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Owner to the extent it may require, which approval or ratification shall be final for the purposes of this Article;

37.2.6 Transfer title and deliver to the Owner in the manner, at the times, and to the extent, if any directed by it, (a) the fabricated or unfabricated parts, work in process, completed work, supplies and other material procured as part of, or acquired in connection with the performance of, the work terminated by the Notice of Termination, and (b) the completed or partially completed plans,

drawings, information, and other property, which, if the Contract had been completed, would have been required to be furnished to the Owner;

37.2.7 Use his best efforts to sell, in the manner, at the times, to the extent, and at the price or prices direction or authorized by the Owner, property of the types referred to in (37.2.5) above; provided, however, that the Contractor (a) shall not be required to extend credit to any purchaser and (b) may acquire any such property under the conditions prescribed by and at a price or prices approved by the Owner; provided further that the proceeds of any such transfer or disposition will be applied in reduction of any payments to be made by the Owner to the contractor under this Contract or will otherwise be credited to the price or cost of the work covered by this Contract or paid in such other manner as the Owner may direct;

37.2.8 Complete performance of each part of the work as shall not have been terminated by the Notice of Termination; and

37.2.9 Take such action as may be necessary, or as the Project Manager may direct, for the protection and preservation of the property related to this Contract which is in the possession of the Contractor and in which the Owner has or may acquire an interest.

37.3 After receipt of a Notice of Termination, the Contractor shall submit to the Project Manager his termination claim, in the form and with certification prescribed by the Owner. Such claims shall be submitted promptly but in no event later than the earliest of the following: (1) one year from the effective date of termination or (2) thirty days after the remainder of the project has been accepted by the owner.

37.4 Subject to the provision of Paragraph 37.3, the contractor and the Owner may agree upon the whole or any part of the amount or amounts to be paid to the Contractor by reason of the total or partial termination of work pursuant to this Article, which amount or amounts may include an allowance for profit on work done; provided that such agreed amount or amounts, exclusive of settlement costs, shall not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the Contract price of work terminated. The Contract will be amended accordingly, and the Contractor will be paid the agreed amount.

37.5 In the event of failure of the Contractor and the Owner to agree, as provided in Paragraph 37.4, upon the whole amount to be paid the Contractor by reason of the termination of work pursuant to this Article, the Owner will pay the Contractor the amounts determined by the Owner as follows, but without duplication of any amounts agreed upon in accordance with Paragraph 37.4;

37.5.1 With respect to contract work performed prior to the effective date of the Notice of Termination, the total (without duplication of any items) of:

37.5.1.1 The cost of such work;

37.5.1.2 The cost of settling and paying claims arising out of the termination of work under subcontracts or orders as provided in subparagraph 37.2.5 above, exclusive of the amounts paid or

payable on account of supplies or materials delivered or services furnished by the subcontractor prior to the effective date of the Notice of Termination of work under this Contract, which amounts shall be included in the cost on account of which payment is made under 37.5.1 above.

37.5.1.3 A sum, as profit on 37.5.1.1 above, determined by the Owner to be fair and reasonable; provided, however, that if it appears that the Contractor would have sustained a loss on the entire Contract had it been completed, no profit shall be included or allowed under this subparagraph 37.5.1.3 and an appropriate adjustment shall be made by reducing the amount of the settlement to reflect the indicated rate of loss.

37.5.2 The reasonable cost of the preservation and property incurred pursuant to subparagraph 37.2.9 and any other reasonable cost incidental to termination of work under this Contract, including expense incidental to the determination of the amount due to the Contractor as the result of the termination of work under this Contract.

37.5.3 The total sum to be paid to the contractor under paragraph 37.5.1 above will not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the Contract price of the work terminated.

37.6 In arriving at the amount due the Contractor under this Article, there will be deducted (1) any claim which the Owner may have against the Contractor in connection with this Contract, (2) the agreed price for, or the proceeds of sale, of materials, supplies or other things acquired by the contractor or sold, pursuant to the provisions of this Article, and not otherwise recovered by or credited to the Owner and (3) the full amount of any statutory or other claim against the Contractor filed with the Owner.

37.7 Unless otherwise provided for in this Contract, or by applicable statute, the Contractor, from the effective date of termination and for a period of three years after final settlement under this Contract, shall preserve and make available to the Owner at all reasonable times at the office of the Contractor but without direct charge to the Owner, all his books, records, documents, electronic/digital media and other evidence bearing on the costs and expenses of the Contractor under this Contract and related to the work terminated hereunder, or to the extent approved by the Owner, or other authentic reproductions thereof.

37.8 The Contractor shall insert in all subcontracts that the subcontractor shall stop work on the date of and to the extent specified in a Notice of Termination from the Owner and shall require that any tier subcontractors insert the same provision in any tier subcontracts.

37.9 Under no circumstances is the Contractor entitled to anticipatory, unearned profits or consequential damages as a result of a termination or partial termination under this Article.

ARTICLE 38
TERMINATION FOR DEFAULT

38.1 If, in the opinion of the Owner, the Contractor has failed to prosecute work, the Owner will notify the Contractor. The Contractor will then have 5 days to remedy the failure to prosecute work or to obtain the Owner's authorization for the delay or an extension of time as set forth in Article 32.

38.2 If the Contractor refuses or fails after reasonable notice as set forth above to prosecute Work, or any separable part thereof, with such diligence as will insure its completion within the time specified in this Contract, or refuses or fails to complete said Work within such time, the Owner may, by written notice to the Contractor, terminate for default his right to proceed with the Work or such part of the Work as to which there has been unauthorized delay. In such event the Owner may take over the work and prosecute the same to completion, by Contractor or otherwise, and may take possession of and utilize in completing the Work such materials, appliances, and plant as may be on the Work Site and necessary therefore. Whether or not the Contractor's right to proceed with the Work is terminated, he and his sureties shall be liable for any damage to the Owner resulting from his refusal or failure to complete the Work in the specified time.

38.3 If the Owner so terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such time as may be required for final completion of the Work together with any increased costs incurred by the Owner in completing the Work as further set forth in Article 41.

38.4 If, after Notice of Termination of the Contractor's right to proceed under the provisions of this Article, it is determined for any reason that the Contractor was not in default under the provisions of this Article or that the Contractor was entitled to an extension of time under Article 32, EXTENSION OF TIME, the rights and obligations of the parties shall be the same as if the Notice of Termination had been issued pursuant to Article 37, TERMINATION FOR CONVENIENCE OF THE OWNER.

38.5 The right to terminate for default and any other rights and remedies of the Owner provided in this clause are in addition to any other rights and remedies provided by law or under this Contract.

ARTICLE 39
TERMINATION OF RIGHT TO PROCEED FOR CERTAIN DEFAULTS

39.1 In addition to the Owner's right to terminate for default under other Articles of this Contract, the Owner will have the right to terminate the Contractor's performance of work in whole or in part for default for any of the following reasons:

39.1.1 The Contractor's or subcontractor's performance of work is in violation of the terms of the Contract.

39.1.2 The Contractor or subcontractor has violated an authorized order or requirement of the Owner.

39.1.3 Abandonment of Contract.

39.1.4 Assignment or subcontracting of the Contract or any work under the Contract without approval of the Owner.

39.1.5 Bankruptcy or appointment of a receiver for the Contractor's property.

39.1.6 Performance of the Contractor in bad faith.

39.1.7 Contractor allowing any final judgment to stand against him for a period of 48 hours (excluding weekends and legal holidays).

39.2 If, in the opinion of the Owner, the Contractor is in default of the Contract, the Owner will notify the Contractor. If the Contractor fails to remedy or commence to remedy the default within five days after receipt of such notice, the Owner may terminate the Contractor's right to proceed with the Work or that portion of the Work which the Owner determines is most directly affected by the default.

39.3 If, after Notice of Termination of Contractor's right to proceed under this Article it is determined for any reason Contractor was not in default, the rights and obligations of the parties shall be the same as if the Notice of Termination had been issued pursuant to Article 37, TERMINATION FOR CONVENIENCE OF THE OWNER.

ARTICLE 40
RIGHTS AND OBLIGATIONS OF PARTIES AT TERMINATION FOR DEFAULTS

40.1 This Article shall apply to terminations for defaults covered in Article 15, 38, and 39 of these General Conditions.
40.2 On receipt of a Notice of Termination from the Owner, the Contractor shall:

40.2.1 Stop all work under the Contract on the date and to the extent specified in the Notice of Termination.

40.2.2 Place no further orders or subcontracts for materials, equipment or services except as they relate to the performance of work covered by the Notice of Termination.

40.2.3 Cancel or terminate all orders or subcontracts to the extent that they relate to the performance of work covered by the Notice of Termination.

40.2.4 Comply with all other requirements of the Owner as may be specified in the Notice of Termination.

40.3 Upon the Owner termination of the Contractor's right to proceed with the Work because of the Contractor's default under the Contract, the Owner will have the right to complete the Work by whatever means and method it deems advisable. The Owner shall have the right to take possession of and use any or all the Contractor's materials, plat, tools, equipment and property of any kind provided by or on behalf of the Contractor for the purpose of the Work, or a portion of them, without being responsible to the Contractor for fair wear and tear. The Contractor shall have no rights in such property during their use by the Owner. The Owner will not be required to obtain the lowest prices for completing the Work but shall make such expenditures as, in the Owner's sole judgment, best accomplish such completion.

40.4 The expense of completing the Work, together with a reasonable charge for engineering, managerial and administrative services, as certified by the Owner, will be charged to the Contractor and the expense so charged will be deducted by the Owner out of such monies as may be due or may at any time thereafter become due to the Contractor. In case such expense is in excess of the sum which otherwise would have been payable to the Contractor under the Contract, the Contractor or his surety shall promptly pay the amount of such excess to the Owner upon notice from the Owner of the excess so due. The Owner may, in its sole discretion, withhold all or any part of any progress payments otherwise due the Contractor until completion and final settlement of the Work covered by the Notice of Termination of Contractor's right to proceed.

40.5 The Contractor shall insert in all subcontracts that the subcontractor will stop work on the date of or to the extent specified in a Notice of Termination from the Owner and shall require the subcontractors to insert the same provision in any tier subcontracts.

40.6 The Contractor shall immediately upon receipt communicate any Notice of Termination issued by the Owner to the affected subcontractors and suppliers at any tier.

40.7 Rights of Surety: The Surety on the Performance Bond provided for in this Contract shall not be entitled to take over the Contractor's performance of work in case of termination under this Article, except with the consent of the Owner.

ARTICLE 41
LIQUIDATED DAMAGES

41.1 Time is of the essence of the Contract. In the event the Contractor fails to achieve Substantial Completion of the Work within the Contract Time, or fails to meet any other time requirement or the time limit set forth in the Contract, after due allowance for any extension or extensions of time made in accordance with the Contract, the Contractor shall pay to the Owner as fixed, agreed and liquidated damages, pursuant to the clause of the Contract entitled TERMINATION FOR DEFAULT—DAMAGES FOR DELAY—TIME EXTENSIONS, the sum of $500.00 for each

calendar day of delay unless otherwise stated in the Special Provisions. Such liquidated damages shall be assessed for each and every day that the Contractor shall be in default. The Owner shall have the right to deduct said liquidated damages from any amount due or that may become due the Contractor, or to collect such liquidated damages from the Contractor or its surety.

41.2 Liquidated damages in the amount stipulated do not include any sums of money to reimburse the City for actual damages which may be incurred between Substantial Completion and Final Completion because of the Contractor's failure to achieve Final Completion within the Contract Time. For such delay in Final Completion, the Contractor shall reimburse the City, as a mitigation of City damages and not as a penalty, those administrative costs incurred by the City as a result of such failure.

41.3 Liquidated damages in the amounts stipulated do not include any sums of money to reimburse the City for extra costs which the City may become obligated to pay on other contracts which were delayed or extended because of the Contractor's failure to complete the Work within the Contract Time. Should the City incur additional costs because of delays or extensions to other contracts resulting from the Contractor's failure of timely performance, the City will assess these extra costs against the Contractor, and these assessments will be in addition to the stipulated liquidated damages.

41.4 The City reserves all of its rights to actual damages from the Contractor for injury or loss suffered by the City from actions or omissions of the Contractor, including but not limited to any other breach or default of the Contract, outside of the scope of the above sections.

ARTICLE 42
USE AND POSSESSION PRIOR TO COMPLETION

42.1 The Owner shall have the right to take possession of or use any completed or partially completed parts of the Work. Such possession or use will not be deemed an acceptance of Work not completed in accordance with the Contract. While the Owner is in such possession, the Contractor, notwithstanding the provisions of Article 18, DAMAGE TO WORK AND RESPONSIBILITIES FOR MATERIALS, will be relieved of the responsibility for loss or damage to the work other than that resulting from the Contractor's fault or negligence or breach of warranty. If such prior possession or use by the Owner delays the progress of the Work or causes additional expense to the Contractor, an equitable adjustment in the Contract price or the time of completion will be made, and the Contract will be modified in writing accordingly.

ARTICLE 43
RIGHTS IN SHOP DRAWINGS AND WORKING DRAWINGS

43.1 Shop Drawings and Working Drawings, submitted to the Project Manager by the Contractor, subcontractor or any lower tier subcontractor pursuant to the Work, may be duplicated by the Owner and the Owner may use and disclose, in any manner and for any purpose, Shop Drawings and Working Drawings delivered under this Contract.

43.2 This Article, including this Paragraph 43.2, shall be included in all subcontracts hereunder at all tiers.

ARTICLE 44
PATENT AND COPYRIGHT

44.1 The Contractor shall warrant that the materials, equipment or devices used on or incorporated in the Work shall be delivered free of any rightful claim of any third party for infringement of any United States patent or copyright. If notified promptly in writing and given authority, information and assistance, the Contractor shall defend, or may settle, at his expense, any suit or proceeding against the Owner or the Project Manager based on a claimed patent or copyright infringement which would result in a breach of his warranty. The Contractor shall pay all damages and costs awarded therein against the Owner or the Project Manager due to such breach. If any use of materials, equipment or devices is held to constitute an infringement and such use is enjoined, the Contractor shall, at his expense and option, either procure for the Owner the right to continue using said materials, equipment or devices, or replace same with noninfringing materials, equipment or devices, or modify same so it becomes noninfringing. The Contractor shall report to the Owner promptly and in reasonable written detail, each notice or claim of patent or copyright infringement based on the performance of this Contract of which the Contractor has knowledge. In the event of any claim or suit against the Owner on account of any alleged patent or copyright infringement arising out of the performance of this Contract or out of the use of any supplies furnished or work or services performed hereunder, the Contractor shall furnish to the Owner when requested by the Owner, all evidence and information in possession of the Contractor pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Owner except where the Contractor has agreed to indemnify the Owner. This clause shall be included in all subcontracts.

ARTICLE 45
HISTORICAL, SCIENTIFIC AND ARCHAEOLOGICAL DISCOVERIES

45.1 All articles of historical, scientific or archaeological interest uncovered by the Contractor during progress of the Work shall be preserved in accordance with applicable law and reported immediately to the Project Manager. Further operations of the Contractor with respect to the find, including disposition of the articles, will be decided by the Owner in accordance with applicable law.

ARTICLE 46
SUBSTITUTIONS

46.1 Where reference is made to one or more proprietary products but restrictive descriptive material of only one manufacturer is used, it is understood that the products of other manufacturers will be accepted, provided they equal or exceed the standards set forth in the plans and specifications and are compatible with the intent and purpose of the design, subject to the written approval of the Owner and the Project Manager. 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.

46.2 The Contractor may propose the substitutions of any material as a supplement to his bid with the monetary amount, additive or deductive as may be the case, clearly stated. Manufacturer's information, catalog numbers, and complete descriptive information shall be included with the proposed substitution. This shall be completely apart and separate from the base bid quotation and shall be solely for the information of the Owner, and the use of such proposed substitutions shall be strictly at the decision of the Owner. If substitution is accepted by the Owner, the Contract sum shall be adjusted from the base bid either up or down as indicated on the supplementary list.

ARTICLE 47
INSURANCE

47.1 General

47.1.1 The Contractor shall provide from insurance companies, acceptable to the Owner, the insurance coverage designated hereinafter and pay all costs. The Contractor also indemnifies the Owner as further described in Article 4.

47.1.2 Before commencing work under this Agreement, the Contractor shall furnish the Owner with certificates of insurance specified herein showing the type, amount, class of operations covered, effective dates, and date of expiration of policies. Furthermore, each such certificate shall contain a valid provision or endorsement that the policy may not be cancelled, terminated, changed or modified without first giving ten (10) days written notice to the Owner, which notice must be sent registered mail, return receipt requested, to the Project Manager.

47.1.3 In case of the breach of any provision of this Article, the Owner, at his option, may take out and maintain, at the expense of the Contractor, such insurance as the Owner may deem proper at the Contractor’s expense and may deduct the cost of such insurance from any monies which may be due or become due the Contractor under this Agreement.

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

47.1.5 Co-Insurance: The Contractor herein agrees to name the Owner as an insured party on all liability insurance policies provided for by this Article 47, INSURANCE.

47.1.6 No insurance shall be cancelled or otherwise voided during the Contract period, without at least 10 days prior written notice to the Owner, nor shall any insurance be invalidated should the insured waive any or all right of recovery against any party.

47.1.7 Liability insurance may be arranged by Comprehensive General Liability and

Comprehensive Automobile Liability policies for the full limits required; or by a combination of underlying Comprehensive Liability policies for lesser limits with the remaining limits provided by an Excess or Umbrella Liability policy.

47.1.8 The Owner shall purchase and maintain such boiler and machinery insurance as may be required by the Contract Documents or by law. This insurance shall include the interest of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work.

47.1.9 Any loss insured under Article 47 is to be adjusted with the Owner and made payable to the Owner as trustee for the insured, as their interests may appear, subject to the requirements of any applicable mortgage clause. The Contractor shall pay each subcontractor a just share of any insurance monies received by the Contractor, and by appropriate share of any insurance monies received by the Contractor, and by appropriate agreement, written where legally required for validity, shall require each subcontractor to make payments to his subcontractors in similar manner.

47.1.10 If the Contractor requests in writing that insurance for risks other than those described in this Article or other special hazards be included in the Owner's property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

47.1.11 The Owner as trustee shall have power to adjust and settle any loss with the insurers.

47.1.12 If the Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion thereof, such occupancy or use shall not commence prior to a time mutually agreed to by the Owner and Contractor and to which the insurance company or companies providing the property insurance have consented by endorsement to the policy or policies. This insurance shall not be cancelled or lapsed on account of such partial occupancy or use. Consent of the Contractor and of the insurance company or companies to such occupancy or use shall not be unreasonably withheld.

47.2 Workmen's Compensation and Employer's Liability Insurance:

47.2.1 The Contractor shall provide coverage and amounts as required by the Workmen's Compensation Act of the State of Colorado.

47.2.2 The Contractor shall provide Employer's Liability Insurance in an amount not less than $100,000 for each occurrence.

47.2.3 The Contractor shall require any subcontractor to provide Workmen's Compensation and Employer's Liability Insurance in the same amounts for all of the subcontractor's employees to be engaged in work under this Agreement.

47.3 General Liability

47.3.1 General Liability Insurance shall be on a Comprehensive General Liability form and shall provide coverage for the following: Premises and Operations, Owners and Contractors Protective, Elevators, Independent Contractors, Products and Completed Operations, Contractual, Personal Injury, and Broad Form Property Damage; "XCU" exclusions must be deleted.

47.3.2 Minimum requirements for Comprehensive General Liability are: bodily injury, $1,000,000.00 each person, $2,000,000.00 each occurrence; property damage, $1,000,000.00 each occurrence.

47.4 Automobile Liability

47.4.1 Comprehensive Automobile Liability Insurance shall include coverage for all owned motor vehicles and hired and non-owned motor vehicles.

47.4.2 Minimum requirements for Comprehensive Automobile Insurance are: bodily injury, $1,000,000.00 each person, $2,000,000.00 each occurrence; property damage, $1,000,000.00 each occurrence.

47.5 Property Insurance:

47.5.1 The Owner may require the Contractor to purchase and maintain "Builder's Risk" Property Insurance for all work at the site to the full insurable value thereof. The Owner and the Project Manager shall be named as co-insured.

ARTICLE 48
UNCOVERING AND CORRECTION OF WORK

48.1 During construction, whenever materials requiring inspection in place by the Project Manager and the Owner to be permanently covered up, it shall be Contractor's responsibility to notify the Project Manager at least 24 hours in advance of commencement of such covering operation. In the event of failure by Contractor to give such notification, Contractor shall, at his own expense, uncover such portions of work as required by the Project Manager or the Owner, and reinstall such covering after satisfactory inspection and correction of any and all deficiencies.

ARTICLE 49
EQUAL OPPORTUNITY

49.1 The Contractor agrees to comply with the letter and spirit of the Colorado Antidiscrimination Act of 1957, as amended, and other applicable laws respecting discrimination and unfair employment practices (24-34-402, CRS 1973, as amended). The Contractor shall be responsible for any discriminatory or unfair employment practices of his subcontractors.
Neither the Contractor nor any subcontractor will discriminate against any employee or applicant for employment because of race, creed, color, national origin, sex, religion, ancestry, mental or physical handicap, or age. Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to their race, creed, color, national

origin, sex, religion, ancestry, mental or physical handicap, or age. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment, or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of non-discrimination.

49.2 Contractor and all subcontractors shall, in all solicitations or advertisement for employees placed by them or on their behalf, state that qualified applicants will receive consideration for employment without regard to race, creed, color, national origin, sex, religion, ancestry, mental or physical handicap, or age.

ARTICLE 50
CLAIMS

50.1 The Contractor shall not assert any claim arising out of any act or omission by any officer, agent or employee of the Owner in the execution or performance of this Contract against such officer, agent or employee in his or her individual or official capacities.

50.2 The Contractor shall require each Separate Contract Design Professional or Contractor to agree in his Contract not to make any claim against the Owner, its officers, agents or employees, by reason of such Contract with the contractor.

50.3 Nothing in this Contract shall be construed to give any person other than the Owner and the Contractor any legal or equitable right, remedy or claim under this Contract; and it shall be held to be for the sole and exclusive benefit of the Owner and the Contractor.

ARTICLE 51
NOTICES

51.1 Except as otherwise provided herein, any notice, approval, acceptance, request, bill, demand or statement hereunder from either party to the other shall be in writing and shall be deemed to have been given when either delivered personally or deposited in a U.S. mailbox in a postage prepaid envelope, addressed to the other party via certified mail. Notices to the Owner shall be addressed to the Project Manager by name. Either party may at any time change such address by delivering or mailing, as aforesaid, to the other party a notice stating the change and the changed address.

ARTICLE 52
LEGAL INSERTIONS, ERRORS, INCONSISTENCIES, OR DISCREPANCIES IN CONTRACT

52.1 It is the intent and understanding of the parties to this Contract that each and every provision of law required to be inserted in this Contract shall be and is inserted herein. Furthermore, it is hereby stipulated that every such provision is deemed to be inserted herein, and if through mistakes or otherwise, any such provision is not inserted in correct form, then this Contract shall upon application of either party, be amended by such insertion so as to comply strictly with the law and without prejudice to the right of either party.

52.2 If this Contract contains any errors, inconsistencies, ambiguities, or discrepancies, including typographical errors, the Contractor shall request a clarification of same by writing to the Project Manager whose decision shall be binding upon the parties.

ARTICLE 53
CAPTIONS OR HEAD NOTES

53.1 The captions or head notes on articles or sections of this Agreement, and marginal notes are intended for convenience and reference purposes only and in no way define, limit or describe the scope or intent hereof, or of this Agreement not in any way affect this Agreement.

ARTICLE 54
EFFECTIVE AND BINDING

54.1 This Contract shall not become effective or binding upon the Owner unless it has been authorized and executed in accordance with the ordinances of the City of Greeley.

ARTICLE 55
CONTRACTOR

55.1 All personnel assigned to the Project by the Contractor shall be required to cooperate fully with personnel of the Owner and if in the sole discretion of the Owner the Contractor's personnel fails so to cooperate, the Contractor shall relieve them of their duties on the Project when required by the Owner.

55.2 Within seven (7) consecutive calendar days after date of written notice to commence work, the Contractor shall designate in writing one person who, on his behalf, shall be responsible for coordinating all of the services to be rendered by the Contractor hereunder. Such designee shall be subject to the approval of the Owner. Any change to the approved designee shall be proposed in writing seven (7) days in advance and subject to Owner approval.

55.3 The Contractor shall engage, at his sole expense, all engineers, architects, cost estimators, lawyers, experts and Contractors as may be required for the proper performance of the Contract. The Contractor shall be responsible for the performance of the work of all architects, engineers, cost estimators, lawyers, experts and Contractors so engaged by him, including maintenance of schedules, correlation of their work and resolution of all difference between them. It is understood that all architects, engineers, cost estimators, lawyers, experts and Contractors are employees of the Contractor and not of the Owner, and the Contractor alone is responsible for their work.

55.4 All drawings, tracings, specifications, digital media/electronic files and other material prepared and furnished under and for this Contract shall become the property of the Owner upon substantial completion and/or their acceptance by the Owner and/or upon termination of the services

of the Contractor. Such documents shall be promptly delivered to the Owner upon demand and thereafter may be used by the Owner in whole or in part or in modified form, for those purposes it may deem advisable without further employment of, or payment of additional compensation to, the Contractor.

55.5 The Contractor shall not, without the prior written approval of the Owner, specify for the project, or necessarily imply the required use of any article, product, material, fixture or form of construction, the use of which is covered by a patent, or which is otherwise exclusively controlled by a particular firm or group of firms.

55.6 Should any claim be made or any action brought against the Owner relating to the design and satisfactory operation of the Project herein, the Contractor shall diligently render to the Owner without additional compensation any and all assistance which may be requested by the Owner.

55.7 The Owner's Project Manager's decision shall be final and binding upon the Contractor as to all matters arising in connection with or relating to this Contract. The Project Manager shall determine the amount, quality, acceptability and fitness of the work being performed hereunder and shall determine all matters relative to the fulfillment of this Contract on the part of the Contractor and such determination shall be final and binding on the Contractor. Acceptance by the Owner of any document hereunder and all supporting documents shall not relieve the Contractor of sole responsibility for work performed under this contract, including, but not limited to, the final design of the Project, including the plans, specifications and all supporting documents, except as to any feature thereof which the Owner had specifically directed in writing to be included over the written objection of the Contractor. In case any question shall arise, the decision of the Owner's Project Manager, who is hereby accepted by the Contractor as the arbiter, shall be a condition precedent to the right of the Contractor to receive any money under this Contract.

ARTICLE 56
APPEALS

56.1 Except as otherwise provided in this Contract, any dispute concerning a question of fact arising under this Contract which is not disposed of by Agreement shall be decided by the Project Manager, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Contractor. The decision of the Project Manager shall be final and conclusive unless, within fifteen (15) days from the date of receipt of such copy, the Contractor mails or otherwise furnishes to the Project Manager a written notice of appeal.

56.2 In the event a decision of the Project Manager is the subject of an appeal, such dispute may be settled by appropriate legal proceeding, or, if the parties mutually agree, through arbitration or administrative process. Pending any binding arbitrative or administrative decision, appeal, or judgment referred to in this section or the settlement of any dispute arising under this Contract, the Contractor shall proceed diligently with the performance of this Contract.

56.3 Venue and jurisdiction of any suit, right, or cause of action arising under or in connection with this Contract shall lie exclusively in Weld County, Colorado.

ARTICLE 57
PROHIBITED INTEREST

57.1 No member, officer or employee of the City of Greeley shall have any financial or pecuniary interest, direct or indirect, in this Contract or the proceeds thereof.

ARTICLE 58
FINDINGS CONFIDENTIAL

58.1 Any reports, information, data, etc., available to or prepared or assembled by Contractor under this Contract shall not be made available to any individual or organization by Contractor without consent in writing from the Owner subject to applicable law.

ARTICLE 59
GENERAL PROVISIONS

59.1 Services and work performed by Contractor under this Contract shall conform to reasonable and normal professional standards known and accepted within the community.

59.2 No reports, graphics or other material produced directly or indirectly for the Owner under this Contract shall be the subject of an application for copyright or trademark by or on behalf of Contractor.

59.3 The laws of the State of Colorado and applicable Federal, state and local laws, regulations and guidelines shall govern hereunder.

59.4 The headings of the articles, clauses, and paragraphs of this Contract are inserted for reference purposes only and are not restrictive as to content.

59.5 This Contract and any subsequent amendment shall be deemed an original having identical legal effect, and all of which together constitute one and the same instrument.

59.6 Nothing contained herein shall be deemed to give any third party any claim or right of action against the Owner which does not otherwise exist without regard to this Contract.

59.7 Where a number of days is specified in this Contract it shall mean calendar days unless otherwise specified.

59.8 This Contract shall not be assigned, in whole or in part, without the written consent of the Project Manager and Contractor.

59.9 The Owner certifies the following;

A. An amount of money equal to or greater than the Contract amount has

been appropriated and budgeted for the Project which this Contract concerns.

B. No Change Order which requires additional compensable work to be performed by the Contractor will be issued by the Owner unless an amount of money has been appropriated and budgeted sufficient to compensate the Contractor for such additional compensable work unless such work is covered under the remedy-granting provisions of this Contract.

C. As used in this paragraph, "remedy granting provision" shall mean any clause of this Contract which permits additional compensation in the event of a specific contingency or event occurs. This term shall include, but not be limited to, change clauses, differing site conditions clauses, variation in quantities clauses, and termination for convenience clauses.

ARTICLE 60
CONTRACTOR ACCEPTANCE

60.1 The acceptance by the Contractor, his successors or assigns of any payment made on the final acceptance of the Project under this Contract or of any final payment due on termination of this Contract, shall constitute a full and complete release of the Owner from any and all claims, demands and causes of action whatsoever which the Contractor, his successors or assigns have or may have against the Owner under the provisions of this Contract.

60.2 No action shall be maintained by the Contractor, its successors or assigns, against the Owner on any claims based upon or arising out of this Contract or out of anything done in connection with this Contract unless such action shall be commenced within 180 days after the date of filing of the voucher for final payment hereunder in the office of the Finance Director, or within 180 days of the termination of this Contract.

ARTICLE 61
SUCCESSORS AND ASSIGNS

61.1 The Contractor binds itself, its partners, successors, assigns and legal representatives to the other party to this Contract and to the partners, successors, assigns and legal representatives of such other party with respect of all covenants of this Agreement. The Contractor shall not transfer, assign, or subcontract any interest in this Agreement.

ARTICLE 62
SEVERABILITY CLAUSE

62.1 If any provision of this Agreement is subsequently declared by legislative or judicial authority to be unlawful, unenforceable, or not in accordance with applicable laws, statutes, and regulations of the United States of America and the State of Colorado, all other provisions of this Agreement shall remain in full force and effect.

ARTICLE 63
AGREEMENT

63.1 This Agreement represents the entire and integrated Agreement between the Owner and the Contractor and supersedes all prior negotiations, representations or agreements, either written or oral. This Agreement may be amended only by written instrument signed by both Owner and Contractor.

ARTICLE 64
COLORADO LABOR

64.1 In accordance with C.R.S. §8-17-101, all parties contracting with the City of Greeley on public works projects shall employ Colorado labor to perform the work to the extent of not less than eighty percent (80%) of each type or class of labor in the several classifications of skilled and common labor employed on this project.

ARTICLE 65
ELECTRONIC SIGNATURE

65.1 The Contract Documents may be executed in two or more counterparts, each of which shall be deemed an original but all of which together shall constitute one and the same document. The Contract Documents, including all component parts set forth above, may be executed and delivered by electronic signature by any of the parties and all parties consent to the use of electronic signatures.

ARTICLE 66
FORCE MAJEURE

66.1 To the extent that either party is not able to perform an obligation under this Agreement due to fire; flood; acts of God; severe weather conditions; strikes or labor disputes; war or other violence; acts of terrorism; plague, epidemic, pandemic, outbreaks of infectious disease or any other public health crisis, including quarantine or other employee restrictions; act of authority whether lawful or unlawful, compliance with any law or governmental order, rule, regulation or direction, curfew restriction, or other cause beyond that Party's reasonable control, that Party may be excused from such performance so long as such Party provides the other Party with prompt written notice describing the condition and takes all reasonable steps to avoid or remove such causes of nonperformance and immediately continues performance whenever and to the extent such causes are removed.

CONTRACT ADDENDUM
COVID-19 RISK MITIGATION

1) Implementation of Basic Infection Prevention Measures:

a. All Contractors and Subcontractors shall develop procedures for employees to report when they are sick or experiencing symptoms of COVID-19. At a minimum, these procedures will include temperature monitoring and symptom assessment as set forth below.

1) Contractors are required to insure that their employees and all of their subcontractor's employees conduct daily self-assessments for potential presence of COVID-19 upon their arrival at the worksite. The assessment must be carried out regardless of whether the employee believes he/she has been exposed to COVID-19.

2) Employees must ask themselves the following questions:

- Do I have a runny nose, sneezing, cough, sore throat, diarrhea, nausea or vomiting (not related to other health conditions such as known allergies or chronic illness)?

- Am I having trouble breathing in a manner that is out of the ordinary for me?

- Do I have a sore throat?

- Have I experienced an exposure or have I been in close contact with anyone experiencing the symptoms described above or who is suspected to have/diagnosed with COVID-19?

3) Contractors must insure that their employees and all of their subcontractor's employees have their temperature taken prior to or upon their arrival at the worksite.

- Taking temperatures is not done instead of the other health and hygiene requirements that have been set forth by the local, state and national authorities. Temperature taking is done in addition to those requirements.

4) Any symptoms identified by the Daily Self-Assessment or a confirmed temperature of 100.4° F or higher must result in the affected employee being sent home. The Contractor must follow federal, state, and local guidance to determine when the employee can return to the worksite.

- The Contractor shall immediately notify the Project Manager about any employees that are sent home due to temperature or COVID-19 symptoms.

b. All personnel must comply with social distancing on construction worksites.

1) Reduce size of work crews: Teams should reduce the number of people in each work crew to the minimum number of people possible to perform the task safely, even

if the reduction of crew size means the job takes longer.

2) Minimize interaction between work teams: Even groups within the same project should avoid interaction across groups, to minimize possible viral spread if one worker contracts COVID-19. Approaches to avoiding contact between groups may include staggered shifts, compressed work weeks where different teams work different days, and maximizing geographic distance between different teams working on the same project.

3) Avoid contact with visitors: Visitors outside the typical work crew should avoid interaction with the team wherever possible. For example, if an inspector or materials delivery needs to enter the site, they should alert the work team (e.g. by honking the horn of their vehicle twice or through another established communication means) so that the work team can vacate the site while the external parties are present.

4) Maintain a 6 foot distance between employees wherever possible: Construction teams should make every effort to limit activities that cannot be performed within 6 feet of distance between COVID-19: MULTI-INDUSTRY CONSTRUCTION GUIDANCE 040120 1 workers. However, some core construction activities may require some proximity to complete (e.g., concrete pours, utility potholing, work in cranes, drainage pipe construction, among others). In these cases, construction crews must employ other aggressive measures to limit contact. Examples include requiring employees to face away from each other, the use of supplemental Personal Protection Equipment (PPE) like face shields or respirators, minimizing the number of people on a team, and retaining consistency within work teams to limit contact with parties external to that team.

5) Office work should be done remotely, whenever possible: Office functions associated with a project (e.g. accounting or records) should be done from home to the maximum extent practicable.

6) In-person meetings should be avoided: Office meetings and consultations should take place virtually, with participants working from home or their work truck, whenever possible. If an in-person meeting is absolutely necessary, that must be limited to fewer than ten people, and participants must maintain 6 foot distance at all times during the meetings. All surfaces should be wiped down before and after the meeting, and hand washing should also occur before and after the meeting.

7) Workers must not congregate during breaks: Construction workers should not congregate for lunch or other breaks.

8) Activity specific work plans: Contractors should consider all job activities and review how they can be accomplished using necessary social distancing and sanitation protocols.

c. General Recommendations for Routine Cleaning and Disinfection on the Jobsite:

1) Contractors and subcontractors should use disposable wipes to wipe down used communal items like tools, equipment and job-boxes.

2) Make wipes and disinfectant available in common areas and "shared" equipment to allow workers to clean equipment before and after use.

3) Before using Aerosol Disinfectants on Fall Protection Harnesses, Connectors or Rigging, consult the manufacturer recommendations for cleaning since these can deteriorate the fibers of the material.

4) Practice routine cleaning of frequently touched surfaces (for example: tables, workstations, doorknobs, handles, etc.) with household cleaners and EPA-registered disinfectants that are appropriate for the surface, following label instructions. Labels contain instructions for safe and effective use of the cleaning product, including precautions you should take when applying the product, such as wearing gloves and making sure you have good ventilation during use of the product.

d. General Recommendations on How to Clean and Disinfect Surfaces:

1) Wear disposable gloves when cleaning and disinfecting surfaces. Gloves should be discarded after each cleaning. If reusable gloves are used, those gloves should be dedicated for cleaning and disinfection of surfaces for COVID-19 and should not be used for other purposes. Consult the manufacturer's instructions for cleaning and disinfection products used. Clean hands immediately after gloves are removed.

2) If surfaces are dirty, they should be cleaned using a detergent or soap and water prior to disinfection.

3) For disinfection, diluted household bleach solutions, alcohol solutions with at least 70% alcohol, and most common EPA-registered household disinfectants should be effective.

4) Diluted household bleach solutions can be used if appropriate for the surface. Follow manufacturer's instructions for application and proper ventilation. Check to ensure the product is not past its expiration date. Never mix household bleach with ammonia or any other cleanser. Unexpired household bleach will be effective against coronaviruses when properly diluted. Prepare a bleach solution by mixing:

- 5 tablespoons (1/3rd cup) bleach per gallon of water or
- 4 teaspoons bleach per quart of water

5) A list of CDC-approved disinfectants against viruses (including COVID-19 virus), see: https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2 Follow the manufacturer's instructions for all cleaning and disinfection products (e.g., concentration, application method and contact time, etc.).

6) For soft (porous) surfaces such as carpeted floor and rugs, remove visible contamination, if present, and clean with appropriate cleaners indicated for use on these surfaces.

e. Detailed Recommendations for Cleaning and Disinfecting on the Jobsite:

1) Sanitation Units (Portable Toilets)

- Evaluate and provide additional restrooms (with hand sanitizer) as needed.
- Frequently or as needed, clean the surfaces that are dirty. They should be cleaned using a detergent or soap and water prior to disinfection.
- Use an Aerosol Disinfectant or diluted household bleach solutions (mentioned in the section above) to disinfect the commonly used items on the unit (handles, locks, toilet seat, etc.).
- With the promotion of frequent handwashing, it is more likely that the handwashing stations will need frequently or as needed refill of the water tank, soap/hand sanitizer dispensers and paper towel dispenser. It is recommended to add a morning and afternoon inspection of the units to guarantee they are serviceable.

2) Project Site Offices, Conference Rooms, Break Areas and Other Common Areas:

- Frequently or as needed, clean the surfaces that are dirty. They should be cleaned using a detergent or soap and water prior to disinfection.
- Wipe down tables and chairs with household cleaners or disinfectant wipes that are appropriate for the surface, following label instructions.
- Floor should be swept and disinfected with a diluted household bleach solution.
- As there is no designated lunch break area on for field personnel, it is recommended that lunch breaks be taken in personal vehicles or segregated around the site. Please do not congregate in tool trailers or connex boxes. This will help maintain social distancing of 6 feet.

3) Jobsite Entrances, Gates and Doors:

- Routine cleaning of the pull handles, locks and/or panic devices on doors by wiping them down with household cleaners or disinfectant wipes that are appropriate for the surface, following label instructions.

4) Operators of Light and Heavy Equipment (Forklifts, Scissor Lifts, Excavators, Loaders, Scrapers, etc.)

- Prior to and after use, wipe down controls, seats, handrails or other frequently touched surfaces with household cleaners or disinfectant wipes that are appropriate for the surface, following label instructions.

5) Hand Hygiene and other Preventive Measures:

- Employees should clean hands often, including immediately after removing gloves and after contact with any other person, by washing hands with soap and water for at least 20 seconds. If soap and water are

not available and hands are not visibly dirty, an alcohol-based hand sanitizer that contains at least 60% alcohol may be used. However, if hands are visibly dirty, always wash hands with soap and water.

- Employees should follow normal preventive actions while at work and home, including recommended hand hygiene and avoiding touching eyes, nose, or mouth with unwashed hands.

2. Update Safety Procedures

a. Contractors will update their safety procedures to implement the guidance issued by federal, state and local authorities related to COVID-19, as well as to implement the procedures required by this addendum.

b. Contractors will train employees on the updated safety policy.

c. Contractors will ensure that all subcontractors are aware of and follow Contractors updated safety policy.

3. City of Greeley Project Sites Controls:

a. Site Isolation:

1) All Contractors and Subcontractor shall minimize or eliminate activities within City of Greeley facilities that require operations by City Staff. If City Staff and Contractor are required to be located in the same facilities, the Contractor shall coordinate with the Project Manager to minimize contact and reduce exposure.

2) All Contractors and Subcontractors shall eliminate face to face meetings to minimize possible of exposure. All questions, concerns, and construction related questions shall be address through phone communications.

3) Contractors shall notify the Project Manager prior to entering City facilities and provide information on work to be done and areas they will be in. Contractors shall not enter any administrative or occupied facilities without prior approval from the Project Manager.

4) If any employee of a Contractor or Subcontractor enter the site while sick, they will be immediately asked to leave. Contractors will not be compensated for this lost time.

b. Personal Protective Equipment (PPE):

1) All Contractors and Subcontractors shall wear non-medical face coverings while working on City of Greeley job sites.

2) Contractors shall require the use of additional PPE as recommended by federal, state and local authorities.

4) **City of Greeley contract controls:**

a. To remain ahead of identified concerns, Contractors must reach out to their subcontractors and suppliers to ascertain potential sources of delay to ensure they give the proper notices to their owners.

b. Contractors must promptly notify the Project Manager of potential delays.

c. If a Contractor determines that a project or project phase must be shut down due to the COVID-19 pandemic, the Contractor shall immediately contact the Project Manager and submit a change order request.

1) Contractors must insure that the project site is left in a safe condition. Contractor shall insure periodic inspection of the project site.

2) Traffic control devices must continue to be inspected and maintained, so it is a best practice to minimize their need and use when a project is temporarily inactive.

d. Contractor will insure compliance with all CDC and OSHA requirements.

e. Contractor agrees that this addendum may be supplemented as additional guidance is received from federal, state and local authorities.

SECTION 520
SUBCONTRACTORS/MATERIALS SUPPLIERS AND RELATED DATA

Firm Name:_____City Contractors License #_____
Primary Contractor_____
PROJECT:_____ Address:_____
_____

For each Subcontractor and/or Materials Suppliers to be utilized, please provide the following information (use additional sheets as necessary):

Phone Number:_____Fax Number:_____
Proposed work and percentage of total work to be assigned_____
_____Percentage:_____%

Firm Name:_____City Contractors License #_____
Address:_____
Phone Number:_____Fax Number:_____
Proposed work and percentage of total work to be assigned_____
_____Percentage:_____%

Firm Name:_____City Contractors License #_____
Address:_____
Phone Number:_____Fax Number:_____
Proposed work and percentage of total work to be assigned_____
_____Percentage:_____%

Firm Name:_____City Contractors License #_____
Address:_____
Phone Number:_____Fax Number:_____
Proposed work and percentage of total work to be assigned_____
_____Percentage:_____%

Firm Name:_____City Contractors License #_____
Address:_____
Phone Number:_____Fax Number:_____
Proposed work and percentage of total work to be assigned_____
_____Percentage:_____%

If the Primary Contractor adds any Subcontractors or Materials Suppliers during the duration of the project, the Primary Contractor will supply the City with an updated form before the Subcontractor or Materials Supplier will be allowed to work on the project.

SECTION 00620

SPECIAL PROVISIONS
Island Grove Event Center Lighting Up-grade
At the Island Grove Event Center
Greeley, Colorado

DESCRIPTION OF THE PROJECT:

The intent of this project is to replace all existing HID lighting fixtures and replace new Sport Beam LED Fixtures. The Square D lighting controls will be removed and new lighting controls will be installed. The City of Greeley has purchased the Sport Beam fixtures (SB) in order to have them before the start of the project. Contractor will still be responsible for the purchase of all other fixtures called out on the drawings.

LOCATION OF WORK:

All work is located at location @ 425 North. 15th Avenue

SPECIFICATIONS:

This project subject to the following drawings and specifications: See attached Fixture Specifications and Electrical Drawings provided by Travis Pofahl Electrical Engineering @ RJ McNutt & Associate's 970/330-3266

1. Construction scheduled time frame is November 16, 2020.
2. Work hours are 7:00 AM to 5:00 pm, unless coordinated with Facilities Division.
3. Restroom facilities will be available within the facility.
4. All Lighting and Control equipment must **be completed & operational by December 18, 2020.**
5. Parking will be available on the south side of the facility.
6. (2) Facility keys will be issued for access to the facility. Must be returned upon completion of project and final payment.
7. Contractor must obtain all necessary permits. (**Electrical contractor must be licensed with the City of Greeley).**
8. All lighting electrical power shutdowns for this project during construction period must be coordinated with Island Grove Facility staff: Debra Warner @ 970/ 371-5969 or Tom Welch @ 970/371-2685

9. **Contact person for Facilities Division. (Dale Blehm @ 970/539-6230) for issues during project.**
10. Per-bid meeting and walk-through is highly recommended to bid this project.
11. The Contractor must provide documentation with the bid that the company has journeyman electricians do the work on project.
12. All work shall be completed including other trades by December 18, 2020.
13. Construction work area shall be cleaned up at the end of each workday.
14. Contractor will be responsible for all damages during on this project.
15. **The City of Greeley has purchased the Sport Beam fixtures (SB) in order to have them before the start of the project. Contractor will still be responsible for the purchase of all other fixtures called out on the drawings.**

16. **All Bid questions will need to be emailed to Doug Clapp by the deadline: June by 10:30 am, Email to Doug.Clapp@greeleygov.com**

PERMITS:
The Contractor must be licensed with City of Greeley. Contractor will obtain necessary permits for work in public facilities. City will waive permit fees.

CONTRACT TIME, LIQUIDATED DAMAGES, DELAYS:
Work shall be completed within (45) days, calendar days of the Notice to Proceed. The Notice to Proceed will be issued after a meeting with the selected contractor, and that contractor has an opportunity to schedule this work.

Liquidated damages will be withheld from the final payment to the Contractor for each day that the project's substantial completion is delayed beyond the contract completion date (60 calendar days plus any additional time allowed by the City per change orders).

Liquidated damage amount will be $500.00 per calendar day.

Liquidated damages are based on additional costs to the City of Greeley for delay of project completion and are not a "late penalty".

Additional time will be allowed for formal seasonal "bad weather" days. The Contractor shall provide documentation of weather history as described below when submitting requests for additional time for severe weather. An actual adverse weather day must prevent work for 50 percent or more of the CONTRACTOR'S workday, delay work critical to the timely completion of the project, and must be documented by the CONTRACTOR. The OWNER'S representative observing the construction shall determine on a daily basis whether or not work can proceed or if work is delayed due to adverse weather or

the effects thereof. The CONTRACTOR shall notify the OWNER'S representative in writing of any disagreement as to whether or not work can proceed on a given date, within two (2) calendar days of that date. The OWNER'S representative will use the above written notification in determining the number of working days for which work was delayed during each month.

While extensions of time shall be granted for "unusually severe" weather or climate conditions, no monetary compensations shall be made by the OWNER for any costs to the CONTRACTOR arising out of such delays. The CONTRACTOR shall comply with the portions of these contract documents relating to his project schedule and amendments thereto which result from "unusual severe" weather condition.

Work Hours:

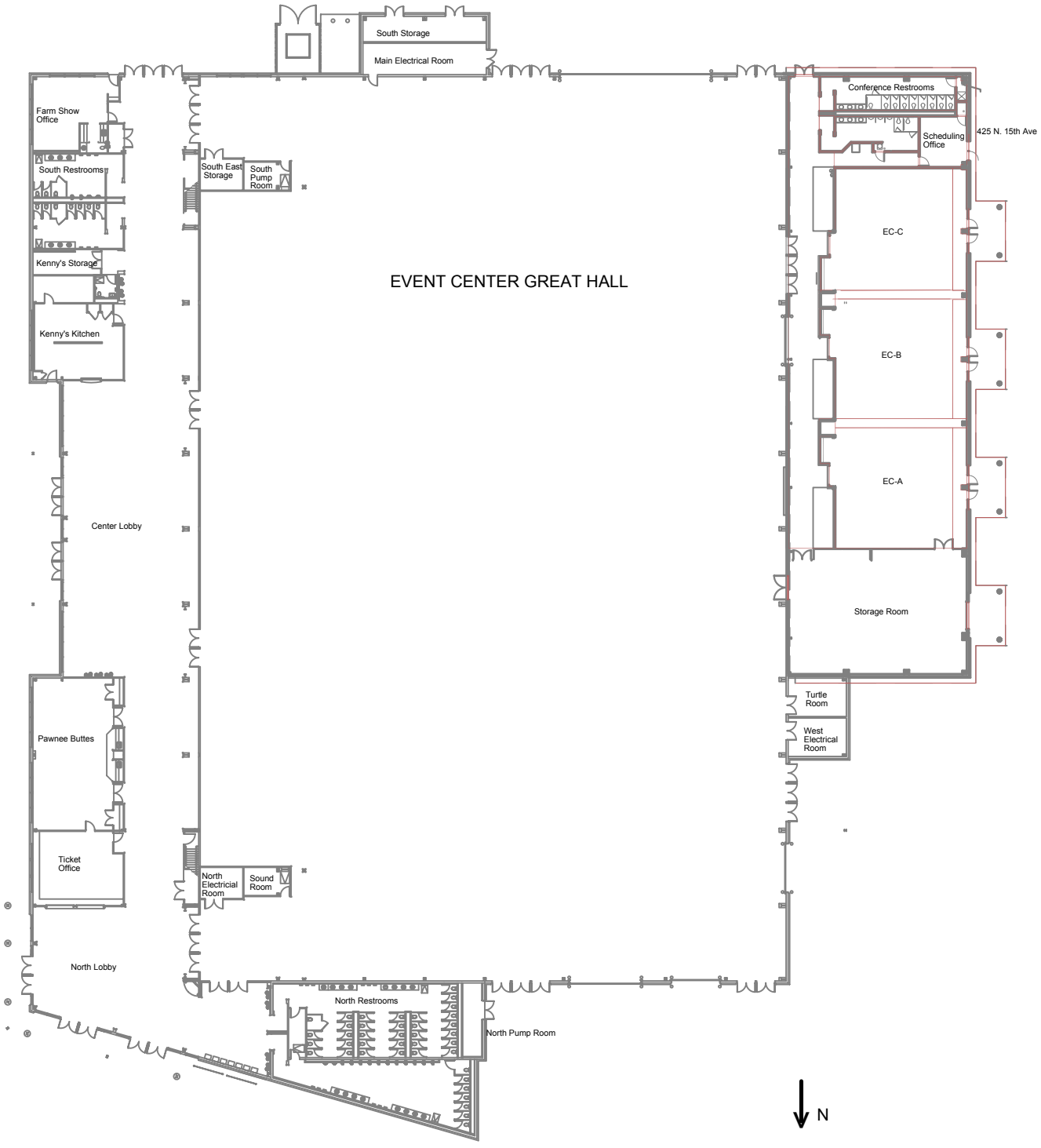
The Contractor is limited to working between 7.00 am to 5:00 pm or per-determined after hours. The work must be coordinated with Dale Blehm @ 970/539-6230 Project Manager or Tom Welch @ 970/371-2685 IG Manager

MEASUREMENT AND PAYMENTS:
This contract is a Lump sum price for construction, etc. No additional payment for work not described in these documents will be allowed, whether a bid item exists or not. The Contractor shall include the costs of all incidentals of construction, labor, equipment, and materials in the appropriate bid item.

FINAL CLEAN UP:
At the completion of the contract and prior to submittal of final pay request, the Contractor shall clean up all construction material and debris. The Contractor shall notify the City when final cleanup is ready for inspection.

POST CONSTRUCTION INSPECTION AND WARRANTY:
Please see General conditions 501 article 11

END OF SECTION 00620



EVENT CENTER 521 N. 15TH AVE

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SECTION 26 01 00

GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Principal work in this Section
   1. Coordinate the electrical work with that of other trades.
   2. Complete branch circuit wiring for new and existing lighting
   3. Lighting fixtures and lamps.
   4. Adjustment of adjustable lighting fixtures and lamps.
   5. Dimming and control

B. Available to Owner: Electrical Contractor shall be available to Owner for additional hook up to lights, equipment, etc. on time and material.

1.3 LEGAL REQUIREMENTS AND STANDARDS

A. Particular attention is called to the following documents:
   1. National Electrical Code (NEC), 2017 Edition.
   2. International Building Code (IBC), 2018 Edition.

B. The requirements of the authority having jurisdiction shall be the minimum acceptable requirements for the work and nothing described in these Specifications or indicated on Drawings shall be construed to permit work not conforming to the most stringent of the applicable codes and regulations. When Drawings or Specifications call for materials or construction of better quality or larger size than by codes, laws, rules and regulations, Drawings and Specifications shall take precedence.

C. New/Contractor furnished equipment not complying with the final inspection shall be removed and replaced with approved equipment at Contractor's expense.

D. Should any changes to the work as indicated on Drawings or described in Specifications be necessary in order to comply with the above requirements notify Owner immediately and cease affected work until approval for any required modifications to the construction has been obtained from Owner.

E. The Authority Having Jurisdiction (AHJ) on this project is the City of Greeley

1.4 PERMITS AND FEES

A. Obtain and pay for fees, permits and inspections related to the electrical work. Deliver certificates of inspection to Owner. Provide copy of Permit to Owner as start of project.

B. The Electrical Contractor shall be on site during all electrical inspections. No additional fees or overtime will be paid for after-hours inspections. Additionally, the Electrical Contractor should notify the Project Manager a minimum of 48 hours before all electrical inspections.

1.5 MATERIALS

A. The label of listing by UL shall appear on materials and equipment for which standards have been established by that agency.

B. Where State of Colorado or City of Greeley has established label of approval requirements, furnish materials and equipment with either the required labels affixed or the necessary written approval.

C. Drawings are designed around standard products of one or more of Manufacturers listed as being

acceptable for the products involved.

D. All materials shall be brand new and current production runs. No close-out items are allowed. Bear all costs associated with removing and replacing with specified materials.

1.6 SUBSTITUTIONS

A. It is the intent of Specifications to establish quality standards of materials and equipment installed. Specific items are identified by Manufacturer, trade name or catalog designation. Should Contractor propose to furnish materials and equipment other than those specified as permitted by the "or approved equal" clauses, he shall submit a written request in pdf format at least seven days, excluding Saturdays, Sundays and Holidays prior to bidding date for any or all substitutions to the Owner. Such a request shall be accompanied with complete descriptive and technical data and all other information deemed necessary by the Owner for evaluation. Substitutions submitted for approval shall list items as specified with the alternate substitution.

B. Alternates: Where substitutions alter the design, conduit, wiring or space requirements indicated on the drawings, Contractor shall include items of cost for the revised design and construction.

C. Approvals: Acceptance or rejection of proposed substitutions shall be subject to approval by Owner. Under no circumstances will Owner be required to prove substitution is not equal to specified item. It is mandatory that Contractor support his contention that proposed substitution is equal to item indicated in drawings and specifications. If requested by Owner or Engineer, Contractor shall submit samples of both specified and proposed substitute items for inspection.

D. Substitutions sent by USPS will not be acceptable and will not be reviewed.

1.7 SHOP DRAWINGS

A. Submit electronic pdf files on all materials and equipment, even if same is as specified or shown on Drawings.

B. Electrical Contractor shall provide shop drawing approval stamps on all equipment supplied by them prior to Engineer's shop drawing approval. Electrical Contractor to check for conformance with the design of the project and compliance with the information given in the contract documents. Contractor is responsible for dimensions, which shall be confirmed and correlated at the job site, fabrication process and techniques of construction.

1.8 WARRANTY

A. Provide a minimum one year warranty on all material and labor, extended period of guarantee from date of acceptance shall apply for material and/or equipment as detailed in other sections of this specification.

B. Standard warranty of Manufacturer shall apply for replacement of parts after expiration of above period. Manufacturer shall furnish replacement parts to Owner or his service agency as directed. Furnish to Owner printed Manufacturers' warranties complete with material included and expiration dates upon completion of Project.

C. The Contractor shall provide a Maintenance Agreement to replace any LED’s/drivers or lighting control devices that burn out or fail, for any reason, for a period of one year.

D. Provide 10% or 3, whichever is more, spare fuses for owner’s stock. Turn over to owner at project completion.

1.9 INTERPRETATIONS

A. All requests for interpretations of Drawings and Specifications must be made through Owner.

1.10 COORDINATION AND COOPERATION

A. Drawings indicate diagrammatically the desired locations or arrangement of conduit runs, outlets, equipment, etc., and are to be followed, as closely as possible. Proper judgment must be exercised in executing the work so as to secure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference with structural conditions. Contractor is responsible for the correct placing of this work and the proper location and connection of this work in relation to the work of all trades.

B. Lighting fixtures are shown in their approximate locations only. Do not install light outlets, conduits or fixtures in conflict with other trades prior to obtaining approval by owner; then lights

shall be installed in locations best suited for equipment arrangement or as directed by Owner or Owner's Rep.

C. Scaled and figured dimensions are approximate of typical equipment of the class indicated. Before proceeding with any work, carefully check and verify all dimensions, sizes, etc., with Drawings to see that the equipment will fit into the spaces provided without violation of applicable codes.

D. Locate outlets for equipment by referring to Shop Drawings, Manufacturers' recommendations, and measuring actual equipment to be installed.

E. Replace or repair, without additional compensation, any work which, in the opinion of Owner or Owner's Rep., does not comply with these requirements.

1.11 OUTAGES

A. Coordinate all electrical service outages with Owner. Plan all work so that duration of outage is kept to an absolute minimum. Provide temporary wiring as necessary and as required in order to maintain continuous service for Owner's operation where outage must be accomplished during a time when power is deemed necessary by Owner, or when outage is to be of an extended duration (over six hours). All outage time and scheduling of same shall be as approved by Owner and shall conform to Owner's schedules.

1.12 REMODEL WORK

A. “In as much as the remodeling and/or rehabilitation of an existing building requires that certain assumptions be made regarding existing conditions, and because some of these assumptions may not be verifiable without expending additional sums of money, or destroying otherwise adequate or serviceable portions of the building, Electrical Contractor and Owner will hold harmless, indemnify and defend Design Professional from and against any and all claims arising out of the professional services provided under this agreement".

B. Electrical Contractor shall attend site walk through scheduled prior to bid. Bid shall not be accepted if Electrical Contractor does not attend pre-bid walk through.

C. Electrical Contractor shall remove all wiring devices, light fixtures, etc., which are indicated to be removed. In general, symbols which are dashed indicate existing devices which are to remain. Symbols which are dashed and crosshatched are existing devices which are to be removed. Devices which are to be removed may require reworking conduit and wiring in order to maintain service to other devices. If removed devices are on walls or ceilings which are to remain, blank coverplates are to be installed on outlet boxes.

D. Where remodeling interferes with circuits in areas which are otherwise undisturbed, circuits shall be reworked as required to maintain circuit continuity.

E. Existing devices and circuiting which are shown are indicated only for informational purposes. Electrical Contractor shall visit the site and shall verify conditions as they exist and shall remove, relocate and/or rework any electrical equipment or circuits affected (whether indicated or not) due to removal or reworking of existing walls, ceilings, etc. Electrical Contractor shall familiarize himself with all work to be done prior to submitting bid.

F. Coordinate routing of all conduits in order to avoid conflicts with ducts, pipes, etc.

G. Lighting fixtures removed and reused shall be cleaned and reconditioned by Contractor prior to reinstallation. Provide new lamps, etc., as required to restore fixtures to operation condition.

H. All equipment, fixtures, devices, etc., which are removed shall be delivered to Owner. All items which are removed and not wanted by Owner and which are not reused shall become the property of Electrical Contractor and shall be removed from site.

I. The cost of cutting and patching necessary for the installation or removal of electrical work shall be included in the Electrical Contract. Coordinate with Owner.

J. Areas of Removal: Electrical Contractor shall check areas of demolition for electrical damage and physical damage. See damaged existing electrical equipment and device paragraph. If existing electrical equipment and devices do not have electrical power, Electrical Contractor is responsible to provide power from electrical panels determined by Engineer.

K. Damaged Existing Electrical Equipment and Services:

1. Existing damaged equipment and devices that are to be reused shall be reported to Owner in writing. The equipment and devices will be evaluated by the design team as to their reuse status. Damaged equipment and devices not reported to Owner in writing shall be the responsibility of Electrical Contractor to replace with new equipment and devices.

1.13 CONSTRUCTION POWER AND LIGHT.

A. Provide construction power and lighting for construction as required. Energy costs will be paid by Owner. All temporary facilities shall be properly grounded, shall comply with NEC and OSHA requirements, and shall have ground fault protection.

END OF SECTION

SECTION 26 01 01

MISCELLANEOUS EQUIPMENT AND SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION

A. This Section describes the principal electrical work related to the furnishing, installation, connection, and control of equipment under this Contract and includes electrical work for future or Owner furnished power equipment. Should the examination of related work indicate discrepancies or omissions; request clarification from Owner prior to performing or omitting any electrical work.

B. Refer to Drawings and other Contract Documents for description of items being furnished by Owner.

C. Principal work in this Section:
   1. The requirements of Section 26 01 00 apply to work of this Section.
   2. Electrical work for powered equipment specified or indicated as furnished by separate contracts, as future installations, or by Owner, during construction.
   3. Empty raceway systems for, but not necessarily limited to, these systems:
      a. Low Voltage (DMX and lighting control) Cabling
   4. Wiring above suspended ceilings.
   5. Owner Furnished Equipment.

1.3 EMPTY RACEWAY SYSTEMS

A. Provide empty raceway systems with conduit, J-boxes, plywood fire retardant backboards, and all miscellaneous appurtenances required for complete system. Leave empty raceway systems complete with pull rope, minimum 4' extra length at each end, properly tagged.

B. Systems shall meet requirements of, be accepted by, and be approved by the City of Greeley, equipment supplier, Owner, or Contractor furnishing system equipment and wiring for the system involved.

C. Empty raceway systems include systems in hollow walls. Provide J-boxes, conduit stubs, bushed ends, plaster frames, coverplates, and pull wires from outlet to J-box above accessible ceilings.

D. Empty raceway systems for Divisions 27 & 28 shall conform to the following additional requirements:
   1. Raceways 1 1/2" trade size and larger shall be provided with pull ropes, and bushed ends, 3/16" diameter polypropylene, with 700 lbs. minimum breaking strength. 3/32" 200 lb. pull lines shall be installed for 1 1/4" conduits and smaller.
   2. Unless indicated otherwise, outlets located in stud walls, masonry walls or masonry partitions shall be flush-mounted, securely attached to metal studs or other suitable backing. Size of opening and coverplates shall be as specified under "Plates" in Section 26 27 26. Conduits for these outlets shall be terminated and bushed. A pull wire or cord is required.
   3. See “Raceways and Boxes” for additional requirements.

E. All low voltage cabling routed through exposed structural ceiling areas (auditoriums, gymnasiums, etc.) and inaccessible areas (gyp ceilings, etc.) may be routed exposed: concealed from public view. Electrical Contractor (EC) to coordinate with special systems providers for installation of appropriate systems as the requirements is not necessarily indicated on drawings.

1.4 WIRING ABOVE SUSPENDED CEILINGS

A. Approved Class II wiring systems such as controls, etc., may be routed without conduit on bridal rings (five feet on center and neatly trained) where above suspended accessible ceiling systems unless otherwise indicated. Where wiring runs occur in inaccessible construction such as underfloor, in walls, above gypsum board ceilings, etc., provide all necessary outlets and conduits stubbed into nearest accessible suspended ceiling space. Wiring in all exposed areas such as exposed ceilings, surface mounted on walls, etc., shall be routed in conduit. All conduit stubs shall be tagged. Where suspended ceiling plenums are used for transportation of environmental air and where required by local inspection authority, all Class II wiring runs shall be enclosed in an approved raceway system or approved return plenum cable on bridal ring system. This shall include all systems such as telephone, data, etc., even if this Contractor is not providing the cables or conductors. Refer to Article 300-22 of the NEC.

1.5 OWNER FURNISHED EQUIPMENT

A. Coordinate with Owner to determine the extent and arrangement of the installation. Provide all necessary raceways, outlets, disconnects, receptacles, cords, pigtails, etc., as required for a complete connection of all equipment and related controls.

B. All rough-in requirements shall be verified with Owner prior to beginning work. All dimensional data and electrical characteristics shall be verified with Owner. All final connections shall be accomplished per Owner's recommendations.

END OF SECTION

SECTION 26 05 00

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Electrical equipment coordination and installation.
   2. Sleeves for raceways and cables.
   3. Sleeve seals.
   4. Grout.
   5. Common electrical installation requirements.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For sleeve seals.

1.5 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical equipment:
   1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
   2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
   3. To allow right of way for conduit installed at required slope.
   4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."

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

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Conduit Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

2.2 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:
      a. Advance Products & Systems, Inc.
      b. Calpico, Inc.
      c. Metraflex Co.
      d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM, NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.

2.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

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

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

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

G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry
1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants."

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."

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

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

3.3 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve.

3.4 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

END OF SECTION

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Building wires and cables rated 600 V and less.
   2. Connectors, splices, and terminations rated 600 V and less.
   3. Sleeves and sleeve seals for cables.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

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

B. Qualification Data: For testing agency.

C. Field quality-control test reports.

1.5 QUALITY ASSURANCE

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

B. Comply with NFPA 70.

1.6 COORDINATION

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

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Building Wire
   1. Thermoplastic-Insulated Building Wire: NEMA WC 5.
   2. Rubber -Insulated Building Wire: NEMA WC3.
   3. Feeders and Branch Circuits 8 AWG and larger: Copper, stranded conductor, 600 volt insulation, 75° C, THHN/THWN, XHHW.
   4. Branch Circuits 10 AWG and Smaller: Copper Conductor, solid conductor, 600 volt insulation, THW, THHN/THWN, XHHW.
   5. Control circuits: Copper, #14 AWG, 19/25 stranding, THHN, 90° C, 600 volt (use THWN in damp and wet locations). Multi-conductor control cables are allowed where more than three conductors are used between common terminations. Minimum of two spare control conductors in each cable.
   6. All wiring shall be #12 solid, minimum, with full size ground conductors unless specifically noted otherwise for certain limited applications.
   7. 600 volt cross linked polyethylene or thermoplastic insulated copper, 98% conductivity, single conductor.
   8. Aluminum conductors are prohibited in any application.
   9. All branch circuits and feeders shall be factory color coded the entire length of conductor.
   10. Cables in underground conduit shall be rated for wet location per NEC 300.5 (B).

B. Remote Control and signal cable.
   1. Control Cable for Class 1 Remote Control and Signal Circuits: Copper conductor, 600 volt insulation, rated 75° C, individual conductors twisted together shielded, and covered with interlocked aluminum armor.
   2. Control Cable for Class 2 or Class 3 Remote Control and Signal Circuits: Copper conductor, 300 volt insulation, rated 75° C, individual conductors twisted together, shielded, and covered with a non metallic jacket; UL listed and labeled as CL2, C3, CL2R, CL3R, or PLTC.
   3. Plenum Cable for Class 2 or Class 3 Remote Control and Signal Circuits: Copper conductor, 300 volt insulation, rated 75° C, individual conductors twisted together, shielded, and covered with a non metallic jacket; UL listed for use in air handling ducts, hollow spaces used as ducts, and plenums and labeled as CL2P or CL3P.
   4. All low voltage cabling shall be plenum rated.

C. Armored Cable, MC Cable, AC Cable, ENT/NM, and Modular Wire: Prohibited.

D. MC Cable is allowed for connection to fixtures, maximum length of 6 ft.

2.2 CONNECTORS AND SPLICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. AFC Cable Systems, Inc.
   2. Hubbell Power Systems, Inc.
   3. O-Z/Gedney; EGS Electrical Group LLC.
   4. 3M; Electrical Products Division.
   5. Tyco Electronics Corp.

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

2.3 SLEEVES FOR CABLES

A. Sleeves: Refer to Specification Section 26 05 00.

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

2.4 SLEEVE SEALS

A. Sleeve Seals: Refer to Specification Section 26 05 00.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Stranded for No. 6 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

C. Wiring and Connection to Vibrating Equipment: Stranded Copper.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

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

B. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN-THWN, XHHW single conductors in raceway.

C. Exposed Branch Circuits: Type THHN-THWN, single conductors in raceway.

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

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

F. Class 1 Control Circuits: Type THHN-THWN, in raceway.

G. Class 2 Control Circuits: Type THHN-THWN, in raceway. Power-limited plenum cable concealed in building finishes except all fire alarm cabling shall be installed in conduit U.O.N. in Fire Alarm Specifications. All cabling shall be in raceway in exposed structural ceiling spaces.

3.3 CONDUCTOR NEUTRAL APPLICATIONS

A. Neutrals: copper, same size as phase conductor, derating neutrals not allowed.

B. Provide separate Neutral conductors for each 15 or 20 amp (120 or 277V) single pole breaker.
   1. All existing circuits involved in project using shared neutral contractor shall provide tie handles on branch circuit breaker per NEC.

3.4 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. Use manufacturer-approved (-20° F) pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. The use of pulling means, such as fish tape, cable, rope, and basket-weave wire/cable grips, are to be used in such a way that they will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Support cables according to Division 26; Section "Hangers and Supports for Electrical Systems."

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

G. General
   1. Use no wire smaller than 12 AWG for power and lighting circuits and no wire smaller than 14 AWG for control wiring.
   2. Use 10 AWG conductors for 20 ampere, 120 volt branch circuit for home runs longer than 75 feet and longer than 150 feet for 277 Volt branch circuits.
   3. Splice only in junction or outlet boxes.
   4. Make conductor lengths for parallel circuits equal.

H. Wiring installation in raceways.
   1. Completely and thoroughly clean and dry inside of raceway systems before installing conductors.
   2. Pull all conductors, disconnect, boxes, etc. into a raceway at the same time after raceway system is complete. Do not allow exposed wire. This requirement includes roofs and exterior locations. Use UL-listed low temp rated wire pulling lubricant for pulling 4 AWG and larger wires.
   3. Install wire in raceway after interior of building has been physically protected from the weather and all mechanical work likely to injure conductors has been completed.

I. Support cables above accessible ceilings at five-foot intervals; do not rest on ceiling tiles. Do not use fixture wire supports. Use spring metal clips and dedicated hanger rods to support cables from structure. Cables shall be installed at perpendicular angles to building surfaces.

3.5 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) exposed.

D. Wiring connections and terminations.
   1. Splice only in readily accessible junction boxes.
   2. Use solderless pressure connectors with insulating covers for copper wire splices and taps, 1- AWG and smaller.

3. Use insulated spring wire connectors with plastic caps for 10 AWG and smaller.
4. Use Ilsco Clear Tap or Burndy Hi Press lugs on wire #8 AWG and larger.
5. Tape or heat shrink un-insulated conductors and connectors with electrical tape to 150 % of the insulation value of the conductor.
6. Terminate spare conductors with wire nut and electrical tape.

3.6 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Sleeve Installation for Electrical Penetrations: Refer to Specification Section 26 05 00.

3.7 SLEEVE-SEAL INSTALLATION

A. Sleeve-Seal Installation: Refer to Specification Section 26 0500.

3.8 FIRESTOPPING

A. Firestopping: Refer to Specification Section 26 0500

END OF SECTION

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Hangers and supports for electrical equipment and systems.
   2. Construction requirements for concrete bases.

1.3 PERFORMANCE REQUIREMENTS

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

B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

C. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.4 SUBMITTALS

A. Product Data: For the following:
   1. Trapeze hangers. Include Product Data for components.
   2. Steel slotted channel systems. Include Product Data for components.
   3. Equipment supports.

1.5 QUALITY ASSURANCE

A. Comply with NFPA 70.

B. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code – Steel".

PART 2 – PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Allied Tube & Conduit.
      b. Cooper B-Line, Inc.; a division of Cooper Industries.
      c. ERICO International Corporation.
      d. GS Metals Corp.
      e. Thomas & Betts Corporation.
      f. Unistrut; Tyco International, Ltd.
      g. Wesanco, Inc.
   2. Metallic Coatings: Stainless steel, galvanized or painted steel – match existing or better.
   3. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported. Perforated pipe straps and wire of any type is prohibited.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes and bars, black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners (only allowed with specific written permission from Owner): Threaded-steel stud, for use in hardened Portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
    a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
        1) Hilti Inc.
        2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
        3) MKT Fastening, LLC.
        4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened Portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
    a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
        1) Cooper B-Line, Inc.; a division of Cooper Industries.
        2) Empire Tool and Manufacturing Co., Inc.
        3) Hilti Inc.
        4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
        5) MKT Fastening, LLC.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: 1/4" diameter threaded steel.
8. Conduit straps shall be of steel and two-hole construction.
9. All suspended items shall be either directly attached to structured or attached to structure via threaded rod.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC (2') two feet from panels, boxes and conduit bodies – (8) eight feet on center thereafter. Minimum rod size shall be 1/2 inch in diameter.

C. Multiple Raceways: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways to these supports with single-bolt or two-bolt conduit clamps.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported directly to structure, as permitted in NFPA 70. Do not fasten supports to piping, ductwork, mechanical equipment, conduit or ceiling system suspension wires of wire of any type.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lbs. (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
   1. To Wood: Fasten with lug screws or through bolts.
   2. To New Concrete: Bolt to concrete inserts.
   3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
   4. To Existing Concrete: Expansion anchor fasteners.
   5. Instead of expansion anchors (with specific written permission from Owner), powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
   6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
   7. To Light Steel: Sheet metal screws.
   8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

F. Drilling or other modifications of structural steel members is prohibited without specific written permission from the Structural Engineer.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

B. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
   1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Touchup: Comply with requirements in Division 09 painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 26 05 33

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. FMC: Flexible metal conduit.

C. IMC: Intermediate metal conduit.

D. LFMC: Liquidtight flexible metal conduit.

E. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

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

1.5 QUALITY ASSURANCE

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

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. AFC Cable Systems, Inc.
   2. Alflex Inc. (Southwire)
   3. Allied Tube & Conduit; a Tyco International Ltd. Co.
   4. Anamet Electrical, Inc.; Anaconda Metal Hose.
   5. Electri-Flex Co.
   6. Manhattan/CDT/Cole-Flex (Alpha Wiring)
   7. Maverick Tube Corporation (Tenaris).
   8. O-Z Gedney; a unit of General Signal.
   9. Western Tube and Conduit.
   10. Wheatland Tube Company.

B. Rigid Steel Conduit, Zinc Coated: ANSI C80.1.

C. IMC: ANSI C80.6.

D. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
   1. Comply with NEMA RN 1.
   2. Coating Thickness: 0.040 inch, minimum.

E. EMT, Zinc Coated: ANSI C80.3.

F. FMC: Zinc-coated steel, full wall.

G. LFMC: Flexible steel conduit with PVC jacket.

H. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed. All fittings shall have insulated throats.
   1. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints, NEMA TC2 and TC3.
   2. Conduit Fittings for EMT: Steel set screw type (Dry applications).
   3. Conduit Fittings for EMT: Steel compression type (damp/wet applications).

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

2.2 NONMETALLIC CONDUIT AND TUBING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. AFC Cable Systems, Inc.
   2. Anamet Electrical, Inc.; Anaconda Metal Hose.
   3. Arnco Corporation.
   4. CANTEX Inc.
   5. CertainTeed Corp.; Pipe & Plastics Group.
   6. Condux International, Inc.
   7. ElecSYS, Inc.
   8. Electri-Flex Co.
   9. Lamson & Sessions; Carlon Electrical Products.
   10. Manhattan/CDT/Cole-Flex (Alpha Wiring).
   11. Prime Conduit.
   12. RACO; a Hubbell Company.
   13. Thomas & Betts Corporation.

B. RNC: NEMA TC 2, Type EPC-40-PVC, not allowed on project.

C. LFNC: UL 1660.

D. ENT, AC, NM or other pre-wired systems are not approved for this project.

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

2.3 METAL WIREWAYS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Cooper B-Line, Inc.
   2. Hoffman.
   3. Square D; Schneider Electric.
   4. Wiremold Company (The), Electrical Sales Division.

B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1, 12, 3R, unless otherwise indicated.

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

D. Wireway Covers: Hinged type.

E. Finish: Manufacturer's standard enamel finish.

2.4 SURFACE RACEWAYS

A. Surface Metal Raceways: Galvanized steel with snap-on covers.
   1. Manufacturers:
      a. Carlton
      b. IsoDuct
      c. Panduit
      d. Pass & Seymour
      e. Walker Systems, Inc.; Wiremold Company (The).

2. Couplings, elbows and connectors designed for use with the raceway system
3. Boxes and Extension Rings designed for use with the raceway systems
   a. Extension boxes and/or rings not allowed on new work
4. Use flat head screws to fasten channel to surfaces
   a. Option: Use suitable clips and straps
5. Use insulating bushings and inserts at connections to outlets and corner fittings
6. Maintain grounding continuity between raceway components
7. Preferred location: below the work surface or desk tops

2.5 BOXES, ENCLOSURES, AND CABINETS

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

B. Cast-Metal Outlet and Device Boxes: NEMA FB1, ferrous alloy, aluminum, Type FD, with gasketed cover.

C. Outlet boxes shall be standard, stamped galvanized steel boxes, except as specified below of the proper size to accommodate the device and function for which intended. Boxes for wall devices, single or multiple gang boxes shall be properly sized to accept required devices, complete with plaster rings where required. Do not use Gangable type boxes for multi-gang applications.

D. Boxes shall be of proper code size for the number of wires or conduits passing through or terminating therein, but in no case shall any box be less that 4" square by 2 1/8" deep. Boxes shall be furnished with proper covers or wall device plates. The box criterion applies to all systems, including but not limited to, fire, elevator and temperature controls.

E. Boxes for mounting of surface lighting fixtures shall be 4" octagon boxes by 2 1/2" deep, with 1/2" no-bolt fixture studs.

F. Wall boxes for exterior use shall be hot-dipped galvanized complete with weatherproof covers and rubber or neoprene gaskets.

G. Surface mounted boxes shall be cast aluminum weatherproof, with grounding terminal, threaded hubs.

H. Boxes exposed to weather shall be cast aluminum weatherproof, with grounding terminal, threaded hubs and gaskets.

I. Boxes used in CMU and concrete construction shall be concrete rated type.

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

K. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.
   1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
   2. Nonmetallic Enclosures: Plastic

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

2.6 SLEEVES FOR RACEWAYS

A. Sleeves: Refer to Specification Section 26 0500.

2.7 SLEEVE SEALS

A. Sleeve Seals: Refer to Specification Section 26 0500.

PART 3 - EXECUTION

3.1 RESTRICTIONS

A. Attachment of conduit and tubing to any exterior part of the building envelope is prohibited without the approval of the Owner.

B. Horizontal conduit runs within concrete slabs above grade are prohibited.

C. Limit horizontal runs in concrete slabs to circuits feeding cast in place floor outlets only.

D. Horizontal runs below concrete slabs are permitted. Minimum of 6" below bottom of concrete.

3.2 RACEWAY APPLICATION

A. Comply with the following indoor applications, unless otherwise indicated:
1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed, Not Subject to Severe Physical Damage: EMT.
3. Exposed and Subject to Severe Physical Damage: Rigid steel conduit.
4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
5. Connection to Vibrating Equipment (Including light fixture whips): LFMC.
6. Damp or Wet Locations: Rigid steel conduit or EMT with compression fittings.
7. Raceways for Optical Fiber or Communications Cable: EMT
8. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 3R, stainless steel in damp, corrosive or wet locations.

B. Minimum Raceway Size: Accessories.

1. Conduit Rack: Steel channel with conduit straps or clamps; Oversize by 25%.
2. Size conduit for Type THW, per N.E.C. or per plans, whichever is larger.
3. 1/2 inch minimum except flexible fixture whips which may be 3/8 inch.
4. Home runs to switchboards and panels: 3/4 inch minimum.

C. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.
3. Electrical Metallic Tubing and Fittings

a. EMT: ANSIO C80.3 Galvanized tubing
b. Fittings: ANSI/NEMA FB 1: High quality, insulated throat, steel set screw.
1) Die cast fittings are prohibited
2) High quality compression is required on surface work in kitchens, greenhouses, and other areas where waterproof fittings are required by NEC.
3) Conduit Bodies: Steel or malleable iron
a) PVC is prohibited

D. Do not install aluminum conduits.

E. PVC conduit not allowed in any above-grade installation.

F. MC (Metal Clad), AC (Armor Clad), NM (Romex) or ENT: Not allowed on this project (except MC allowed for 6 foot light fixture whips furnished with recessed light fixtures).

3.3 INSTALLATION

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

B. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."

SECTION 26 09 43

NETWORK LIGHTING CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections apply to work of this section.
B. Requirements of the following Division 26 Sections apply to this section:
   1. Basic Materials and Methods
   2. Lighting Fixtures
C. Refer to lighting control drawings for operational intent of the following:
   1. Lighting control system on drawings for operational intent and device requirement.
   2. Typical control diagrams and details.
   3. Equipment layout and quantity.

1.2 SUMMARY

A. Provide, install, energize, program, and warrant a complete and coordinated network lighting control system consisting of but not limited to controllable breaker panels, ALCR emergency lighting control devices, multi-button keypads, touchscreens, lighting control processors, lighting control network equipment, DMX data distribution and equipment, equipment enclosures, UPS, associated low voltage wire, and required technical and programming services for the retrofit of the lighting control system.
B. The drawings and specifications indicate minimum acceptable level of quality, performance, and control intent for building areas. Where control intent is indicated either on drawings or specifications for a building area, the contractor shall provide that control feature to the entire area, as applicable.
C. The exact quantity of product and services required to meet the control intent, shall be determined by the equipment manufacturer based upon the specific performance of the product. Where a revised quantity of product is required, the contractor shall furnish and install in coordination with the engineer and owner.
D. Types of lighting control equipment specified in this section includes but is not limited to the following:
   1. MLO controllable breaker panels
   2. Lighting Control equipment panel
   3. ALCR Emergency Lighting Control device(s)
   4. Architectural Lighting Control System Processors and Power Supplies
   5. Lighting Control System Ethernet equipment
   6. Touch screen control stations with programmable graphics and user interface – wall mount and portable
   7. Digital, Wall Mounted Portable Touchscreen interface Stations
   8. Digital, Wall Mounted Keypads
   9. DMX data distribution equipment
   10. System Communications Wiring
   11. Lighting Control Software
   12. A customizable software which offers astronomical time clock to provide building wide automatic/remote and manual lighting control for interior and exterior light fixtures.
E. Refer to other Division 26 sections for wires/cables, raceways, electrical boxes and fittings, and wiring devices which are required in conjunction with lighting control equipment to perform work of this section.
F. The following outlines the areas of work to be controlled by this section.
   1. Network Lighting Control System
      a. Interior and Exterior Lighting currently controlled by existing lighting control system

b. New Event Center multi-attribute, DMX controlled Digital Lighting Fixtures

1.3 SUBMITTALS

Submittal documentation shall be furnished by the contractor for approval by the Engineer and must be approved in writing prior to shipment of any equipment from the manufacturer. It shall consist of:

A. Project Cover Sheet: indicating project name, location, and team members for contractor and manufacturer supplying the lighting control equipment.
B. Bill of Material and Services: itemized list of all materials and services being supplied to meet the specifications.
C. Operational Narrative for the control and programming intent for the system.
D. Shop Drawings: Contractor shall submit shop drawings as part of submittal set to include but not be limited to:
   1. Plan view drawings showing all equipment/component locations with low voltage inter-connect wiring type and route
   2. One-line system wide equipment riser diagram with associated low voltage wiring type
   3. Controllable breaker panel schedules
E. DMX address schedule (patch chart)
F. Technical Product Data Sheets: for all equipment supplied – these data sheets shall describe all hardware and software items provided. A detailed line by line specification compliance shall be included.
G. Wiring Diagrams: submit typical wiring diagrams for all components. Detailed interconnection diagrams are required only if proper inter-wiring of components is not clearly indicated on typical wiring diagrams – or – if electrical contractor intends to vary from typical interconnection diagrams on standard manufacturer data sheets.
H. Plan Drawings: Manufacturer shall submit hard copy color plan drawings showing the type and location of system components including photocells, occupancy sensors, switch packs, I/O Modules, etc. Sensor coverage and quantity shall be verified prior to the preparation of these drawings.
I. Touchscreen Graphics: submit Manufacturer generated graphic screen layouts as part of a two-step approval process.
   1. Initial submittal to owner to review proposed touchscreen graphics pages and page flow for control of multi-attribute lighting and house lighting for the events arena.
   2. Submittal return shall include owner comments and suggestions for changes to proposed graphics. Manufacturer's programmer shall implement owner's comments into job site programming implementation and review with owner upon system energization. Owner comments on implemented touchscreen graphics shall be incorporated prior to final owner training and demonstration.
J. Closeout Documents: At the substantial conclusion of the project provide the owner with a set of close out documents which will include:
   1. Maintenance Manuals: Furnish maintenance manuals which contain equipment cuts, operating instructions, troubleshooting procedures, and spare parts list for equipment. Ensure manual includes operating instructions in addition to instructions for maintenance of the system's software package.
   2. Contact information for:
      a. The system manufacturer's 24/7 technical support hotline
      b. The electrical contractor installing the system
      c. The Lighting Control System local agent for this installation
      d. The manufacturer's local agent
   3. Revised submittal documents reflecting the as-built project condition.

1.4 QUALITY ASSURANCE

A. The manufacturer shall provide a complete lighting control system capable of functioning and performing as required by these specifications and the plan drawings. It is the sole responsibility

of the Electrical Contractor to ensure that all equipment meets the specifications and technical performance.

B. Approved Manufacturers: the basis of design and minimum acceptable level of technical performance is equipment as specified herein and manufactured by ETC of Middleton, Wisconsin.
   1. Colorado ETC Representative – GLS Lighting and Control – Golden, CO 303-394-0220

C. Manufacturer's Quality Assurance:
   1. Manufacturer of lighting control equipment shall have manufactured the specific type of equipment specified herein for no less than 10 consecutive years prior to the bid date of this project. No exception to control of network lighting control system user interfaces such as keypads and touchscreen control stations and DMX controlled lighting from a single processor system.
   2. Equipment shall be manufactured in the United States

D. Technical Support:
   1. Manufacturer of lighting control system shall maintain a 24/7/365 technical support hotline with guaranteed response within 15 minutes any time of any day.
   2. Manufacturer of lighting control system shall maintain
   3. Manufacturer's Territory Representative shall be within 100 miles of the project jobsite and shall have manufacturer trained and certified field service technicians on staff.
   4. Manufacturer's Dealer Network – manufacturer shall have no less than 4 factory authorized stocking dealers within 100 miles of the project jobsite each of whom shall employ manufacturer trained and certified field service technicians on staff.

E. Alternate Manufactures for Lighting Control equipment: It is the intent of the owner to utilize equipment and associated services as provided by ETC of Middleton, Wisconsin due to the technical nature of the lighting control of multi-attribute DMX controlled digital lighting for this project. Requests for approval of lighting control equipment manufactured by companies other than the specified manufacturer require approval in writing prior to the bid date and will be considered if the following conditions are met:

   1. The requesting contractor submits the request for approval 7 working days prior to the bid.
   2. Submittal for alternate equipment shall include a full submittal set as indicated in section 1.3 – Submittals.
   3. Contractor shall demonstrate proposed alternate equipment to engineer and owner within 2 days of submitting alternate request. Demonstration shall include demonstrating harmonious control of the specified multi-attribute DMX controlled digital lighting fixtures from SportsBeams.
   4. Alternate lighting control equipment submittal shall include a technical specification compliance document with a line by line itemization identifying compliance or non-compliance with the technical specifications included here-in. For non-compliance – include a written description of compliance derivation.
   5. Alternate equipment submittal shall include written declaration from an officer of the equipment manufacturing company certifying the technical specification compliance document and certifying the manufacturer has been manufacturing this equipment (or similar) for a period of no less than 10 years.

F. Codes and Standards:
   1. Electrical Code Compliance: Comply with applicable local electrical code requirements of the authority having jurisdiction and NEC as applicable to construction, installation of lighting control equipment.
   2. UL Compliance: Comply with applicable requirements of UL standard 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors". Provide lighting control equipment and components which are UL-listed and labeled. Any custom cabinets that may be required shall be assembled by a U.L. listed panel shop that is approved for building industrial panels. Each panel shall bear a U.L. label detailing all requirements for industrial panel fabrication.

3. NEMA Compliance: Comply with applicable requirements of NEMA's Standard Pub No. 250, "Enclosures for Electrical Equipment (1000-Volts Maximum)".
4. All lighting control equipment shall be in compliance with FCC Emission Standards specified in Part 15 Subpart J for Class A applications.
5. NFPA 70: National Electric Code (NEC 2017); NFPA 101: Life Safety Code (2017)
6. USITT latest edition of technical standards for sACN and DMX512-A (United State Institute for Theatre Technology)

1.5 WARRANTY

A. Installation Warranty: A written warranty shall be supplied by the installing contractor agreeing to provide the labor and materials to replace any portion of the lighting control system equipment or wiring that fails due to materials or workmanship for a period of twelve months after substantial completion.
B. Manufacturer's Warranty: A written warranty shall be supplied by the manufacturer agreeing to replace any equipment that fails due to materials or workmanship for a period of 2 years.
C. Warranty Commencement: Warranty shall begin at the point of substantial completion of the system, which is defined as the date when commissioning and owner training has been completed and the Owner obtains beneficial use of the system.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver lighting control equipment and components in factory-fabricated type containers or wrappings, which properly protect equipment from damage.

B. Store lighting control equipment in original packaging and protect from weather and construction traffic. Wherever possible, store indoors; where necessary to store outdoors, store above grade and enclose with watertight wrapping.
C. Handle lighting control equipment carefully to prevent physical damage to equipment and components. Do not install damaged equipment; remove from site and replace damaged equipment with new.

PART 2 - LIGHTING CONTROL SYSTEM SERVICES

2.1 LIGHTING CONTROL SYSTEM SERVICES

A. The electrical contractor installing the equipment specified herein shall carry the services of a manufacturer certified field service technician to assist with the installation, energization, and technical check out of the system.
B. The electrical contractor installing the equipment specified herein shall carry the services of a manufacturer certified field service technician to provide the system programming, owner training, and associated warranty services for the system.
C. Owner Training: Provide no less than 2 owner training sessions – allow up to 6 hours of owner training for each session.
    1. Training session #1 shall be the formal system O&M training with the owner's operational personnel. Installing contractor to ensure sign off sheet is present for owner's agents to sign after completion of owner's training.
    2. Training session #2 shall be organized with the owner's personnel by the installing contractor. Session shall take place within the first 6 months of system possession and shall consist of programming adjustments and additional training over system O&M.
D. The electrical contractor installing the equipment may at their discretion elect to contract the DMX data system wire terminations from a manufacturer's certified field service technician. DMX data wire terminations per USITT DMX512-A standard are integral to this system functioning properly.
E. These services shall not be limited to a certain quantity of job site "trips" nor limited to certain number of job site "hours".

F. The Lighting Control System services shall be completed (with exception of warranty obligation) when the owner or owner's agent has received a complete demonstration of a working system and O&M training over the system and signed documentation indicating receipt of such training.
G. The owner at their discretion may or may not video tape the system demonstration and O&M training.
H. Owner support during first events after installation
    1. Contractor shall carry the services of a manufacturer's authorized field service technician to be present during the owner's first two events at the venue.
    2. Contractor shall have agent present during the first two events.
I. Warranty – see Warranty section of this specification.

PART 3 - SYSTEM DESCRIPTION
3.1 SYSTEM DESCRIPTION

A. The network lighting control system shall be turned over to the owner as a complete and fully operating system with all hardware and software components supplied, installed, programmed and fully operating at the time of substantial completion.
B. The network lighting control system shall be an architectural lighting control system network capable of operating up to 1,024 zones of lighting from a single processor that manages a network of lighting control manual user interfaces while simultaneously controlling lighting load panels and DMX lighting control loads.
C. The system head end electronics shall be housed in a 19" floor standing equipment rack located in the AV control room. This rack shall house the system lighting control processor, digital station bus interface, DMX Gateways, SportsBeams lighting Gateways, UPS and miscellaneous lighting control system network gear. The head end processor shall house a web browser engine so the owner can log into the system and adjust system attributes such as scenes, zones, time clock from a web browser without the need of additional purchased software. The system head end processor shall include an acromial time clock scheduler which can automate lighting control playback as needed.
D. The system shall utilize a digital user interface bus carrying user interface power and data over a single polarity independent and topology independent data wire. User interfaces shall consist of but not be limited to digital multi-button keypads, programmable 7" wall mount Touchscreens, programmable 7" portable Touchscreens, wall mounted DMX input faceplates which can accept data from any DMX source. The digital user interface bus shall allow digital lockout (disabling) of individual user interfaces based upon commands from the master Touchscreen interface. Touchscreen interfaces shall be capable of supporting multiple user configurations – each user shall have a unique log in ID and associated graphics pages and functionality.
E. The system shall be capable of outputting up to 1,012 DMX control channels for operation of DMX controlled light fixtures.
F. The system shall include digitally operated controllable breaker panels located in electrical rooms as specified herein. The controllable breaker panels shall be capable of controlling switched loads, 0-10V dimmed loads, and DALI controlled loads
G. The system shall be supplied with all necessary lighting control software and associated licenses for the owner to fully operate the system. No additional software or software license purchases shall be necessary for the owner to have a complete and operating system.
H. The system shall be provided to the owner with all specified technical services, programming services, and training services included at no additional costs.

PART 4 - TECHNICAL SPECS
4.1 LIGHTING CONTROL SYSTEM PROCESSOR ENCLOSURES

A. The control enclosure shall be the Unison ERn Series Control Enclosure as manufactured by Electronic Theatre Controls, Inc., or equal.
B. Mechanical
    1. The External Processing enclosure shall be a surface mounted panel constructed of 18 gauge formed steel panels with a hinged, lockable full-height door containing an integral electrostatic air filter.

a. The enclosure door shall have an opening to allow limited access to the control module face panel.
b. Enclosures shall be convection cooled without the use of fans.

2. Control Enclosures shall be sized to accept one or two Control Processors and one or two Station Power Modules, including various options and accessories.
   a. The Control Enclosure for a single control processor (ERn2) shall support a single Station Power Supply module; The Control Enclosure for 2 control processors (ERn4) shall support a quantity of 2 modules.
3. All enclosure components shall be properly treated and finished.
   a. Exterior surfaces shall be finished in fine textured, scratch resistant, powder based epoxy paint.
4. Enclosure(s) shall also be available in a 19” rack mounted (RM) version.
   a. Rack-mounted version shall have an independent enclosure suspension kit, with a full height, locking door/cover attached to the kit.
   b. Rack-mounted version shall have an opening to access the control module face panel, and openings to view indicators on option modules.
5. Enclosure dimensions and weights (without modules) shall not exceed:
   a. ERn2 - 15" W x 9" H, 10" D, 15 lb.
   b. ERn2-RM - 19" W 11"H 10" D, 20 lb.
   c. ERn4 - 15" W x 14" H x 10" D, 20 lb.
   d. ERn4-RM - 19" W x 16" H x 10" D, 25 lb.
6. Top, bottom, and side knockouts shall facilitate conduit entry.
7. Enclosures shall be designed to allow easy insertion and removal of all control and option modules without the use of tools.
   a. Supports shall be provided for precise alignment of modules into power and signal connector blocks.
   b. With modules removed, enclosures shall provide clear front access to all power and control wire terminations.
8. Option Modules
   a. Ethernet Switch
      1) The Control Enclosure shall support an optional 5-port Ethernet Switch, with at least 4 ports supplying Power over Ethernet (PoE).
      2) The Ethernet Switch module shall be 100BaseTX, auto MDI/MDIX, 802.3af PSE compliant.
      3) The Ethernet Switch module shall contain power, status, and activity indicators. All indicators shall be visible when the enclosure door is open for both rack and wall mounted ERn.
   b. Redundant Power Supply (RRPS)
      1) The Control Enclosure shall support an optional redundant power supply which shall automatically provide power to the control electronics upon failure or removal of the primary power supply.
      2) The redundant power supply shall assert itself seamlessly without a loss of power to the control electronics.
      3) The redundant power supply shall seamlessly remove itself when the primary power supply is reengaged.
      4) The redundant power supply shall provide visible indication that it is active.
   c. Station Bus Repeaters (ERn4 only)
      1) The Control Enclosure shall support an optional module to expand the station bus length an additional 400 meters, and the station count an additional 30 stations (60 maximum per processor/enclosure)
      2) Wall-mount and 19" Rack-Mount versions shall also be available to support mid-span insertion away from the Control Enclosure.
   d. Station Bus Dual Repeaters (ERn4 only)
      1) The Control Enclosure shall support an optional module to expand the station bus length to two additional 400 meter segments (a total of 1200

meters from a single enclosure, and the station count to 60 stations (60 maximum per processor/enclosure).
2) Wall-mount and 19" Rack-Mount versions shall also be available to support mid-span insertion away from the Control Enclosure.

9. Accessories
   a. RideThru Option (RTO)
      1) The Control Enclosure shall support an optional, short-term back-up power source for the control electronics.
      2) RideThru Option (RTO) provides power for controls electronics during brief power outages or drop outs.
      3) The short-term back-up power source shall automatically engage upon the loss of normal power, seamlessly transitioning the supply power for the control electronics power to itself.
      4) The short-term back-up power supply shall detect the return of normal power, and seamlessly return the control electronics to normal power.
      5) The short-term back-up power source shall support the control electronics for at least 10 seconds.
   b. BatteryPack Option (BPO)
      1) The Control Enclosure shall support an optional, long-term back-up power source for the control electronics.
      2) The long-term back-up power source shall automatically engage upon the loss of normal power, seamlessly transitioning the supply power for the control electronics power to itself.
      3) The long-term back-up power source shall supply power to the control electronics for at least 90 minutes.
      4) The long-term back-up power supply shall detect the return of normal power, and seamlessly return the control electronics to normal power.
      5) A test switch/indicator shall be available without opening the rack door or removal of any modules/components.

C. Electrical
   1. External Processing enclosures shall be available in 100, 120, 230 and 240 volt, single-phase configurations.
   2. External Processing enclosures shall be completely pre-wired by the manufacturer. The contractor shall provide input and control wiring.
   3. External Processing enclosures shall be designed to support the following wire terminations:
      a. AC (single phase)
      b. Echelon link power (Belden 8471 or equivalent)
      c. 24Vdc (2- 16AWG Wire)
      d. DMX512A Port A (In or Out) (Belden 9729 or equivalent)
      e. DMX512A Port B (In or Out) (Belden 9729 or equivalent)
      f. RS232 Serial In/Out (Belden 9729 or equivalent)
      g. Unshielded Twisted Pair (UTP) Category 5 Ethernet
      h. Contact Closure In (14AWG to 26AWG Wire)
      i. Contact Closure Out (14AWG to 26AWG Wire)
         1) Contact Closure Out shall provide 1A @ 30vDC
   4. Station Power Modules
      a. Station power supply modules shall provide LinkPower for at 32 stations and 1.5A@24VDC of Auxiliary (AUX) power.
      b. Station power repeater modules shall provide LinkPower for 30 stations and1.5A@24VDC of Auxiliary (AUX) power.
      c. Station power module shall support over-current/short protection for LinkPower and Aux. LinkPower shall support fault detection on each leg of the balanced data bus.
   5. All control wire connections shall be terminated via factory provided connectors.

D. Thermal

1. Ambient room temperature: 0-40°C / 32-104°F
2. Ambient humidity: 10-90% non-condensing

4.2 CONTROL PROCESSOR MODULES

A. The Architectural Control Processor shall be the Unison Paradigm P-ACP Series Control Processor as manufactured by Electronic Theatre Controls, Inc., or equal.

B. The Architectural Control Processor (ACP) assembly shall be designed for use in DRd Series Dimming Enclosures and ERn Series Control Enclosures.

C. The processor shall utilize microprocessor based, solid state technology to provide multi-scene lighting and building control.

D. ACP shall support functions such as station programming, macro sequencing, electronic lockout, room combine and astronomical time clock events. ACP station processor shall allow configuration of the control system via the menus. See software section for additional system details.

E. When used in a dimming enclosure, the ACP shall allow access to dimming control menus including the status screen, dimming configuration screen, backup menu, test menu and configuration menu.

F. One ACP shall be rated to drive 1024 channels of control, 1024 zones, 64 rooms, 512 presets, 63 button or button/fader stations and 6 Touchscreen Stations

G. ACP module electronics shall be convection cooled.

H. The ACP shall provide front-panel RJ45 jack, Secure Digital (SD) card slot, and Universal Serial Bus (USB) Port for configuration and data exchange.
   1. Architectural Lighting System configuration and program information shall be stored in flash memory, which does not require battery backup.
   2. The ACP shall be contained in a plug-in assembly and require no discrete wiring connections; all wiring shall be terminated into Dimming or Control Enclosure.

I. The ACP shall support the following communications:
   1. Echelon LinkPower
   2. 10/100BaseTX, auto MDI/MDIX, 802.3af compliant Ethernet networking with TCP/IP, ESTA BSR E1.17 Advanced Control Networks (ACN) and ESTA BSR E1.31 (sACN) Protocols
   3. EIA-232 serial protocol
   4. ESTA DMX512A, configurable as input or output ports
   5. Dry contact closure inputs
   6. Dry contact closure outputs, rated at 1A@30VDC

4.3 STATION PROCESSOR MODULES

A. The Station Power Module shall be the Unison Paradigm P-SPM-E Series Station Power Module as manufactured by Electronic Theatre Controls, Inc., or equal.
   1. The Station Power Module (SPM) assembly shall be designed for use in DRd Series or ERn Rack Enclosures.
   2. The SPM shall convert input power into low-voltage (Class II) power with data line and a secondary auxiliary low-voltage line to energize button, button/fader, touchscreen, and interface devices for multi-scene lighting and building control.

B. The SPM, in conjunction with a matching Architectural Control Processor (ACP), shall support Echelon LinkPower communications with remote devices, including button, button/fader, touchscreen and interface stations, and shall interoperate with LonMARK-approved third-party devices.

C. The LinkPower network shall utilize polarity-independent, low-voltage Class II twisted pair wiring, type Belden 8471 (unshielded) or Belden 8719 (shielded) or equivalent. One # 14 AWG drain wire will be required for system not using grounded metal conduit.
   1. The LinkPower network shall be topology free. Network wiring may be bus, loop, home run, star or any combination of these.
   2. Link power wiring shall permit a total wire run of 1640 ft. (500m)
      a. Repeaters allow an additional wire run of 1640 ft. (500m)
      b. Dual-repeaters allow two additional wire runs of 1640 ft. (500m)

c. Link power wiring between stations shall not exceed 1313 ft. (400m).

D. The SPM shall support auxiliary power for certain remote devices, including touchscreen and interface stations, as required by the device.
   1. The auxiliary power network shall utilize polarity-dependent, low-voltage Class II wiring, consisting of two # 16 AWG wires.
   2. Auxiliary wiring shall permit a total wire run of 1640 ft. (500m)
   3. Repeaters allow an additional wire run of 1640 ft. (500m)
   4. Dual-repeaters allow two additional wire runs of 1640 ft. (500m)
   5. The SPM shall supply 1.25 amps at 24v DC continuously.

E. ACP module electronics shall be convection cooled.

F. Each SPM shall:
   1. Supply power for up to 63 button and button/fader stations.
   2. Supply auxiliary power for a similar number of interface stations.
   3. Shall supply auxiliary power for up to four Touchscreen stations, when a like number of other stations are deducted from the total.

G. Repeaters and dual-repeaters allow two additional Touchscreens (six total) when a like number of other stations are deducted from the total

4.4 TOUCHSCREEN CONTROL STATIONS

A. The Touchscreen Control Stations shall be the Unison Paradigm Touchscreen P-TS7 Series Control Stations as manufactured by ETC, Inc., or equal.

B. General
   1. Touchscreen stations shall support default and fully graphical control pages.
   2. The Touchscreen station shall operate using graphic buttons, faders and other images on at least 30 separate programmable control pages.
   3. Touchscreen stations shall also allow programming of page pass-code, lock out and visibility levels.

C. Mechanical
   1. Touchscreen stations shall consist of a seven inch, backlit liquid crystal display (LCD) with a minimum resolution of 800 by 400 pixels and 24-bit color depth with a capacitive touch interface.
   2. Touchscreen bezels shall be constructed of cast aluminum finished in a fine texture powder coat.
      a. Touchscreen shall be available in five standard colors
         1) Cream (RAL 9001)
         2) Ivory (RAL 1015)
         3) Gray (RAL 7001)
         4) Black (RAL 9004)
         5) Signal White (RAL 9003)
      b. The bezel shall have no visible means of attachment.
      c. The bezel shall allow the touchscreen to be installed and removed without the use of tools.
      d. The bezel shall provide two working positions for the Touchscreen: service and normal operation.
   3. Touchscreen shall offer optional hinged locking covers
      a. Locking covers shall be made from cast aluminum and be painted to match standard touchscreen color options
      b. Locking covers shall allow for viewing of system status on the touchscreen though a smoked Lexan window
   4. The manufacturer shall provide back boxes for all LCD stations.
      a. Flush back box for Touchscreens with or without locking covers shall be 7.94” wide x 5.33” high x 3.25” deep
      b. Surface back box dimensions shall be 8.3” wide x 5.6” high x 2.75” deep
      c. Surface back box for Touchscreens with locking cover dimensions shall be 10.0” wide x 6.7” high x 2.75” deep

D. Electrical

1. Touchscreens shall be powered entirely by the System network.
2. Touchscreens shall connect to the System using an Ethernet network with Power over Ethernet (PoE) or the Unison control station Echelon® Link power network.
    a. Ethernet Network
        1) Ethernet network shall be 10/100BaseTX, auto MDI/MDIX, 802.3af (PoE) compliant.
        2) Network shall utilize Unshielded Twisted Pair (UTP) Category 5, or better wiring.
        3) PoE power consumption shall be PoE class 2, consuming no more than 6 watts.
    b. Echelon® Link power network.
        1) Link power shall utilize low-voltage Class II unshielded twisted pair, type Belden 8471 or equivalent, and one #14 ESD drain wire (when not installed in grounded metal conduit).
        2) Touchscreen stations shall also require (2) #16 AWG stranded wires for 24Vdc operating power. 24Vdc wiring shall be topology free.
        3) Network wiring may be bus, loop, home run, star or any combination of these.
        4) Network insulation displacement connectors shall be provided with all stations.

E. Functional
1. System
    a. The Touchscreen shall support configuration firmware upload from a Paradigm Processor as proxy
    b. The Touchscreen shall support configuration or firmware upload from local removable media
2. Setup Mode
    a. There shall be a setup display that is separate from any user-defined configuration
    b. It shall be possible to view and modify connectivity settings
    c. It shall be possible to view status information
    d. It shall be possible to view and modify LCD screen settings
    e. It shall be possible to perform Touchscreen calibration
    f. It shall be possible to view and modify audio settings
    g. The appearance of the setup display shall be standard and not editable
    h. The setup display may be invoked from within the user-defined configuration and/or physical button on the Touchscreen
    i. There shall be a default protected method to invoke the setup display
3. Configurations
    a. It shall be possible to have multiple configurations stored within an LCD Station
    b. Where multiple configurations are stored there shall be a boot menu to allow selection of a configuration
4. Operation
    a. The Unison Paradigm Control System shall be designed to allow control of lighting and associated systems via Touchscreen controls. System shall allow the control of presets, sequences, macros and time clock events.
        1) System presets shall be programmable via Button, Button/Fader, Touchscreen, or LightDesigner software.
            a) Presets shall have a discrete fade time, programmable from zero to 84,600 seconds with a resolution of one hundred milliseconds.
            b) Presets shall be selectable via Touchscreen stations.
        2) System macros and sequences shall be programmable via LightDesigner system software.
            a) Macro and sequence steps shall provide user selectable steps, and allow the application of conditional logic.
            b) Macro and sequences shall be activated by button, time clock event or LightDesigner software.

3) System time clock events shall be programmable via the Touchscreen, LightDesigner system software, the processor user interface, or the internal web server.
   a) Time clock events shall be assigned to system day types. Standard day types include: anyway, weekday, weekend, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday. System shall support programming of additional custom or special day types.
   b) Time clock events shall be activated based on sunrise, sunset, time of day or periodic event. System shall automatically compensate for regions using a fully configurable daylight saving time.
4) A Color picker, supporting Hue, Saturation and Brightness (HSB) color selection shall be available for color selection of color changing fixtures and provide visual feedback of the current color produced by the associated fixture.
   a) The color picker shall be provided with a default layout that requires no user configuration
   b) The Color Picker shall provide RGB faders in addition to the default HSB color wheel for color selection
   c) Color picker values shall allow for numerical value input in addition to color wheel and fader control
   d) The color picker shall be compatible with color mixing systems that use up to seven discrete color control channels

b. Touchscreen stations shall be designed to operate standard default or custom system functions. Components shall operate default functions unless re-assigned via LightDesigner, the Windows-based configuration program.
   1) Optional button functions include: preset selection, manual mode activation, record mode activation, station lockout, raise, lower, macro activation, and cue light, or room join/separate.
   2) Optional fader functions include master control, individual channel control, fade rate control or preset master control.

c. Touchscreen stations shall allow programming of station and component electronic lockout levels via LightDesigner.

d. It shall be possible to adjust LCD contrast and brightness.

e. It shall be possible to program the station to dim during periods of inactivity

4.5 PORTABLE TOUCHSCREEN CONTROL STATIONS

A. The Portable Touchscreen Control Stations shall be the Unison Paradigm Portable Touchscreen P-TS7-P/PE Series Control Stations as manufactured by ETC Inc., or equal.

B. General
   1. Portable Touchscreen stations shall support default and fully graphical control pages.
   2. Portable Touchscreen stations shall operate using graphic buttons, faders and other images on at least 30 separate programmable control pages.
   3. Portable Touchscreen stations shall also allow programming of page pass-code, lock out and visibility levels.
   4. Portable Touchscreen station shall support connection to the System using an Ethernet network with Power over Ethernet (PoE) or the Unison control station Echelon® Link power network.
   5. Portable Touchscreen stations connected to the Unison control station Echelon® Link shall support location awareness to automatically load the configuration required dependent on the connection point to the system

C. Mechanical
   1. Portable Touchscreen stations shall consist of a seven inch, backlit liquid crystal display (LCD) with a minimum resolution of 800 by 400 pixels and 24-bit color depth with a capacitive touch interface.
   2. The Portable Touchscreen enclosure and cover shall be constructed of aluminum and finished in a black fine-texture powder coat paint

3. The enclosure shall provide a hinged cover with two positions for the Touchscreen: closed and normal operation.
4. The Portable Touchscreen shall have a protective cover for removable media ports.
5. The Echelon® Link Touchscreen shall include an attached cable with 6-pin Amphenol connector and strain relief to interface with Portable Connector Stations
    a. Attached Cable shall be 15’ in length constructed of ultra-flexible material
    b. Extension cables up to 100’ in length shall be available to extend the cable length to a maximum of 115’ total length
6. The Ethernet Network Touchscreen shall include a Neutrik Ethercon Port on the rear of the touchscreen for connection to an Ethernet Network.
    a. Unit will ship with a 10’ Ethercon to RJ-45 cable
    b. Cables with extended lengths shall be available up to 300’ in length.

D. Electrical
1. Portable Touchscreens shall be powered entirely by the System network.
2. Portable Touchscreens shall connect to the System using an Ethernet network with Power over Ethernet (PoE) or the Unison control station Echelon® Link power network.
    a. Ethernet Network
        1) Ethernet network shall be 10/100BaseTX, auto MDI/MDIX, 802.3af (PoE) compliant.
        2) Network shall utilize Unshielded Twisted Pair (UTP) Category 5, or better wiring.
        3) PoE power consumption shall be PoE Class 2, consuming no more than 6 watts.
    b. Echelon® Link power network.
        1) Link power shall utilize low-voltage Class II unshielded twisted pair, type Belden 8471 or equivalent, and one #14 ESD drain wire (when not installed in grounded metal conduit).
        2) Touchscreen stations shall also require (2) #16 AWG stranded wires for 24Vdc operating power. 24Vdc wiring shall be topology free.
        3) Network wiring may be bus, loop, home run, star or any combination of these.

E. Functional
1. System
    a. The Portable Touchscreen shall support configuration upload from a Paradigm Processor as proxy
    b. The Touchscreen shall support configuration or firmware upload from local removable media
    c. It shall be possible to connect multiple Portable Touchscreen station to the system at one time
2. Setup Mode
    a. There shall be a setup display that is separate from any user-defined configuration
    b. It shall be possible to view and modify connectivity settings
    c. It shall be possible to view status information
    d. It shall be possible to view and modify LCD screen settings
    e. It shall be possible to perform Touchscreen calibration
    f. It shall be possible to view and modify audio settings
    g. The appearance of the setup display shall be standard and not editable
    h. The setup display may be invoked from within the user-defined configuration and/or physical button on the Portable Touchscreen
    i. There shall be a default protected method to invoke the setup display
3. Configurations
    a. It shall be possible to have multiple configurations stored within an LCD Station
    b. It shall be possible for Portable Touchscreen Stations connected via the Echelon® Link power network to select a configuration automatically based on the physical connection point of the touchscreen.

c. Where multiple configurations are stored there shall be a setup menu to allow selection of a configuration.

4. Operation
   a. The Unison Paradigm Control System shall be designed to allow control of lighting and associated systems via Touchscreen controls. System shall allow the control of presets, sequences, macros and time clock events.
      1) System presets shall be programmable via Button, Button/Fader or Touchscreen stations, or LightDesigner software.
         a) Presets shall have a discrete fade time, programmable from zero to 84,600 seconds with a resolution of one hundred milliseconds.
         b) Presets shall be selectable via Touchscreen stations.
      2) System macros and sequences shall be programmable via LightDesigner system software.
         a) Macro and sequence steps shall provide user selectable steps, and allow the application of conditional logic.
         b) Macro and sequences shall be activated by button, time clock event or LightDesigner software.
      3) System time clock events shall be programmable via the Touchscreen, LightDesigner system software, the processor user interface, or the internal web server.
         a) Time clock events shall be assigned to system day types. Standard day types include: anyway, weekday, weekend, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday. System shall support programming of additional custom or special day types.
         b) Time clock events shall be activated based on sunrise, sunset, time of day or periodic event. System shall automatically compensate for regions using a fully configurable daylight saving time.
      4) A Color picker, supporting Hue, Saturation and Brightness (HSB) color selection shall be available for color selection of color changing fixtures and provide visual feedback of the current color produced by the associated fixture.
         a) The color picker shall be provided with a default layout that requires no user configuration
         b) The Color Picker shall provide RGB faders in addition to the default HSB color wheel for color selection
         c) Color picker values shall allow for numerical value input in addition to color wheel and fader control
         d) The color picker shall be compatible with color mixing systems that use up to seven discrete color control channels
   b. Portable Touchscreen stations shall be designed to operate standard default or custom system functions. Components shall operate default functions unless re-assigned via LightDesigner, the Windows-based configuration program.
      1) Optional button functions include: preset selection, manual mode activation, record mode activation, station lockout, raise, lower, macro activation, and cue light, or room join/separate.
      2) Optional fader functions include master control, individual channel control, fade rate control or preset master control.
   c. Portable Touchscreen stations shall allow programming of station and component electronic lockout levels via LightDesigner.
   d. It shall be possible to adjust LCD contrast and brightness.
   e. It shall be possible to program the station to dim during periods of inactivity.

4.6 DIGITAL BUTTON AND FADER STATIONS

A. Button and Fader Stations
   1. General

a. The control station shall be the Paradigm Inspire Station Series as manufactured by ETC, Inc., or equal
b. It shall be a remote station on a LinkConnect network that can recall presets, provide direct zone control, play macros and provide room combine actions for a control system
c. The station shall consist of a dual function (control/ record) push-button with an integral tri-color backlight for each corresponding button and fader

2. Mechanical
   a. Control stations shall operate using one, two, four, six or eight buttons. A four button with fader station shall also be available
   b. All button stations shall be available with cream, grey, black or white decorator style faceplates
      1) Manufacturer's standard colors shall conform to the RAL CLASSIC Standard
   c. Stations shall have tri-color backlights for each button and fader
      1) Indicators shall utilize a configurable color backlight for active status
      2) Indicators shall utilize a configurable color backlight for inactive status to assist in locating stations in dark environments. Stations that do not support a lit inactive or deactivated state shall not be accepted
      3) Stations shall support an off backlight state of inactive status when required
   d. All faceplates shall be designed for flush or surface mounting and have no visible means of attachment
   e. Station faceplates shall be constructed of ABS plastic and designed based on a standard decorator style faceplate.
   f. Buttons shall be indelibly laser marked for each button function
   g. Control station electronics shall mount directly behind the faceplate. The entire assembly shall mount into a single gang back box. Back boxes for flush mounted stations shall be industry standard back boxes. The manufacturer shall supply back boxes for surface mounted stations.
3. Electrical
   a. Control station wiring shall be LinkConnect control wiring utilizing low-voltage, Class II unshielded twisted pair, type Belden 8471 or equivalent, and one #14 ESD drain wire (when not installed in grounded metal conduit).
   b. The station shall operate on class 2 voltage provided by the control system via the LinkConnect network.
   c. Station wiring must be topology free. It may be point-to-point, bus, loop, home run or any combination of these.
   d. Wiring termination connectors shall be provided with all stations.
   e. Control stations shall be UL/ cUL listed and CE marked and meet WEEE Compliance
4. Functional
   a. The Control System shall be designed to allow control of lighting and associated systems via Button and Fader controls.
      1) System presets shall be programmable via LightDesigner configuration software.
         a) Presets shall have a discrete fade time, programmable from zero to 1,000 hours with a resolution of one millisecond.
      2) System macros and sequences shall be programmable via LightDesigner configuration software.
         a) Macro and sequence steps shall provide user selectable steps, and allow the application of conditional logic.
         b) Macro and sequences shall be activated by button, time clock event or LightDesigner software.
   b. Control components shall be designed to operate default or custom system functions. Components shall operate default functions unless re-assigned via LightDesigner, the software-based configuration program.

1) Optional button functions include: preset selection, manual mode activation, record mode activation, station lockout, raise, lower, macro activation, or room join/separate.
2) Optional fader functions include manual master control, individual zone control, color control fade rate control or preset master control.
3) Stations (Button and Button/Fader) shall allow programming of station and component electronic lockout levels via LightDesigner.

4.7 DATA PLUG-IN STATIONS

A. General
1. The Plug-in Stations shall consist of the appropriate connectors required for the functional intent of the system. These stations shall be available with DMX input or output, Remote Focus Unit, Network, or architectural control connectors. Custom control connectors shall be available.

B. Connector Options
1. The following standard components shall be available for Plug-in Stations:
   a. 5-Pin male XLR connectors for DMX input
   b. 5-Pin female XLR connectors for DMX output
   c. 6-Pin female XLR connectors for RFU and ETCLink connections
   d. RJ45 connectors for Network connections - Twisted Pair
   e. 6-Pin female DIN connectors for Unison connections
   f. DB9 female serial connector for architectural control from a computer
2. Custom combinations and custom control connections shall be available.

C. Physical
1. Station faceplates shall be .80” aluminum, finished in fine texture, scratch-resistant black powder coat. Silk-screened graphics shall be white.
2. The station panel shall mount into an industry standard back box, depending on size and quantity of connectors. A terminal block shall be supplied for contractor terminations.

4.8 DMX ETHERNET GATEWAY – FOUR PORT

A. General
1. The lighting control gateway shall be a microprocessor-based unit specifically designed to provide DMX-512 control of lighting systems and transport of RDM configuration and status messages. The gateway shall permit DMX-512 data to be encoded, routed over an Ethernet network and decoded back to DMX-512. The unit shall be a Response Mk2 4-port DMX Gateway as provided by ETC, Inc.
2. Gateways shall communicate over Ethernet directly with at least ETC, Inc.’s entertainment and architectural lighting control products and other Ethernet interfaces.
3. Connections shall be made between gateways, consoles, architectural systems, and PCs over standard Ethernet distribution systems using 10/100BaseT.
4. The gateway shall support multiple protocols including:
   a. ANSI E1.17 Architecture for Control Networks (ACN)
   b. ANSI E1.31 Streaming ACN (sACN)
   c. ANSI E1.11 USITT DMX512-A
   d. ANSI E1.20 Remote Device Management (RDM)
5. The gateway shall be tested to UL standards and labeled ETL Listed.
6. The gateway shall be RoHS Compliant (lead-free).
7. The gateway shall be CE compliant.
8. The gateway shall have a graphic OLED display and four buttons for identification (soft-labeling), configuration, status reporting and troubleshooting
   a. Labeling shall be user configurable using ANSI E1.17 Architecture for Control Network (ACN), or a purpose built software configuration tool.
   b. The OLED display shall show DMX port configuration indication as well as indicate the presence of valid signal.
   c. Gateways that do not indicate port configuration (input/output) and valid data shall not be acceptable.

9. Each gateway shall have power and data activity LEDs on the front of the gateway

B. DMX Ports
   1. DMX Ports shall comply with the requirements of ANSI E1.11 USITT DMX512-A standards.
   2. Each DMX port shall be software or locally-configurable for either input or output functionality.
   3. DMX input shall be optically-isolated from the gateway electronics.
   4. DMX Port shall provide at least 500V isolation to ground and the rest of the electronics
   5. Each port shall incorporate one DMX512-A Connection
      a. Gateways shall be available with the following connection options: 5-pin male XLR, 5-pin female XLR, Ethercon RJ-45, or terminal strip for DMX wiring.
   6. Network gateways that do not indicate input/ output port configuration or presence of valid data shall not be accepted

C. Processor
   1. Each gateway shall have sufficient processing power to manage up to 63,999 universes (32,767,488 addresses).
   2. Maximum delay time from input to output shall not be greater than one packet time (approximately 22 mSec.).
   3. A minimum DMX update rate of 40Hz shall be sustained under all conditions unless specifically configured for a slower rate for the sake of compatibility with 3rd party DMX devices.

D. Mechanical
   1. The Gateway shall be fabricated of 16-gauge steel, finished in fine-texture, scratch-resistant, black powder coat (RAL 9004).
   2. The gateway shall support table top use
   3. The gateway shall support field configuration allowing the Ethernet port to be either on the front or the rear of the unit
   4. Optional accessories for rack-mount and pipe applications shall be available from the manufacturer. These accessories shall support installation by an end-user

E. Power
   1. Power for the gateway shall be provided over the Category 5 (or better) cable, utilizing IEEE 802.3af compliant Power over Ethernet (PoE). Power consumption using shall not be greater than 7 watts.
   2. An optional low-voltage DC power input shall be available utilizing an isolated in-line power supply capable of an operating range of 12-24VDC. The Power supply shall be provided by the gateway manufacturer.
   3. The gateway electronics shall be electrically isolated from the power supplied over the Category 5 (or better) cable.

F. Configuration
   1. The Gateway must support local or remote configuration.
   2. Each gateway on the network shall be individually configurable using freely available software configuration tools. The primary configuration tool shall be Net3 Concert configuration software running on a network connected PC. The PC shall only be required for configuration, and shall not be required for normal operation of the system.
   3. Each port of the DMX gateway shall control up to 512 DMX addresses, within the confines of 63,999 universes.
   4. The specific DMX data input or output by the gateway shall be freely configurable by the user.
   5. Duplicate outputs of DMX lines (DMX splitter) and discrete outputs shall be fully supported.
   6. Multiple DMX universes may be configured with any length up to 512 total addresses. Any range of DMX input addresses shall support selection and routing to the specified sACN output.
   7. Multiple sACN sources may be combined with a priority may be assigned to each source sending data to the gateway

8. All relevant routing information shall be stored in non-volatile memory at each gateway. The system shall recover from a power outage without requiring the PC to be online. Gateways that do not support non-volatile storage of data routing shall not be accepted.

G. Network
1. Communications physical layer shall comply with IEEE 802.3i for 10BASE-T, 802.3u for 100BASE-TX and 802.3af for Power over Ethernet specifications.
2. All network cabling shall be Category 5 (or better), conforming to TIA-568A/B, and shall be installed by a qualified network installer.
3. Data transport shall utilize the TCP/IP suite of protocols to transfer the DMX data.
4. ANSI E1.17 Architecture for Control Networks (ACN) and streaming ACN (sACN) shall be supported. Gateways that do not support ANSI E1.17 shall not be acceptable.
5. Each DMX gateway shall control up to 512 DMX addresses, per DMX port within the confines of up to 63,999 universes (32,767,488 addresses) using Streaming ACN (sACN).
    a. Any range of DMX addresses may be selected for each universe.
    b. Multiple sources shall be supported by prioritized Highest Takes Precedence (HTP with priority). Each source shall support assignment of priority to allow override of default HTP behavior.
    c. Each DMX port shall support its own universe and start address.
6. Gateways shall have built in DMX merger capability on a universe or channel-by-channel basis.
7. Gateways shall support have built in priority on a per-universe or channel-by-channel basis. Gateways that do not support prioritized merging of multiple network sources at independent priorities shall not be accepted.

H. Environmental
1. The ambient operating temperature shall be 0° to 40°C (32° to 104°F).
2. The storage temperature shall be -40° to 70°C (-40° to 158°F).
3. The operating humidity shall be 5% - 95% non-condensing.

I. Accessories
1. Hanging bracket kit shall allow unit to be mounted in three orientations.
2. U-Bolt or C-Clamp mounting hardware shall be available
3. One E.I.A. rack space mounting bracket kit shall support either one or two complete units and allow for up to eight ports of DMX
4. Front Access Panel kit shall allow the connectors on the rear of the gateway to be accessed from the front of an equipment rack. Options for 5-pin XLR style connectors that support DMX input or output shall be available
5. A Universal Power Supply with international plug-set shall be available. Multiple power supplies shall be able to fit in a vertically stacked power strip.
6. ETC Net3 Concert Configuration and monitoring Software

J. System Requirements
1. Provide the quantity and type of gateways required, as scheduled. Gateways and software shall be as manufactured by ETC Inc. of Middleton, WI.

4.9 277VAC INTELLIGENT BREAKER SYSTEM

A. General
1. Intelligent breaker system shall be Sensor IQ-277V as manufactured by ETC, Inc., or equal
2. Breaker Panels shall be UL508, UL67, and UL924 Listed, and shall be so labeled when delivered
3. Breakers shall be UL489 listed and shall be labeled when delivered
4. Breaker Panels shall consist of a main enclosure with 12, 24, or 48 pole breaker subpanels, integral control electronics for low voltage terminations and provision for accessory cards
    a. Up to two accessory cards shall be supported per breaker panel

B. Mechanical

1. The panel shall be constructed of 16-gauge galvannealed steel. All panel components shall be properly treated or finished in fine-textured, scratch resistant paint
2. 240/277V breaker panels shall be capable of being mounted on the surface of a wall or recessed mounted
3. Breaker panels shall be available in 12, 24, and 48 pole configurations
    a. 12 pole (with provision to add main breaker)
        1) 49.00” high, 20.00” wide and 5.11” deep (with front panel attached)
    b. 24 pole (with provision to add main breaker)
        1) 55.00” inches high, 20.00” wide and 5.11” deep (with front panel attached)
    c. 48 pole (with provision to add main breaker)
        1) 73.00” high, 20.00” wide and 5.11” deep (with front panel attached)
4. Choice of panel covers shall be available for surface or recess mount applications. This outer panel shall ship complete with a locking door to limit access to electronics and breakers
    a. Optional center-pin reject security screws shall be available for all accessible screws
    b. Optional recess mount doors shall extend 1” beyond all panel edges to hide wall cut-out
5. The unit shall provide interior cover over the control electronics and accessory cards to allow access only to class 2 wiring and prevent direct access to class 1 line voltage components
6. The panel shall support up to twelve, twenty-four, or 48 single pole branch circuits
    a. Branch circuits shall range from 15A to 30A capable of holding full rated load for minimum of three hours continuously
7. Breakers shall provide manual switching control while power is unavailable to the panel such that critical lighting can be set to an on state, without the need for power to the panel
8. Breaker output lugs shall accept 10-14 AWG dual conductor wire
9. Breaker output lug shall support solid or stranded 6-14 AWG class B, C, or K copper wire
10. Control wiring for DMX, station bus, and Emergency input terminations shall land on a removable headers for contractor installation

C. User Interface
1. The user interface shall contain an LCD display with button pad to include 0-9 number entry, up, down back arrow navigation and enter
2. Test shortcut button shall be available for local activation of preset, sequence and set level overrides
3. The user interface shall have a power status LED indicator (Blue), a DMX status LED indicator (Green), a network status LED indicator (Green) and an LED indicator (red) for errors
4. Interface shall allow the backlight to timeout and shall provide user editable options to shut off backlight completely as well as adjust screen contrast
5. Ethernet interface shall default to automatic IP through link local and DHCP. Upon receiving IP address, the address of the Network Interface Card (NIC) shall display in the about menu. Static address and settings shall also be possible
6. The control interface shall support a USB memory stick interface for uploads of configurations and software updates
7. The user interface shall support power input from an external Uninterruptible Power Supply (UPS) supplying 800W-2400W AC power

D. Functional
1. Panel setup shall be user programmable. The control interface shall provide the following breaker setup features (per circuit):
    a. Type (1 pole, 2 pole, or 3 pole)
    b. Name
    c. Circuit Number
    d. DMX address
    e. sACN address

f. Space Number
g. Circuit Modes
    1) Normal (priority and HTP based activation and dimming)
    2) Latch-lock
    3) Fluorescent
    4) DALI
h. On threshold level
i. Off threshold level
j. Include in UL924 emergency activation
k. Allow Manual

2. Breaker panels shall support discrete addressing of each breaker. Panels that are restricted to use of start address with sequential addressing, and cannot assign each 0-10V output control to any internal circuit shall not be acceptable
3. The panel shall be capable of switching 6 poles on or off at once, or in a user-selectable delay per breaker using a period of 0.1 to 60 seconds, in 0.1 second increments
4. An Ethernet connection shall provide advanced control of relays over streaming ACN (sACN) and transmit status, control override, and measured energy usage per branch circuit via an internal Web UI or central monitoring interface
    a. Control electronics shall report the following information per branch circuit.
        1) Breaker state (On/Off)
        2) Breaker state (Open/Closed)
        3) Current draw (In Amps)
        4) Voltage
        5) Energy usage
    b. Panels that do not report this information shall not be acceptable.
5. Built-in Control shall include:
    a. Ability to record up to 16 presets in each space from the control panel, connected control stations, or timed events
    b. Presets shall be programmable by recording current levels (as set by DMX or connected control stations), by entering levels on the control panel directly, manually selecting breaker state on each breaker, or a combination of these methods. From the control panel, stations, or timed events it shall be possible to record values for up to 16 zones per space
    c. Up to 8 spaces in a single rack for total of up to 16 spaces shall be supported per system or system subnet
    d. Indication of an active preset shall be visible on the control panel display
    e. One 16-step sequence per space for power up and power down routines
    f. The panel shall have a UL924-listed contact input for use in Emergency Lighting systems. The panel shall respond to the contact input by setting included breakers to “on”, while setting non-emergency breakers “off”. Each breaker can be selected for activation upon contact input
    g. Upon Data loss the system shall provide options to hold last look infinitely or hold for a configured time period set by the installing technician then fade/switch to the input of the next available priority
    h. Control electronics shall respond directly to control stations for zone, preset, and sequence control. Systems that require secondary control systems for this functionality are not acceptable
    i. After power loss, electronics shall be capable of holding the system in its previous state until new level data (DMX, architectural presets, sequences and zones, or local overrides) is received to make each breaker change state
6. The control of lighting and associated systems via timed and Astronomical clock controls
    a. The breaker panel shall allow the activation of presets, sequence, and zone programming of up to 50 time clock events via a built in real and astronomical time clock
    b. System time events shall be programmable via the control panel

1) Time clock events shall be assigned to system day types. Standard day types include: everyday, weekday, weekend, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday
2) Time clock events shall be activated based on sunrise, sunset, time of day or periodic event
3) System shall automatically compensate for regions using a fully configurable daylight saving time
4) Presets shall be assigned to events at the time clock

c. The time clock shall support event override
1) It shall be possible to override the timed event schedule form the face panel of the time clock

d. The time clock shall support timed event hold
1) It shall be possible to hold a timed event from the face panel of the processor
2) Timed event hold shall meet California Title 24 requirements

7. The panel shall receive ESTA DMX512-A control protocol. Addressing shall be set via the user interface button keypad with any circuit patched to any DMX control address
a. 2,500V of optical isolation shall be provided between the DMX512 inputs and the control electronics as well as between control and power components
b. The breakers shall respond to control changes (DMX or Stations) in less than 25 milliseconds. DMX512 update speed shall be 40Hz
c. Setting changes shall be able to be made across all, some, or just one selected breaker in a single action from the face panel
d. DMX data loss shall allow for levels/breakers to be held for ever or for a specified time before switching to a lower priority source
e. Initial Panel setup
1) The breaker panel shall automatically detect the type of breaker or dimmer installed in each location without need for manual configuration of the physical arrangement
2) Quick rack setup shall be available to apply address settings across all circuits for rack number, DMX Start Address, sACN universe, and sACN start address
3) Emergency Setup Menu shall provide optional delays when emergency is activated or deactivated, and option to turn off non-emergency circuits shall be available. Record function shall allow circuits that are turned on to be added to the emergency setting

E. Electrical
1. Breaker Panels shall be available to support power input from:
a. 277/480V, 230/400V and 240/415V three phase. 4-wire plus ground
2. Conduit Entry:
a. Feeders:
1) Top or upper 6” of either side
2) Bottom or lower 6” of either side
3) Feeders shall enter through the top or bottom according to the orientation of the enclosure
4) Feeder entry shall be nearest to the location of the feeder lugs or main breaker

b. Load:
1) Load wiring shall enter through the top or bottom of the enclosure through the surface nearest to the breaker sub panel
2) Load wiring may also enter through left and/or right side provided a low voltage chase is not required through the same area. If class 2 chase is required, a field installable barrier panel shall be provided upon request. The side of the panel where the barrier has been installed shall not permit load wiring

c. Low Voltage:

1) Top or upper 6” of either side
2) Bottom or lower 6” of either side
3) For low voltage conduit entry at the breaker end of the cabinet, conduits shall be located at the outer 3” of the top/bottom panel

3. Breaker
   a. Bus connection type: Stab on
   b. Single pole
   c. UL489 listed
   d. 15 amp, 20 amp, or 30 amp
   e. 14,000 SCCR (15A, 20A), 10,000 SCCR (30A); 65,000A series rated with main fuse kit. Manufacturer to provide fuses or series rate with upstream fuses noted on one-line as required to meet specified interrupting rating requirements.
   f. High inrush trip curve (matches all Sensor breakers)
   g. Maintains trip curve through entire thermal range
   h. Guaranteed not to trip at full load
   i. Load lugs accept 6-14awg load wiring
   j. Multi-conductor listed output terminal
   k. Integral mechanically held air gap relay
   l. Manual control of relay state using breaker handle w/o power
   m. Integral current sensing
   n. Integral position and trip sensing
   o. Control and status provided by contact pads directly at bottom of the breaker case
   p. No external wires or connections required for control or feedback
   q. The breaker shall be capable of switching up to 30A
4. The breaker panel
   a. The breaker panel, U.O.N on drawings, shall support a maximum feed size
      1) 100 Amps at 12 circuits
      2) 200 Amps at 24 circuits
      3) 400 Amps at 48 circuits
   b. Breaker panels shall support a main fuse option
   c. Series SCCR ratings apply as follows with appropriate upstream fuse:
      1) 65,000 Amps at 240/277V
   d. Breaker panels shall support main circuit breaker options as a convenience disconnect
   e. Main breaker options shall be optional and available for purchase upon request
   f. Main breakers shall be field installable
   g. Main breakers shall be available in up to 100 Amps for 12 circuit panels, up to 200 Amps for 24 circuit panels, and up to 400 Amps for 48 circuit panels at 240/277V
   h. Main breakers shall allow the following range of wire sizes:
      1) Up to 300kcmil at 100A and 200A
      2) Up to 2x250kcmil at 400A
   i. Main Lug input shall support up to 2x250kcmil
   j. Breaker panel shall support a 500kcmil main lug option for 48-circuit panels

F. Breaker remote switching ratings
1. Mechanical 1,000,000 cycles
2. 24A Resistive 100,000 cycles
3. 16A Ballast (HID) 75,000 cycles
4. 15A Electronic (LED) 100,000 cycles
5. 15A Tungsten 45,000 cycles
6. 30FLA; 180 LRA Motor Load 50,000 cycles
7. Tested duty cycle: 12 operations (6 cycles) per minute
8. Decreasing duty cycle significantly increases switch life
9. Isolation: 4000V RMS
10. Current reporting accuracy: 5%
11. Latching state mechanical relay

G. Breaker Panel Accessories

1. A low voltage 0-10V dimming option shall provide up to 24 0-10v control outputs that are linked to relay circuits within the panel. Each output shall support up to 400mA of current sink per output
2. A contact input option shall provide 24 dry contact inputs to be linked for direct or group relay control, to activate a preset, or to activate a sequence. Controller software shall allow for normally open maintained, normally closed maintained, or momentary toggle
3. A DALI control option shall provide 24 control loops of broadcast DALI control, with each loop controlling up to 64 DALI devices
4. A RideThru option shall provide short-term power backup of control electronics by automatically engaging when power is lost, and recharging when normal power is present
5. An Isolated Ground Option shall provide each circuit in the panel with a ground terminal that is electrically isolated from the equipment ground.
6. Main Fuse and Breaker options shall be available as shown in Section E.4

H. Thermal
1. The panel shall be convection cooled. Panels that require the use of cooling fans shall not be acceptable
2. The panel shall operate safely in an environment having an ambient temperature between 32ºF (0ºC) and 104ºF (40°C), and humidity between 5-95% (non-condensing)

4.10 INTELLIGENT BREAKER SYSTEM

A. General
1. Intelligent breaker system shall be 120V Sensor IQ as manufactured by ETC, Inc., or equal
2. Breaker Panels shall be UL508, UL67, and UL924 Listed, and shall be so labeled when delivered
3. Breakers shall be UL489 listed and shall be labeled when delivered
4. Breaker Panels shall consist of a main enclosure with 12, 24, or 48 pole breaker subpanels, integral control electronics for low voltage terminations and provision for accessory cards
    a. Up to two accessory cards shall be supported per breaker panel

B. Mechanical
1. The panel shall be constructed of 16-gauge galvannealed steel. All panel components shall be properly treated or finished in fine-textured, scratch resistant paint
2. Breaker panels shall be capable of being mounted on the surface of a wall or recessed mounted
3. Breaker panels shall be available in 12, 24, and 48 pole configurations
    a. 12 pole MLO (No provision for main Breaker)
        1) 31 inches high, 14.25” wide and 4” deep (with front panel attached)
    b. 12 pole (with provision to add main breaker)
        1) 40.25 inches high, 14.25” wide and 4” deep (with front panel attached)
    c. 24 pole (with provision to add main breaker)
        1) 50.25 inches high, 14.25” wide and 4” deep (with front panel attached)
    d. 48 pole (with provision to add main breaker)
        1) 64 inches high, 20” wide and 5.25” deep (with front panel attached)
4. Choice of panel covers shall be available for surface or recess mount applications. This outer panel shall ship complete with a locking door to limit access to electronics and breakers
    a. Optional center-pin reject security screws shall be available for all accessible screws
    b. Optional recess mount doors shall extend 1” beyond all panel edges to hide wall cut-out
5. The unit shall provide interior cover over the control electronics and accessory cards to allow access only to class 2 wiring and prevent direct access to class 1 line voltage components
6. The panel shall support up to twelve, twenty-four, or 48 single pole branch circuits

a. Branch circuits shall range from 15A to 30A capable of holding full rated load for minimum of three hours continuously
b. Two and three-pole circuits shall be supported at decreased density where each pole constitutes one of the available single-pole circuits. Mixing of circuits in any combination shall be supported

7. Breakers shall provide manual switching control while power is unavailable to the panel such that critical lighting can be set to an on state, without the need for power to the panel
8. Breaker output lugs shall accept 10-14 AWG dual conductor wire
9. Breaker output lug shall support solid or stranded 6-14 AWG class B, C, or K copper wire
10. Control wiring for DMX, station bus, and Emergency input terminations shall land on a removable headers for contractor installation

C. User Interface
1. The user interface shall contain an LCD display with button pad to include 0-9 number entry, up, down back arrow navigation and enter
2. Test shortcut button shall be available for local activation of preset, sequence and set level overrides
3. The user interface shall have a power status LED indicator (Blue), a DMX status LED indicator (Green), a network status LED indicator (Green) and an LED indicator (red) for errors
4. Interface shall allow the backlight to timeout and shall provide user editable options to shut off backlight completely as well as adjust screen contrast
5. Ethernet interface shall default to automatic IP through link local and DHCP. Upon receiving IP address, the address of the Network Interface Card (NIC) shall display in the about menu. Static address and settings shall also be possible
6. The control interface shall support a USB memory stick interface for uploads of configurations and software updates
7. The user interface shall support power input from an external Uninterruptible Power Supply (UPS) supplying 800W-2400W AC power

D. Functional
1. Panel setup shall be user programmable. The control interface shall provide the following breaker setup features (per circuit):
a. Type (1 pole, 2 pole, or 3 pole)
b. Name
c. Circuit Number
d. DMX address
e. sACN address
f. Space Number
g. Circuit Modes
1) Normal (priority and HTP based activation and dimming)
2) Latch-lock
3) Fluorescent
4) DALI
h. On threshold level
i. Off threshold level
j. Include in UL924 emergency activation
k. Allow Manual
2. Breaker panels shall support discrete addressing of each breaker. Panels that are restricted to use of start address with sequential addressing, and cannot assign each 0-10V output control to any internal circuit shall not be acceptable
3. The panel shall be capable of switching 6 poles on or off at once, or in a user-selectable delay per breaker using a period of 0.1 to 60 seconds, in 0.1 second increments
4. An Ethernet connection shall provide advanced control of relays over streaming ACN (sACN) and transmit status, control override, and measured energy usage per branch circuit via an internal Web UI or central monitoring interface
a. Control electronics shall report the following information per branch circuit.

1) Breaker state (On/Off)
2) Breaker state (Open/Closed)
3) Current draw (In Amps)
4) Voltage
5) Energy usage

b. Panels that do not report this information shall not be acceptable.

5. Built-in Control shall include:
   a. Ability to record up to 16 presets in each space from the control panel, connected control stations, or timed events
   b. Presets shall be programmable by recording current levels (as set by DMX or connected control stations), by entering levels on the control panel directly, manually selecting breaker state on each breaker, or a combination of these methods. From the control panel, stations, or timed events it shall be possible to record values for up to 16 zones per space
   c. Up to 8 spaces in a single rack for total of up to 16 spaces shall be supported per system or system subnet
   d. Indication of an active preset shall be visible on the control panel display
   e. One 16-step sequence per space for power up and power down routines
   f. The panel shall have a UL924-listed contact input for use in Emergency Lighting systems. The panel shall respond to the contact input by setting included breakers to “on”, while setting non-emergency breakers “off”. Each breaker can be selected for activation upon contact input
   g. Upon Data loss the system shall provide options to hold last look infinitely or hold for a configured time period set by the installing technician then fade/switch to the input of the next available priority
   h. Control electronics shall respond directly to control stations for zone, preset, and sequence control. Systems that require secondary control systems for this functionality are not acceptable
   i. After power loss, electronics shall be capable of holding the system in its previous state until new level data (DMX, architectural presets, sequences and zones, or local overrides) is received to make each breaker change state
6. The control of lighting and associated systems via timed and Astronomical clock controls
   a. The breaker panel shall allow the activation of presets, sequence, and zone programming of up to 50 time clock events via a built in real and astronomical time clock
   b. System time events shall be programmable via the control panel
      1) Time clock events shall be assigned to system day types. Standard day types include: everyday, weekday, weekend, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday
      2) Time clock events shall be activated based on sunrise, sunset, time of day or periodic event
      3) System shall automatically compensate for regions using a fully configurable daylight saving time
      4) Presets shall be assigned to events at the time clock
   c. The time clock shall support event override
      1) It shall be possible to override the timed event schedule form the face panel of the time clock
   d. The time clock shall support timed event hold
      1) It shall be possible to hold a timed event from the face panel of the processor
      2) Timed event hold shall meet California Title 24 requirements
7. The panel shall receive ESTA DMX512-A control protocol. Addressing shall be set via the user interface button keypad with any circuit patched to any DMX control address
   a. 2,500V of optical isolation shall be provided between the DMX512 inputs and the control electronics as well as between control and power components

b. The breakers shall respond to control changes (DMX or Stations) in less than 25 milliseconds. DMX512 update speed shall be 40Hz
c. Setting changes shall be able to be made across all, some, or just one selected breaker in a single action from the face panel
d. DMX data loss shall allow for levels/breakers to be held for ever or for a specified time before switching to a lower priority source
e. Initial Panel setup
1) The breaker panel shall automatically detect the type of breaker or dimmer installed in each location without need for manual configuration of the physical arrangement
2) Quick rack setup shall be available to apply address settings across all circuits for rack number, DMX Start Address, sACN universe, and sACN start address
3) Emergency Setup Menu shall provide optional delays when emergency is activated or deactivated, and option to turn off non-emergency circuits shall be available. Record function shall allow circuits that are turned on to be added to the emergency setting

E. Electrical
1. Breaker Panels shall be available to support power input from:
a. 120/208V three phase 4-wire plus ground
b. 120/240V single phase 3-wire plus ground
2. Conduit Entry:
a. Feeders:
1) Top or upper 6” of either side
2) Bottom or lower 6” of either side
3) Feeders shall enter through the top or bottom according to the orientation of the enclosure.
4) Feeder entry shall be nearest to the location of the feeder lugs or main breaker.
b. Load:
1) Load wiring shall enter through the top or bottom of the enclosure through the surface nearest to the breaker sub panel
2) Load wiring may also enter through left and/or right side provided a low voltage chase is not required through the same area. If class 2 chase is required, a field installable barrier panel shall be provided upon request. The side of the panel where the barrier has been installed shall not permit load wiring
c. Low Voltage:
1) Top or upper 6” of either side
2) Bottom or lower 6” of either side
3) For low voltage conduit entry at the breaker end of the cabinet, conduits shall be located at the outer 3” of the top/bottom panel
3. Breaker
a. Bus connection type: Stab on
b. 1, 2, or three poles
c. UL489 listed
d. 15 amp, 20 amp, or 30 amp
e. 22,000 SCCR; 65,000A series rated with upstream device (main, etc).
f. High inrush trip curve to accept up to 16A FLA (matches all Sensor breakers)
g. Maintains trip curve through entire thermal range
h. Guaranteed not to trip at full load
i. Load lugs accept 6-14awg load wiring
j. Multi-conductor listed output terminal
k. Integral mechanically held air gap relay
l. Manual control of relay state using breaker handle w/o power
m. Integral current sensing

n. Integral position and trip sensing
o. Control and status provided by contact pads directly at bottom of the breaker case
p. No external wires or connections required for control or feedback
q. The breaker shall be capable of switching up to 30A

4. The breaker panel shall support a maximum feed size (greater when noted on drawings).
   a. Feeder Sizes
      1) 100 Amps at 12 circuits
      2) 200 Amps at 24 circuits
      3) 400 Amps at 48 circuits
   b. Breaker panels shall support main circuit breaker options:
   c. Main breaker options shall be optional and available for purchase upon request
   d. Main breakers shall be field installable
   e. Main breakers shall be available in up to 100 Amps for 12 circuit panels, up to 200 Amps for 24 circuit panels, and up to 400A for 48 circuit panels at 120V
   f. Series SCCR ratings apply as follows with appropriate main breaker:
      1) 22,000A or 64,000 at 120/208V
   g. Main breakers shall allow the following range of wire sizes:
      1) Up to 300kcmil at 100A and 200A
      2) Up to 2x250kcmil at 400A
   h. Main Lug input shall support up to 2x250kcmil
   i. Breaker panel shall support a 500kcmil main lug option for 48-circuit panels

F. Breaker remote switching ratings
1. Mechanical 1,000,000 cycles
2. 24A Resistive 100,000 cycles
3. 16A Ballast (HID) 75,000 cycles
4. 15A Electronic (LED) 100,000 cycles
5. 15A Tungsten 45,000 cycles
6. 30FLA; 180 LRA Motor Load 50,000 cycles
7. Tested duty cycle: 12 operations (6 cycles) per minute
8. Decreasing duty cycle significantly increases switch life
9. Isolation: 4000V RMS
10. Current reporting accuracy: 5%
11. Latching state mechanical relay

G. Breaker Panel Accessories
1. A low voltage 0-10V dimming option shall provide up to 24 0-10v control outputs that are linked to relay circuits within the panel. Each output shall support up to 400mA of current sink per output
2. A contact input option shall provide 24 dry contact inputs to be linked for direct or group relay control, to activate a preset, or to activate a sequence. Controller software shall allow for normally open maintained, normally closed maintained, or momentary toggle
3. A DALI control option shall provide 24 control loops of broadcast DALI control, with each loop controlling up to 64 DALI devices
4. A RideThru option shall provide short-term power backup of control electronics by automatically engaging when power is lost, and recharging when normal power is present
5. An Isolated Ground option shall provide each circuit in the panel with a ground terminal that is electrically isolated from the equipment ground
6. Main Breaker options shall be available as shown in Section E.4

H. Thermal
1. The panel shall be convection cooled. Panels that require the use of cooling fans shall not be acceptable
2. The panel shall operate safely in an environment having an ambient temperature between 32ºF (0ºC) and 104ºF (40°C), and humidity between 5-95% (non-condensing).

PART 5 - EXECUTION
5.1 INSTALLATION

A. Lighting Control Panel:
   1. Install lighting control panels as indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC standards and NECA's "Standards of Installation" and in compliance with recognized industry practices to ensure that products fulfill requirements.
   2. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturers' published torque tightening values for equipment connectors. Where manufacturer's torque requirements are not indicated, tighten connectors and terminals to comply with torque tightening requirements specified in UL Standards 486A and B.
   3. Fasten enclosures firmly to walls and structural surfaces, ensuring that they are permanently and mechanically anchored.
   4. Provide engraved, plastic laminate labels for all lighting control panels indicating name, voltage, phase, wire and short circuit rating.
   5. Provide typed circuit directory card upon completion of installation work to match as-built conditions and nomenclature indicated on engineering drawings and submit directories to the Engineer for review prior to mounting in panel.

B. Controllable Breaker Panel:
   1. Wiring from dimming panel to preset dimming control and accessory controls shall be low voltage Class 2 wiring.
   2. Provide accessories as required for construction type indicated on Finish Schedule. Lighting control catalog numbers do not necessarily denote specific mounting accessories for type of wall or surface in which a lighting control may be installed.
   3. Provide adequate and sturdy support for each lighting control component. Contractor shall be responsible for verifying weight and mounting method of all lighting controls and furnishing and installing suitable supports. Lighting control mounting assemblies shall comply with all local codes and regulations.
   4. Contractor shall be responsible for mounting the lighting controls at the proper depth, and for coordinating the cutout size and shape in wall to ensure that the faceplate covers the cutout entirely. Refer to drawings for location and mounting height of controls.
   5. Install lighting controls with vent holes free of air-blocking obstacles.
   6. Support elements shall not be mounted to or in contact with ducts or pipes.
   7. Mask the lighting controls as necessary to protect the controls during construction.
   8. At the completion of construction, clean the face plates and exposed surfaces of all lighting controls, so as to render them free of any material, substance or film foreign to the lighting control. Use soft, non-abrasive cloth and a cleaning solution recommended by the lighting control manufacturer. If the lighting controls are deemed dirty by the Architect at the completion of the project, the Contractor shall clean them at no additional cost to the Owner. Lighting control components whose finishes are damaged shall be replaced at no cost to the Owner.
   9. Contractor shall furnish all equipment, labor and materials for the proper installation and system setup of all lighting controls and components as shown on drawings and as specified. System setup includes defining each dimmer's load type, assigning each load to a zone, and setting the control functions. System setup shall take place before building is turned over to Owner, after regular working hours where required.

C. Control Devices:
   1. Install lighting control devices in accordance with manufacturer's written instructions, applicable requirements of NEC standards and NECA's "Standards of Installation", and in compliance with recognized industry practices to ensure that products fulfill requirements.
   2. Install occupancy sensors and daylight sensors in accordance with manufacturer's written instructions, applicable requirements of NEC standards and NECA's "Standards of Installation", and in compliance with recognized industry practices to ensure that products

fulfill requirements. Confirm sensors provide coverage for the spaces in which they are installed and provide additional sensors as required for a completely functional system.

5.2 WIRING INSTALLATION

A. Install wiring between control devices for hard wired connections.
B. Coordinate with Division 26 for electrical work, including raceways, electrical boxes and fittings, as necessary to interface installation of lighting control equipment with other work. This Contractor shall route all raceways for lighting control circuits through the lighting control panel, furnish all line and load side conductors, and terminate the line and load side of the lighting control relays. This Contractor shall provide wiring for all remote lighting switches, devices, and their terminations as shown in the construction documents.
C. Provide all low-voltage terminations within the lighting control cabinets, to LCD remote control stations, and all required network cabling between lighting control panels.
D. Low voltage wiring for DMX controlled lighting and lighting control system:
    1. Lighting Control System low voltage wiring
        a. Install all vertical LV wire in rigid metal conduit to roof line
        b. Horizontal runs parallel to building structural members – install in rigid metal conduit and mechanically support from building structure – for protection from any future devices clamping to structure
        c. Horizontal runs perpendicular to building structural members – can be installed surface – support every 48” OC to ensure cable does not loop or sag.
        d. Head End equipment panel – install in rigid metal conduit through mezzanine deck and up to roof line.
        e. Paint conduit to match surface paint where conduit is exposed to public view.

5.3 GROUNDING

A. Provide equipment grounding connections for lighting control equipment. Tighten connectors to comply with tightening torques specified in UL Standard 486A to assure permanent and effective grounding.

5.4 CLEANING

A. Cleaning: The contractor shall remove all paint spatters and other spots, dirt and debris from the equipment. Clean equipment and devices internally and externally using methods and materials recommended by the manufacturers.

5.5 COMMISSIONING

A. Contractor to visually and electrically verify all new controllable breaker panel loads to ensure panel schedules are exact prior to engaging lighting control system manufacturer’s field service technician to energize lighting control system.
B. See lighting control system energization, programming, owner training work identified in specification section “Part 2”.
    1. The contractor shall ensure all installation work is complete before dispatching the lighting control system manufacturer’s field service technician to job site. The contractor shall be responsible for any additional field service technician charges for dispatching the technician to the job site prior to proper installation.
    2. During this work, the contractor shall have an agent familiar with the installation on site working with the lighting control system manufacturer’s field service technician.
    3. During this work, the contractor shall have an agent available to coordinate all line voltage issues with the field service technician.
C. Reports: Contractor shall be accountable for documenting all system training with owner’s personnel and ensuring appropriate sign off signatures are gathered in each owner session.

5.6 CUSTOMER SUPPORT SERVICES

A. Technical Support: The manufacturer shall supply telephone support at no additional cost to the owner for the duration of the warranty period.
   Spare Components: The contractor shall provide the following spare parts to the owner.
   1. A minimum of 2 spare branch breakers of each type in the controllable breaker panels.

B. Replacement components: The manufacturer shall be able to ship replacement parts within 24 hours for any component that fails during the warranty period.

C. Extended Service Coverage: Maintenance agreements shall be available from the manufacturer to provide service for the system both during and after the warranty period.
   1. Contractor shall present the owner with an extended warranty plan during O&M training.
   2. Contractor and/or Lighting Control System Representative shall present the owner with a maintenance program schedule and associated fees during O&M training.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. In the absence of other information, the following standards apply:
   1. NEMA WD 1 – General-Purpose Wiring Devices
   2. NEMA WD 2 – Semiconductor Dimmers for Incandescent Lamps
   3. NEMA WD 5 – Specific-Purpose Wiring Devices

1.2 SUMMARY

A. This Section includes the following:
   1. Receptacles, receptacles with integral GFCI, and associated device plates.
   2. Twist-locking receptacles.
   3. Wall-box motion sensors.
   4. Snap switches and wall-box dimmers.
   5. Pendant cord-connector devices.
   6. Cord and plug sets.

1.3 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

D. RFI: Radio-frequency interference.

E. SPD: Surge Suppressing Device.

F. UTP: Unshielded twisted pair.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.
   1. Include configurations, finishes, and dimensions.

B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

C. Samples: One for each type of device and wall plate specified, in each color specified.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.

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

C. Comply with NFPA 70.

1.6 COORDINATION

A. Receptacles for Owner-Furnished Equipment: Match plugs configurations.
   1. Cord and Plug Sets: Match equipment requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The following work in this Section is restricted to specific manufacturers.
   1. Wall Switches
      a. Pass & Seymour
      b. Cooper Wiring Devices
      c. Hubbell
      d. Leviton
   2. Receptacles
      a. Pass & Seymour
      b. Cooper Wiring Devices
      c. Hubbell (Bryant)
      d. Leviton
   3. Wall Plates
      a. Pass & Seymour
      b. Hubbell (Bryant)
   4. Cord Drops
      a. Daniel Woodhead
   5. Provide samples of items to Owner prior to purchase.

2.2 WIRING DEVICES

A. Comply with NEMA Standard WD 1, "General Purpose Wiring Devices".

B. Enclosures: NEMA 1 equivalent, except as otherwise indicated.

C. Color: Per Owner or required by Code.

D. Receptacles:
   1. Duplex, single, and special receptacles shall be UL listed and have a metal mounting strap with self-grounding and a hex head green grounding screw; 20 AMP, federal specification grade (896), nylon, flat (smooth) faced.
   2. Convenience and Straight Blade Receptacles: NEMA WD 1 (Pass & Seymour CRB5362 Hubbell CR-5352 or Owner approved equal).
   3. Locking Blade Receptacles: NEMA WD 5.
   4. Convenience Receptacle Configuration: NEMA WD 1, Type 5-20-R, nylon face.
      a. Prewired pigtail connectors that accommodate Fed Spec receptacles and GFCI's are approved. Must be crimped and welded terminal right angle application within the connector.
      b. For areas designated as critical or patient care the receptacles shall be hospital grade as indicated by U.L. green dot marking.
   5. All receptacles connected to emergency circuits shall be factory labeled "Emergency" or "Standby Power": Coverplate, depending on transfer switch connection indicated on one-line diagram.
   6. Specific use Receptacle configuration: NEMA WD 1 or WD 5, Black plastic face.
   7. Ground Fault Circuit Interrupter (GFCI) Receptacles: UL Standard 943 "Ground Fault Circuit Interrupters", feed through type, with integral ground fault circuit interrupter arranged to protect connected downstream receptacles on the same circuit. Design units for installation in a 2-3/4 inch (70 mm) deep outlet without an adapter. (Pass & Seymour 2095 or Owner approved equal).
      a. GFCI Receptacles shall meet 2006 revisions to the UL standard 943.
      b. GFCI Receptacle shall have SafeLock™ protection. If critical components are damaged and ground fault protection is lost or if miswired, power to receptacle is disconnected.

E. Pendant Cord/Connector Devices: Matching, locking type, plug and connector body of the types and ratings as indicated on the contract drawings.

F. Bodies: Nylon with screw open cable gripping jaws and provision for attaching external cable grip.

1. Weatherproofing: Molded black elastomer cover for plug and connector. Covers shall interlock to provide a weatherproof cover around the mated plug and connector.
2. External Cable Grip: Woven wire mesh type made of high strength galvanized steel wire strand and matched to cable diameter and with attachment provision designed for the corresponding connector.

G. Cord and Plug Sets: Match voltage and current ratings and number of conductors to requirements of the equipment being connected.
1. Cord: Rubber insulated, stranded copper conductors, with type SOW-A jacket. Grounding conductor has green insulation.
2. Plug: Male configuration with nylon body and integral cable clamping jaws. Match to cord and to receptacle type intended for connection.

H. Snap Switches
1. For Lighting Circuits and single phase motor loads under 1/2 hp.
a. NEMA WD1, AC quiet type, nylon, Federal specification grade (WC596), UL listed with toggle handle, rated 20 amperes at 120/277 volts AC.
b. Mounting straps: Metal and offer self grounding or be equipped with a green hex head ground screw.
c. Handle: Nylon
2. Pilot Light Type: Lighted handle
3. Locator Type: Lighted handle
a. Screw connections only; Quick push-in wire connectors are prohibited.
4. Approved Grounding Type (or Owner approved equal):
a. Basis of Design:
1) Single pole, 20A, Hubbel No. CS-1221I, P&S No. PS20AC1
2) Three-way, 20A Hubbell No. CS-1223-I, P&S No. PS20AC3
3) Single pole, 20A keyed P & S No. PS20AC1-KL, P&S No. PS20AC1L
4) Three-way, 20A, keyed P & S No. PS20AC4-KL, P&S No. PS20AC1L

I. Combination Switch and Receptacle: Both individual devices in individual gang units with plaster ears.
1. Switch: 20 ampere, 120/277 VAC.
2. Receptacle: NEMA configuration 5-20R.

J. Wall Plates: Single and combination type plates shall match corresponding wiring devices. Features include the following: Engrave where indicated on drawings.
1. Plate Securing Screws: Metal with heads colored to match plate finish.
2. Material for Finished Spaces: Nylon, finish.
3. Restroom and Kitchen/Kitchenette areas stainless steel 302.
4. Weatherproof Cover Plate: Gasketed cast metal with hinged gasketed device covers.

2.3 MULTI OUTLET ASSEMBLIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Hubbell Incorporated; Wiring Devices – Kellems.
2. The Wiremold Company.

B. Comply with Standard UL5, "Surface Metal Raceways and Fittings".

C. Components of Assemblies: Products of a single manufacturer designed to be used together to provide a complete matching assembly of raceways and receptacles.

D. Raceway material: Metal, with manufacturer's standard corrosion-resistant finish.

E. Wire: No. 12 AWG.

2.4 PENDANT CORD-CONNECTOR DEVICES

A. Description: Matching, locking-type plug and receptacle body connector; NEMA WD 5 configurations L5-20P and L5-20R, heavy-duty grade.
1. Body: Nylon with screw-open cable-gripping jaws and provision for attaching external cable grip.

2. External Cable Grip: Woven wire-mesh type made of high-strength galvanized-steel wire strand, matched to cable diameter, and with attachment provision designed for corresponding connector.
3. Non-metallic Daniel Woodhead box and strain relief required.

2.5 CORD AND PLUG SETS

A. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.
1. Cord: Stranded-copper conductors, with green-insulated grounding conductor.
a. Oil-resistant thermostat insulated type SJ, SJO or SO multiconductor flexible cord with identified equipment grounding conductor, suitable for extra hard usage in damp locations.
b. Size cord for equipment-rating ampacity plus a minimum of 30 percent or for size of branch circuit overcurrent protection, whichever is greater
2. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.
a. Straight-blade Attachments Plug: NEMA WD 1.
b. Locking-blade Attachment Plug: NEMA WD 5.
3. Use wire and cable with insulation suitable for temperatures encountered in heat-producing equipment.
4. Install pre-finished cord set where connection with attachment plug is indicated or specified, or use attachment plug with suitable strain-relief clamps.
5. Provide suitable strain-relief clamps for cord connections to outlet boxes and equipment connection boxes.
6. Make wiring connections in control panel or in wiring compartment of pre-wired equipment in accordance with manufacturer's instructions. Provide interconnecting wiring.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.

B. Coordination with Other Trades:
1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:
1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:
a. Cut back and pigtail, or replace all damaged conductors.
b. Straighten conductors that remain and remove corrosion and foreign matter.
c. Pigtailing existing conductors is permitted provided the outlet box is large enough.

D. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacles:
1. Install convenience receptacles with grounding pole to match existing. Grounding pole position shall be consistent throughout.
2. No receptacle shall be located within two horizontal feet of a sink or lavatory.
   a. Provide GFCI protection within six horizontal feet of sink or lavatory.
3. Wire receptacles using pigtails for easy future service.

F. Plates
1. Install high quality nylon, device plates on switches and receptacles in finished areas, using jumbo size plates for outlets installed in masonry walls.
2. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
3. Stainless steel 302 in Kitchen/Dishwashing, Restrooms and Locker rooms area.
4. Match color of new devices plates to existing color.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical, with grounding terminal of the receptacle on top or with off of the switch position down. Group adjacent switches under single, multigang wall plates.

H. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

I. Drill opening for poke-through fitting installation in accordance with manufacturer's instructions.

J. De-rate ganged dimmer switches per manufacturer.

3.2 IDENTIFICATION

A. Comply with Division 26 Section "Identification for Electrical Systems."

B. All switches and receptacles should be marked with black on clear, high quality, adhesive material, on front side. The markers should have printed lettering with panel and circuit information. Label inside of cover, use permanent ink that won't bleed through cover back of plate. Include panel and circuit ID.

C. Switches: Where 3 or more switches are ganged, and elsewhere where indicated, identify each switch with approved legend engraved on wall plate.

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.
1. Test Instruments: Use instruments that comply with UL 1436.
2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

B. Tests for Convenience Receptacles:
1. Line Voltage: Acceptable range is 116 to 124 V.
2. Ground Impedance: Values of up to 2 ohms are acceptable.

3. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
4. Using the test plug, verify that the device and its outlet box are securely mounted.
5. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

END OF SECTION

SECTION 26 51 00

INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Interior lighting fixtures.
   2. Lighting fixture supports.

1.3 DEFINITIONS

A. BF: Ballast factor.

B. CRI: Color-rendering index.

C. CU: Coefficient of utilization.

D. HID: High-intensity discharge.

E. LER: Luminaire efficacy rating.

F. Luminaire: Complete lighting fixture, including ballast housing if provided.

G. RCR: Room cavity ratio.

1.4 SUBMITTALS

A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:
   1. Physical description of lighting fixture including dimensions.
   2. Emergency lighting units.
   3. Ballast.
   4. Energy-efficiency data.

B. Shop Drawings: Show details of nonstandard or custom lighting fixtures. Indicate dimensions, weights, methods of field assembly, components, features, and accessories.
   1. Include outline drawings, lamp and ballast data, replacement lamp costs, photometric study, support points, weights and accessory information for each luminaire type.

C. Samples for Verification: Interior lighting fixtures which are substitutions for specified fixtures shall provide a sample and complete photometric review of application for approval. Each sample shall include the following:
   1. Lamps: Specified units installed.
   2. Accessories: Cords and plugs.

D. Product Certificates: For each type of ballast for bi-level and dimmer-controlled fixtures, signed by product manufacturer.

E. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.

F. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.

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

C. Comply with NFPA 70.

1.6 COORDINATION

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

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Provide 1 spare fixture of each type for owner stock.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work are restricted to manufacturers specified.
   2. Manufacturers: Restricted to specific manufacturers that have been previously approved by the Owner.
   3. Basis-of-Design Product: The design for each lighting fixture is based on the product named.

2.2 LIGHTING FIXTURES AND COMPONENTS, GENERAL REQUIREMENTS

A. Metal Parts: Free of burrs and sharp corners and edges.

B. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.

C. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

D. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:
   1. White Surfaces: 85 percent.
   2. Specular Surfaces: 83 percent.
   3. Diffusing Specular Surfaces: 75 percent.
   4. Laminated Silver Metalized Film: 90 percent.

E. Plastic Diffusers, Covers, and Globes:
   1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
      a. Lens Thickness: At least 0.125 inch minimum unless different thickness is indicated.
      b. UV stabilized.
   2. Glass: Annealed crystal glass, unless otherwise indicated.

F. Locate luminaires for easy service; i.e. stairways, common areas.

G. Available Manufacturers:
   1. Only manufacturers listed in the fixture schedule are acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Pendant or surface mounted fixtures shall be provided with required mounting devices and accessories and shall include hickeys, stud extensions, ball-aligners, canopies ands stems to mount fixture to structure. Mounting stems of pendant fixtures shall be of correct length to uniformly maintain fixture heights shown. Allowable variations in tolerance of mounting heights

between any stem and surface mounted fixture shall not exceed 1/4” and shall not vary more than 1/2” from floor mounting height shown. Brace pendants four feet or longer to limit swinging. Provide safety chain or cable between the ballast/structure and / or fixture/structure.

B. Align luminaires and clean lenses and diffusers of paint splatters, dirt and debris.

3.3 SPARE PARTS

A. Provide 1 spare fixture for each type specified for owner stock.

3.4 FIELD QUALITY CONTROL

A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

B. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

END OF SECTION

SECTION 26 55 00

DMX CONTROLLED DIGITAL LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Requirements of the following Division 26 Sections apply to this section:
   1. Basic Materials and Methods
   2. Lighting Fixtures

C. Refer to lighting control drawings for operational intent of the following:
   1. Lighting control system on drawings for operational intent and device requirement.
   2. Typical control diagrams and details.
   3. Equipment layout and quantity.

1.2 SUMMARY

A. Provide, install, and energize DMX controlled multi-attribute digital lighting fixtures.

B. The specified lighting fixtures indicate the minimum acceptable level of performance and technical capabilities.

C. The quantity of lighting fixtures required to meet the operational intent shall be per the plan view drawing layout and the illumination performance criteria listed elsewhere in the project documents.

D. Types of lighting fixture specified in this section includes but is not limited to the following:
   1. DMX controlled, multi-attribute digital lighting fixtures.

E. Refer to other Division 26 sections for wires/cables, raceways, electrical boxes and fittings, and wiring devices which are required in conjunction with lighting control equipment to perform work of this section.

F. The following outlines the equipment associated with products in this section.
   1. Network Lighting Control System in Division 26 09 43

1.3 SUBMITTALS

A. Submittal documentation shall be furnished by the contractor for approval by the Engineer and must be approved in writing prior to shipment of any equipment from the manufacturer. It shall consist of:

B. Project Cover Sheet: indicating project name, location, and team members for contractor and manufacturer supplying the lighting control equipment.

C. Bill of Material and Services: itemized list of all materials and services being supplied to meet the specifications.

D. Photometrics: Contractor shall submit photometric drawings as part of submittal set to include but not be limited to:
   1. Plan view photometric performance for the fixtures in the following CCTs and colors:
      a. 5000 Kelvin
      b. 4000 Kelvin
      c. 3000 Kelvin
      d. Red Only
      e. Blue Only
      f. Green Only
      g. Amber Only

E. Technical Product Data Sheets: for all equipment supplied – these data sheets shall describe all hardware and software items provided. A detailed line by line specification compliance shall also be included.

1.4 QUALITY ASSURANCE

A. Approved Manufacturers: the basis of design and minimum acceptable level of technical performance is equipment as specified herein and manufactured by SportsBeams of Austin, Texas.
   1. Colorado SportsBeams Representative – GLS Lighting and Control – Golden, CO 303-394-0220

B. Manufacturer's Quality Assurance:
   1. Manufacturer of lighting control equipment shall have manufactured the specific type of equipment specified herein for no less than 4 consecutive years prior to the bid date of this project.

C. Technical Support:
   1. Manufacturer of lighting fixtures shall maintain a technical support hotline with guaranteed response within 24 hours.
   2. Manufacturer shall have a contracted Territory Representative within 100 miles of the project jobsite who shall have manufacturer trained and certified field service technicians on staff.

D. Alternate Manufactures for DMX controlled multi-attribute Digital Lighting Fixtures: It is the intent of the owner to utilize equipment and associated services as provided by SportsBeams of Austin, TX due to the direct DMX control of the fixture and the single homogenized aperture delivery of multiple CCT of white light and colored lighting. Requests for approval of lighting control equipment manufactured by companies other than the specified manufacturer require approval in writing prior to the bid date and will be considered if the following conditions are met:
   1. The requesting contractor submits the request for approval 7 working days prior to the bid.
   2. Submittal for alternate equipment shall include a full submittal set as indicated in section 1.3 – Submittals.
   3. Contractor shall demonstrate proposed alternate equipment to engineer and owner within 2 days of submitting alternate request. Demonstration shall include demonstrating harmonious DMX control of the specified multi-attribute DMX controlled digital lighting fixtures.
   4. Alternate lighting fixture submittal shall include a technical specification compliance document with a line by line itemization identifying compliance or non-compliance with the technical specifications included here-in. For non-compliance – include a written description of compliance derivation.
   5. Alternate equipment submittal shall include written declaration from an officer of the equipment manufacturing company certifying the technical specification compliance document and certifying the manufacturer has been manufacturing this equipment (or similar) for a period of no less than 4 years.

E. Codes and Standards:
   1. Electrical Code Compliance: Comply with applicable local electrical code requirements of the authority having jurisdiction and NEC as applicable to construction, installation of lighting control equipment.
   2. UL Compliance: Comply with applicable requirements of UL standard 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors". Provide lighting control equipment and components which are UL-listed and labeled. Any custom cabinets that may be required shall be assembled by a U.L. listed panel shop that is approved for building industrial panels. Each panel shall bear a U.L. label detailing all requirements for industrial panel fabrication.
   3. NEMA Compliance: Comply with applicable requirements of NEMA's Standard Pub No. 250, "Enclosures for Electrical Equipment (1000-Volts Maximum)".
   4. All lighting control equipment shall be in compliance with FCC Emission Standards specified in Part 15 Subpart J for Class A applications.
   5. NFPA 70: National Electric Code (NEC 2017); NFPA 101: Life Safety Code (2017)
   6. USITT latest edition of technical standards for sACN and DMX512-A (United State Institute for Theatre Technology).

1.5 WARRANTY

A. Installation Warranty: A written warranty shall be supplied by the installing contractor agreeing to provide the labor and materials to replace any portion of the lighting control system equipment or wiring that fails due to materials or workmanship for a period of twelve months after substantial completion.

B. Manufacturer's Warranty: A written warranty shall be supplied by the manufacturer agreeing to replace any equipment that fails due to materials or workmanship for a period of 10 years.

C. Warranty Commencement: Warranty shall begin at the point of substantial completion of the system, which is defined as the date when commissioning and owner training has been completed and the Owner obtains beneficial use of the system.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver lighting fixtures and components in factory-fabricated type containers or wrappings, which properly protect equipment from damage.

B. Store lighting fixtures in original packaging and protect from weather and construction traffic. Wherever possible, store indoors; where necessary to store outdoors, store above grade and enclose with watertight wrapping.

C. Handle lighting fixtures carefully to prevent physical damage to equipment and components. Do not install damaged equipment; remove from site and replace damaged equipment with new.

PART 2 - LIGHTING CONTROL SYSTEM SERVICES

2.1 LIGHTING CONTROL SYSTEM SERVICES

A. The electrical contractor installing the equipment specified herein shall carry the services of a manufacturer certified field service technician to assist with the installation, energization, and technical check out of the system.

B. The electrical contractor installing the equipment specified herein shall carry the services of a manufacturer certified field service technician to provide the system programming, owner training, and associated warranty services for the system.

C. Owner Training: Provide no less than 2 owner training sessions – allow up to 6 hours of owner training for each session.

1. Training session #1 shall be the formal system O&M training with the owner's operational personnel. Installing contractor to ensure sign off sheet is present for owner's agents to sign after completion of owner's training.
2. Training session #2 shall be organized with the owner's personnel by the installing contractor. Session shall take place within the first 6 months of system possession and shall consist of programming adjustments and additional training over system O&M.

D. The electrical contractor installing the equipment may at their discretion elect to contract the DMX data system wire terminations from a manufacturer's certified field service technician. DMX data wire terminations per USITT DMX512-A standard are integral to this system functioning properly.

E. These services shall not be limited to a certain quantity of job site "trips" nor limited to certain number of job site "hours".

F. The Lighting Control System services shall be completed (with exception of warranty obligation) when the owner or owner's agent has received a complete demonstration of a working system and O&M training over the system and signed documentation indicating receipt of such training.

G. The owner at their discretion may or may not video tape the system demonstration and O&M training.

H. Owner support during first events after installation

1. Contractor shall carry the services of a manufacturer's authorized field service technician to be present during the owner's first two events at the venue.
2. Contractor shall have agent present during the first two events.

I. Warranty – see Warranty section of this specification.

PART 3 - FIXTURE DESCRIPTION

3.1 FIXTURE DESCRIPTION

A. The DMX Controlled Multi-attribute Digital Lighting Fixtures are intended to provide multi-discipline lighting for the venue from a single fixture aperture.
B. The fixture shall allow full dimming and color control from the DMX Lighting Control System.
C. The fixture shall allow for tunable white light 1,800K to 5,700K and saturated colors in Red, Green, Blue, Amber as well as blended colors from a single homogenized fixture low glare aperture.
D. The fixture shall be capable of delivering up to 85,000 lumens at 5,000K from a 277V, 1P power source.

PART 4 - TECHNICAL SPECS

4.1 DMX Controlled Multi-attribute Digital Lighting Fixture

A. The Lighting Fixture shall be the ChromaBeam 800 as manufactured by SporstBeams of Austin, Texas or pre-approved equal.
B. Mechanical
    1. The fixture shall be a yoke mount, focusable LED based luminaire constructed of aluminum and/or steel.
        a. Fixture chassis shall be constructed of aluminum alloy
        b. Fixture yoke shall be high grade steel
        c. Fixture shall be available with pendant mount system
        d. The fixture shall have a minimum IP rating of IP66 to prevent dust and water ingress.
        e. Fixture shall not exceed 40 lbs.
        f. The fixture shall be devoid of plastic parts and/or lenses in the optical path
            1) The fixture shall have only glass or metal products in the optical path to ensure long life and no deformation and/or degradation of optical delivery system due to UV radiation and/or thermal decay.
            2) Fixtures utilizing plastic optics for light delivery system shall not be acceptable.
    2. All enclosure components shall be properly treated and finished.
    3. Exterior surfaces shall be finished in fine textured, scratch resistant, all weather gray paint
        a. Custom Color shall be available upon request.
C. Electrical
    1. Fixture shall operate at 177-305VAC, 60Hz.
    2. Power Supply
        a. Fixture power supply shall offer programmable start up inrush to reduce circuit inrush loading
        b. Fixture power supply shall be programmable for maximum operating wattage to support curtailing fixture maximum operating wattage.
        c. Fixture power supply shall be controlled by USITT DMX512A data signal
        d. Fixture power supply shall control current to all LED arrays in the fixture to include white LEDs as well as all color LEDS.
        e. Power Supply Operating Characteristics
            1) Power Up With No Date Present: power supply shall be programmable to playback a preprogrammed color and level if the fixture is powered up with no data present.
            2) Data Loss Behavior: If the fixture is under operation and a data loss occurs, the power supply shall be programmable to hold last look for a specified time frame, hold last look indefinitely, or to go to a pre-programmed color and level.
        f. Fixture loading shall depend on output wattage power supply allows by programming.
        g. Power supply shall operate the at less than <0.4% flicker for use as a high resolution video luminaire.
D. Thermal

1. Fixture and associated power supply shall be rated for safe operation at up to 155 degrees Fahrenheit.
2. Fixture and associated power supply shall be rated for safe operate at down to -40 degrees Fahrenheit.
3. Cooling
    a. Fixture shall be actively cooled by a low noise, low speed military grade magnetic fan which maintains positive airflow over the fixtures heat sinks.
    b. Fan shall be rated for over 350,000 hours of operation meantime between failures.
    c. Fixture shall be capable of fan speed and direction control to allow warming the LED junction temperature in cold environments such that the fixture will be capable of full lumen output in low temperature environments.
4. Thermal cutoff
    a. Fixture shall employ a thermal feedback system that will reduce LED drive current in the event the LED array thermal exceeds safe operating temperature
    b. LED shall be rated for 100,000 hours of operation at full output.

E. Optical
1. The fixture shall utilize a single, low glare, optic design.
    a. Fixture shall gather light from all LED emitters via a single parabolic reflector system
    b. Fixture shall emit gathered light through a single, low glare tempered glass lens
2. The fixture shall offer the following symmetrical optical distributions as standard product
    a. NEMA3
    b. NEMA4
    c. NEMA5
    d. NEMA6
    e. Glass or Metal optical accessories for asymmetrical distribution shall be available

F. Light Engine
1. Fixture shall be available in 70, 80, and 90 CRI white
2. Fixture shall offer DMX controlled color tunable white from 1800K to 5700K
3. Fixture shall offer DMX controlled color mixing utilizing red, green, blue, and amber LEDs
4. Light engine shall generate up to 86,000 lumens in white light.

PART 5 - EXECUTION

5.1 INSTALLATION

A. Install lighting fixture in accordance with manufacturer's written instructions, approved submittal drawings, applicable requirements of NEC standards and NECA's "Standards of Installation" and in compliance with recognized industry practices to ensure that products fulfill requirements.

B. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturers' published torque tightening values for equipment connectors. Where manufacturer's torque requirements are not indicated, tighten connectors and terminals to comply with torque tightening requirements specified in UL Standards 486A and B.

5.2 WIRING INSTALLATION

A. Install wiring between control devices for hard wired connections.

B. Coordinate with Division 26 for electrical work, including raceways, electrical boxes and fittings, as necessary to interface installation of lighting fixtures with other work.

C. Provide all low-voltage terminations at the lighting fixture or secure the services of the lighting control system field service technician to provide such.

5.3 GROUNDING

A. Provide equipment grounding connections for lighting control equipment. Tighten connectors to comply with tightening torques specified in UL Standard 486A to assure permanent and effective grounding.

5.4 CLEANING

A. Cleaning: The contractor shall remove all paint spatters and other spots, dirt and debris from the equipment. Clean equipment and devices internally and externally using methods and materials recommended by the manufacturers.

5.5 COMMISSIONING

A. Contractor engage the services of the lighting fixture manufacture or the services of the lighting control system field service technician to set fixture addresses.

5.6 CUSTOMER SUPPORT SERVICES

A. Technical Support: The manufacturer shall supply telephone support at no additional cost to the owner for the duration of the warranty period.

B. Spare Components: The contractor shall provide the following spare parts to the owner.
   1. A minimum of 1 spare light fixture of each type.

END OF SECTION

GENERAL CONSTRUCTION NOTES

1. THE ELECTRICAL CONTRACTOR SHALL VERIFY THAT ALL ELECTRICAL ITEMS TO REMAIN OR BE RELOCATED AND REUSED ARE IN WORKING ORDER PRIOR TO ANY DEMOLITION WORK. IF THE EXISTING MATERIAL IS FOUND TO BE INOPERABLE, CONTRACTOR SHALL INFORM THE OWNER. ONCE ANY DEMOLITION WORK HAS BEGUN, ANY INOPERABLE OR DAMAGED MATERIAL SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE.
2. VERIFICATION OF EXISTING CONDITIONS. "IN AS MUCH AS THE REMODELING AND/OR REHABILITATION OF THE EXISTING BUILDING REQUIRES THAT CERTAIN ASSUMPTIONS BE MADE REGARDING EXISTING CONDITIONS, AND BECAUSE SOME OF THESE ASSUMPTIONS MAY NOT BE VERIFIABLE WITHOUT DESTROYING OTHERWISE ADEQUATE OR SERVICEABLE PORTIONS OF THE BUILDING, THE GENERAL CONTRACTOR AGREES THAT, EXCEPT FOR NEGLIGENCE ON THAT PART OF THE DESIGN PROFESSIONAL THE CONTRACTOR WILL HOLD HARMLESS, INDEMNIFY AND DEFEND THE DESIGN PROFESSIONAL FROM AND AGAINST ANY AND ALL CLAIMS ARISING OUT OF THE PROFESSIONAL SERVICES PROVIDED."
3. ANY ELECTRICAL ITEMS SHOWN OR NOT SHOWN ON THE PLANS, OR WHERE CIRCUITS ARE REMOVED BY DEMOLITION, SHALL UPON COMPLETION OF REMODEL WORK BE LEFT IN WORKING CONDITION.
4. ALL PHASES OF THE ELECTRICAL WORK SHALL BE COORDINATED WITH THE OWNER. WORK SHALL BE DONE IN A FASHION TO CAUSE AS LITTLE INCONVENIENCE AS POSSIBLE TO THE OWNER.
5. ELECTRICAL DEVICES NOTED TO BE REMOVED SHALL BE REMOVED BACK TO A POINT WHERE EXISTING CONDUIT CAN BE ABANDONED IN CONCEALED SPACES. REMOVE ALL WIRING FROM ABANDONED CONDUIT. ALL BOXES TO BE REMOVED SHALL BE TAKEN OUT OF WALLS AND HAVE HOLES REFINISHED TO MATCH WALL FINISH.
6. ELECTRICAL CONTRACTOR SHALL NOT DEFACE ANY AREAS OF THE BUILDING WHERE REMODELING IS NOT BEING DONE.
7. THE ELECTRICAL CONTRACTOR SHALL BE ON SITE DURING ALL ELECTRICAL INSPECTIONS. NO ADDITIONAL FEES OR OVERTIME WILL BE PAID FOR AFTER HOURS INSPECTIONS.
8. RACEWAYS: ALL CONDUIT SHALL BE CONCEALED WHEREVER POSSIBLE. CONDUIT SHALL NOT BE EXPOSED IN FINISHED AREAS (EXCLUDES MECHANICAL ROOMS, STORAGE CLOSETS, AND SIMILAR AREAS). EXPOSED RACEWAYS SHALL BE SURFACE RACEWAYS PER SPECIFICATIONS AND APPROVED BY OWNER PRIOR TO BEGINNING ROUGH–IN.
9. ROUTING OF EXISTING CONCEALED CONDUIT NOT KNOWN. LOCATION DETERMINED BY ELECTRICAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL RECIRCUIT AS NOTED UTILIZING ANY EXISTING CONDUIT. HE SHALL REMOVE EXISTING WIRE AND REPULL NEW. ALL NEW CONDUIT ADDED SHALL BE CONCEALED WHEREVER POSSIBLE.
10. SURFACE RACEWAY: WHEREVER CONCEALED CONDUIT IN FINISHED AREAS IS NOT POSSIBLE, ELECTRICAL CONTRACTOR SHALL INSTALL SURFACE MOUNTED RACEWAYS EQUAL TO WIREMOLD IN FINISHED SPACES. RUN SURFACE RACEWAYS IN CORNER OF WALL AND CEILING. ALL RACEWAYS THAT ARE EXPOSED SHALL BE APPROVED BY OWNER PRIOR TO ROUGH–IN.
11. TERMINATING AND SPLICING: MAKE ALL JOINTS AND SPLICES IN BRANCH CIRCUIT WIRING WITH APPROVED SOLDERLESS TOOL APPLIED OR TWIST–ON CONNECTORS, IN THE VARIOUS BOXES, GUTTERS, AND SIMILAR LOCATIONS, BUT NOT IN RACEWAYS. LEAVE SUFFICIENT SLACK TO PERMIT TWO (2) OR MORE SPLICES OR JOINTS TO BE REMADE IN CASE OF FAULT.
12. MC OR AC CONDUIT WILL NOT BE ALLOWED ON THIS PROJECT. ENT WILL NOT BE ALLOWED ON THIS PROJECT. FLEX CONDUIT OR FIXTURE WHIPS, LONGER THAN SIX FEET, WILL NOT BE ALLOWED ON THIS PROJECT. WIRE SPLICES IN CONDUIT BODIES ARE NOT ALLOWED ON THIS PROJECT.
13. NM (ROMEX CABLE) WILL NOT BE ALLOWED ON THIS PROJECT.
14. ALL OUTLETS AND JUNCTION BOXES SHALL BE METAL. THE USE OF FIBER, NYLON, OR PLASTIC BOXES ARE PERMITTED.
15. ELECTRICAL CONTRACTOR SHALL RECEIVE, FROM SYSTEM SUPPLIERS, ALL WIRING DIAGRAMS FOR ALL EQUIPMENT, PRIOR TO ANY ROUGH–IN, TO ASSURE PROPER ELECTRICAL CHARACTERISTICS ARE PROVIDED. ELECTRICAL CONTRACTOR SHALL PROVIDE OWNER WRITTEN NOTIFICATION PRIOR TO ROUGH–IN, THAT ALL WIRING DIAGRAMS HAVE BEEN RECEIVED AND REVIEWED FOR CORRECTNESS. ANY INCORRECT WIRING OR DEVICES INSTALLED BY ELECTRICAL CONTRACTOR WITHOUT WIRING DIAGRAMS SHALL BE CORRECTED AT ELECTRICAL CONTRACTOR'S EXPENSE.
16. ALL EXISTING AND NEW SMOKE DETECTORS IN OR NEAR AREAS BEING REMODELED SHALL BE BAGGED OR REMOVED. IF REMOVED, STORE IN A SEALED BAG UNTIL ALL REMODELING WORK IS COMPLETE. IF SMOKE DETECTORS ARE NOT BAGGED OR REMOVED THEY SHALL BE REPLACED WITH NEW DETECTORS AT CONTRACTOR'S EXPENSE WHEN THE PROJECT IS COMPLETED.
17. EXACT ELECTRICAL DEMOLITION REQUIREMENTS NOT SHOWN ON THE DRAWINGS. ELECTRICAL CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING TO DETERMINE EXACT DEMOLITION WORK TO BE DONE AND SHALL INCLUDE ALL DEMOLITION COSTS IN THEIR BID.
18. ELECTRICAL CONTRACTOR SHALL VERIFY ELECTRICAL DEVICE LOCATIONS IN ALL CASEWORK WITH EXISTING CASEWORK PRIOR TO ANY ROUGH–IN.
19. THE CONTRACTOR SHALL COORDINATE ALL ELECTRICAL DEVICE LOCATIONS WITH THE EXISTING CONDITIONS.
20. THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH GC TO MAINTAIN FIRE RATINGS FOR ALL CONDUIT PENETRATIONS, INCLUDING CONDUIT SLEEVES, THROUGH FIRE RATED CONSTRUCTION. THIS INCLUDES SEALING ALL SPARE CONDUITS (SPECIAL SYSTEMS, ETC.).
21. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MEASURE THE HORIZONTAL AND VERTICAL DIMENSIONS OF HIS WORK BEFORE INSTALLATION AND COORDINATE THESE DIMENSIONS. FAILURE TO DO SO WILL RESULT IN REJECTION OF INSTALLED WORK AND REINSTALLATION OF PROPERLY LOCATED AND COORDINATED WORK WILL BE AT THIS CONTRACTOR'S EXPENSE.
22. RELOCATIONS: OWNER RESERVES THE RIGHT TO RELOCATE ANY ELECTRICAL DEVICE, UP TO A DISTANCE OF 12'–0", BEFORE INSTALLATION WITHOUT EXTRA CHARGE FROM ELECTRICAL CONTRACTOR.
23. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC ONLY. EXACT LOCATION OF ALL SYSTEMS AND EQUIPMENT SHALL BE FIELD VERIFIED AND COORDINATED WITH OTHER TRADES PRIOR TO ANY INSTALLATION. WHERE EXACT LOCATIONS ARE NECESSARY, THEY ARE DIMENSIONED ON THESE DRAWINGS. WHERE THERE IS A QUESTION OF ADEQUATE CLEARANCE OR COORDINATION BETWEEN TRADES, THIS CONTRACTOR SHALL PREPARE SHOP DRAWINGS FOR ENGINEER'S REVIEW.
24. EMT CONDUIT FITTINGS: DRY LOCATIONS, ALL EMT COUPLERS AND CONNECTORS SHALL BE STEEL SET SCREW TYPE. DAMP/WET LOCATIONS, USE STEEL COMPRESSION GLAND TYPE COUPLER AND CONNECTORS. DIE CAST FITTINGS SHALL NOT BE USED ON THIS PROJECT.
25. ALL WIRING INCLUDING SPECIAL SYSTEMS/LOW VOLTAGE THAT IS IN AN EXPOSED CEILING AREA SHALL BE IN CONDUIT. ALL SPLICES SHALL BE IN J–BOXES.
26. DURING BUSINESS OPERATIONS, AREAS IN USE SHALL HAVE OPERABLE ELECTRIC, TELEPHONE, CATV, FIRE ALARM, EMERGENCY LIGHTING, INTERCOM AND CLOCK OPERATION. SYSTEMS, SHALL ALL REMAIN OPERABLE DURING CONSTRUCTION WHEN EVENTS ARE BEING HELD AND WHERE AREAS ARE USED BY PUBLIC, ETC.
27. ACCESS PANELS REQUIRED BY THE ELECTRICAL CONTRACTOR SHALL BE PROVIDED BY THE ELECTRICAL BID CONTRACTOR, THEN TURNED OVER TO THE APPROPRIATE TRADE FOR INSTALLATION.
28. ELECTRICAL CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE OWNER TO OBTAIN ACTUAL ROOM NAMES AND NUMBERS, DESIGNATED BY THE OWNER AT THE COMPLETION OF THE PROJECT. ACTUAL ROOM NAMES AND NUMBERS SHALL BE USED ON ALL PANEL SCHEDULES, AND SIMILAR.
29. CONTRACTOR SHALL NOT FASTEN, ATTACH OR HANG ANY MATERIAL FROM THE ROOF DECK. ALL CONDUITS, JUNCTION BOXES, FIXTURES, DEVICES AND EQUIPMENT SHALL BE HUNG FROM THE STRUCTURAL STEEL FRAME AND SHALL BE PLACED WITH A MINIMUM CLEARANCE PER NEC BELOW THE ROOF DECK. WIRING AND CONDUITS SHALL NOT BE PLACED WITHIN THE RIBS OF THE ROOF DECK. CONTRACTOR SHALL NOT LOOSEN, REMOVE OR CUT ANY ROOFING SYSTEM FASTENERS PROTRUDING THROUGH THE ROOF DECK.
30. ALL ELECTRICAL DEVICES, CONDUIT, J–BOXES, CABLE SUPPORTS, ETC. THAT ARE REQUIRED TO BE SUPPORTED ABOVE THE GRID CEILINGS SHALL BE SUPPORTED FROM THE STRUCTURE VIA THREADED RODS, ALL AREAS.
31. MULTI–WIRE BRANCH CIRCUITS ARE NOT PERMITTED U.O.N. ON DRAWINGS. WHERE THEY ARE INSTALLED THEY SHALL BE COMMON TRIP OR HAVE HANDLE TIES AS REQUIRED BY N.E.C. WHERE HANDLE TIES ARE NOT PHYSICALLY POSSIBLE, PROVIDE WARNING LABEL ON PANEL COVER AND IDENTIFY CIRCUITS ON PANEL SCHEDULE WHICH SHARE A COMMON NEUTRAL.
32. SWITCHES AND RECEPTACLES SHALL BE IDENTIFIED AS TO PANEL AND CIRCUIT BREAKER FED FROM. LABEL COVERPLATE ON FRONT PER SPECIFICATION AND ON BACK WITH PERMANENT INK ENSURE NO BLEED THROUGH.
33. THESE DRAWINGS ARE SUBJECT TO AN APPROVAL OF THE BUILDING DEPARTMENT, FIRE MARSHAL, UTILITY COMPANY, AND OTHER AGENCIES AUTHORITY HAVING JURISDICTION (AHJ). BY THE ACT OF SUBMITTING A BID PROPOSAL FOR WORK, THE CONTRACTOR HAS REVIEWED THE PLANS THOROUGHLY AND ACCEPTS FULL RESPONSIBILITY OF PLAN CORRECTIONS AND ASSOCIATED CONSTRUCTION COSTS REQUIRED BY AHJ.
34. EMERGENCY AND NORMAL LIGHTING CIRCUITS ARE NOT PERMITTED IN COMMON RACEWAY IN ACCORD WITH NEC.
35. ALL LOW VOLTAGE CABLING SHALL BE PLENUM RATED.

ELECTRICAL ABBREVIATIONS

AC	ABOVE COUNTER
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AIC	AMP. INTERRUPTING CAPACITY
AL	ALUMINUM
ANN	ANNUNCIATOR
ARCH	ARCHITECT
BFG	BELOW FINISHED GRADE
BKR	BREAKER
BPS	FIRE ALARM BOOSTER POWER SUPPLY
BTM	BOTTOM
BWE	BAKED WHITE ENAMEL
C	CONDUIT
CASA	COLOR AS SELECTED BY ARCHITECT
CATV	CABLE TELEVISION
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CLG	CEILING
CM	FIRE ALARM CONTROL MODULE
CP	CONTROL PANEL
CR	CONTROL RELAY
CT	CURRENT TRANSFORMER
CU	COPPER
DC	DEDICATED CIRCUIT
DISC	DISCONNECT
DN	DOWN
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
EB	ELECTRONIC BALLAST
EC	ELECTRICAL CONTRACTOR
ELEC	ELECTRICAL
EM	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
E.O.L.	ELECTRICAL OVERLOAD
EWC	ELECTRICAL WATER COOLER
EXIST, EX, (E)	EXISTING
F.	FUSED
FB	FIBER OPTICS
FLR	FLOOR
FLUOR	FLUORESCENT
FSP	DELUGE SYSTEM CONTROL PANEL
GC	GENERAL CONTRACTOR
GFI	GROUND FAULT INTERRUPTER
GRC	GALVANIZED RIGID CONDUIT
GRD	GROUND
GRP	GROUND FAULT PROTECTED RECEPTACLE
HOA	HAND–OFF–AUTO
HOR	HAND–OFF–REMOTE
HT	HEAT TRACE
IG	ISOLATED GROUND
J–BOX	JUNCTION BOX
LED	LIGHT–EMITTING DIODE
LOC	LOCATION
LTG	LIGHTING
LTF	LIQUID TIGHT FLEXIBLE CONDUIT
LTS	LIGHTS
MC	MECHANICAL CONTRACTOR
MCB	MAIN CIRCUIT BREAKER
MCP	MOTOR CIRCUIT PROTECTOR
MCS	MOLDED CASE SWITCH
MDP	MAIN DISTRIBUTION PANEL
MECH	MECHANICAL
MLO	MAIN LUG ONLY
MTD	MOUNTED
(N)	NEW
NF	NON FUSED
N.T.S.	NOT TO SCALE
NL	NIGHT LIGHT
PB	PUSH BUTTON
PC	PHOTO CELL
PH	PHASE
PNL	PANEL
PT	POTENTIAL TRANSFORMER
PWR	POWER
RECEPT, RCPT, REC	RECEPTACLE
RL	RELOCATE
RT	RAIN TIGHT, NEMA 3R
S/N	SOLID NEUTRAL
S/S	START/STOP
S–SW	SAFETY SWITCH
SCA	SHORT CIRCUIT AVAILABLE
SPC	SPACE
SPD	SURGE PROTECTION DEVICE
SPDT	SINGLE POLE DOUBLE THROW
SPST	SINGLE POLE SINGLE THROW
SPR	SPARE
SPS	SECURITY POWER SUPPLY PANEL
SSL	SOLID–STATE LIGHTING
SW	SWITCH
T–STAT	THERMOSTAT
TBD	TO BE DETERMINED
TC	TIME CLOCK
TTB	TELEPHONE TERMINAL BACKBOARD
TYP	TYPICAL
U.O.N.	UNLESS OTHERWISE NOTED
UC	UNDER COUNTER
V	VOLTS
VA	VOLT–AMPERES
VAC	VOLTS–ALTERNATING CURRENT
VFD	VARIABLE FREQUENCY DRIVE
W	WATTS
W/	WITH
W/O	WITHOUT
WG	WIRE GUARD
WP	WEATHERPROOF
XFMR	TRANSFORMER

NOTE: THIS IS A COMPREHENSIVE LEGEND AND ABBREVIATIONS LIST AND ALL SYMBOLS SHOWN MAY NOT APPEAR ON DRAWINGS.

ELECTRICAL DRAWING INDEX

ELECTRICAL LEGEND

Symbol	Description
	FLAG NOTE
	MECHANICAL EQUIPMENT SYMBOL
	SPECIAL EQUIPMENT SYMBOL
	INDICATES AIMING DIRECTION
	INDICATES EXISTING DEVICE TO REMAIN
	INDICATES EXISTING DEVICE TO BE REMOVED
	EXISTING CIRCUIT RUN TO REMAIN
	EXISTING CIRCUIT RUN TO BE REMOVED
	CIRCUIT RUN: EXPOSED
	CIRCUIT RUN: UNDERFLOOR
—UG—	CIRCUIT RUN: UNDERGROUND
	CIRCUIT RUN: WALLS OR CEILING
	CIRCUIT TURNS UP
	CIRCUIT TURNS DOWN
— T —	UNDERGROUND TELEPHONE RUN
— P —	UNDERGROUND SECONDARY OR PRIMARY SERVICE
— G —	GROUND BUS
—SR—	SURFACE RACEWAY
—PS—	PLUG STRIP AS NOTED
—LV—	LOW VOLTAGE CIRCUIT
	MOISTURE OR EXPLOSION PROOF SEAL
	HOME RUN (PROVIDE DEDICATED NEUTRALS MULTI–WIRE BRANCH CIRCUITS NOT ALLOWED)
A–1,3,5	A – PANEL DESIGNATION 1,3,5 – CIRCUIT NUMBER, 6 CONDUCTORS U.O.N.
T	TRANSFORMER
	WEATHERHEAD
	MAIN DISTRIBUTION PANEL
	SWITCH AND FUSE
	CIRCUIT BREAKER
	CT'S
	PT'S
	GROUND
M	METER
	ELECTRICAL PANEL
	TELEPHONE TERMINAL BOARD
	MOUNTING BACKBOARD
FS	FLOW SWITCH
	TAMPER SWITCH: OS & Y
E.O.L.	END OF LINE RESISTOR
	CONTACT – NORMALLY CLOSED (NC)
	CONTACT – NORMALLY OPEN (NO)
	LIGHTING OUTLET: CEILING RECESSED
A b	LIGHTING OUTLET: CEILING SURFACE A – FIXTURE TYPE, b – SWITCHING
	LIGHTING OUTLET: WALL MOUNTED
	SPOT LIGHT
K pc	PORCELAIN KEYLESS P&S110 W/ 150W A21 LAMP – pc (PULL CHAIN)
	FLUORESCENT/LED FIXTURE: SURFACE
	FLUORESCENT FIXTURE/LED: SUSPENDED DIRECT/INDIRECT
	FLUORESCENT/LED FIXTURE: RECESSED IN DRYWALL
	FLUORESCENT/LED FIXTURE: RECESSED IN GRID
	FLUORESCENT/LED FIXTURE: RECESSED IN GRID DIRECT/INDIRECT
	FLUORESCENT/LED FIXTURE: RECESSED IN GRID PARABOLIC (U.O.N.)
	FLUORESCENT/LED FIXTURE: WALL MOUNTED
	FLUORESCENT/LED STRIP
	TRACK LIGHTING FIXTURE
	INDICATES NIGHT LIGHT OR EMERGENCY CIRCUIT
	INDICATES NIGHT LIGHT OR EMERGENCY CIRCUIT
	LED HIGH BAY FIXTURE: THREAD ROD MOUNTED
	LED HIGH BAY FIXTURE: WALL MOUNTED
	EXIT SIGN: CEILING MOUNTED
	EXIT SIGN: WALL MOUNTED
	EMERGENCY BATTERY WITH NO LAMPS(HEADS)
	EMERGENCY BATTERY WITH LAMPS
	REMOTE EMERGENCY LIGHTS
	REMOTE INDICATING LIGHT
	POLE MOUNTED FIXTURE
	POST TOP FIXTURE
	LIGHTING CONTROL STATION
OS	OCCUPANCY SENSOR
VS	VACANCY SENSOR
P	PHOTO CELL – ELECTRIC
C OR C	CONTACTOR
R	RELAY
FACP	FIRE ALARM CONTROL PANEL
ANN	FIRE ALARM ANNUNCIATOR PANEL
F	MANUAL PULL STATION, + 48" AFF TO TOP OF BOX (U.O.N.)
S	STROBE UNIT ONLY, + 80" AFF U.O.N.
H	HORN UNIT ONLY, + 80" AFF U.O.N.
	AUDIBLE/VISUAL HORN, + 80" AFF U.O.N.
H	EXTERIOR HORN AND LIGHT, + 10'–0" AFG
S	DUCT SMOKE DETECTOR
S	SMOKE DETECTOR: CEILING PHOTOELECTRIC
I	SMOKE DETECTOR: CEILING – IONIZATION
H	THERMAL DETECTOR – CEILING MOUNTED
CM	FIRE ALARM CONTROL MODULE
MD	MOTION DETECTOR
$	NOTE: ALL SWITCHES SHALL BE MOUNTED AT 48" AFF TO TOP OF BOX (U.O.N.)
$	SINGLE POLE SWITCH, 20 AMP U.O.N.
$2	DOUBLE POLE SWITCH, 20 AMP U.O.N.
$3	3 – WAY SWITCH, 20 AMP U.O.N.
$3a	SINGLE POLE SWITCH, 20 AMP U.O.N. 3 – THREE WAY, a – SWITCHING
$4	4 – WAY SWITCH, 20 AMP U.O.N.
$K	KEYED SWITCH, 20 AMP U.O.N.
$LV	SWITCH LOW VOLTAGE
$P	PILOT SWITCH, 20 AMP U.O.N. SWITCH ON, LIGHT ON
$TO	SWITCH WITH THERMAL OVERLOAD, 20 AMP U.O.N.
$TS	SWITCHED FUSED, 20 AMP U.O.N.
$VS	SWITCH VARIABLE SPEED
D	DIMMER SWITCH AS NOTED, 20 AMP U.O.N.
	COMBINATION SWITCH/RECEPTACLE
	SINGLE RECEPTACLE, + 16" AFF TO BOTTOM OF BOX (U.O.N)
	DUPLEX RECEPTACLE, + 16" AFF TO BOTTOM OF BOX (U.O.N)
GFI	DUPLEX RECEPTACLE, INDIVIDUAL GROUND FAULT RECEPTACLE
	DOUBLE DUPLEX RECEPTACLE, + 16" AFF TO BOTTOM OF BOX (U.O.N)
	DUPLEX RECEPTACLE, SPLIT WIRED
	COMBINATION CCTV/CATV WITH DUPLEX RECEPTACLE, + 72" AFF TO BOTTOM OF BOX (U.O.N.)
	TELEVISION OUTLET, + 16" AFF TO BOTTOM OF BOX (U.O.N.)
	COMBINATION CATV/DATA WITH 1"C, + 16" AFF TO BOTTOM OF BOX (U.O.N.)
(X) W–P	TELEPHONE OUTLET, + 16" AFF TO BOTTOM OF BOX (U.O.N.) W – WALL OUTLET, + 54" AFF (U.O.N.) P – PAYPHONE, + 40" AFF (U.O.N.) X DENOTES # OF JACKS
(X)	DATA OUTLET, + 16" AFF TO BOTTOM OF BOX (U.O.N.) X DENOTES # OF JACKS
	DATA/VOICE OUTLET, + 16" AFF TO BOTTOM OF BOX (U.O.N.)
	SPECIAL PURPOSE OUTLET AS NOTED, + 16" AFF TO BOTTOM OF BOX (U.O.N.)
S	FLUSH FLOOR TELEPHONE OUTLET S – SURFACE PEDESTAL
S	FLUSH FLOOR DUPLEX OUTLET S – SURFACE PEDESTAL
	MULTI–CELL FLOOR BOX
J	J–BOX: CEILING
J	J–BOX: WALL
J CN	COMPUTER NETWORKING J–BOX, + 16" AFF TO BOTTOM OF BOX (U.O.N)
TS	TIME SWITCH
	CLOCK OUTLET, + 7'–0" AFF U.O.N
C S	CLOCK/SPEAKER COMBINATION, + 8'–0" AFF TO TOP OF BOX (U.O.N)
MC	MASTER CLOCK
TC	TIME CLOCK
	INTERCOM PUSH BUTTON, + 48" AFF TO TOP OF BOX (U.O.N.)
	INTERCOM CALL STATION, + 48" AFF TO TOP OF BOX (U.O.N.)
H	INTERCOM HAND SET, + 48" AFF TO TOP OF BOX (U.O.N.)
CA	CARD ACCESS STATION
HC	HANDICAP ACCESS STATION
	SECURITY PUSH BUTTON
	SECURITY CAMERA
BD	BEAM DETECTOR
MD	MOTION DETECTOR
D	MAGNETIC DOOR CLOSER
EPO	EMERGENCY POWER OFF
	EMERGENCY POWER OFF (MUSHROOM HEAD)
T	THERMOSTAT
	PUSH BUTTON STATION
	MOTOR OUTLET AND CONNECTION
	MAGNETIC STARTER OR CONTACTOR
	DISCONNECT SWITCH
F	DISCONNECT SWITCH N – FUSED
FS	FIRE–SMOKE DETECTOR/SMOKE DAMPER
PH	PHASE MONITOR
A	AMPLIFIER
M	MICROPHONE OUTLET, + 16" AFF TO BOTTOM OF BOX (U.O.N.)
S	SPEAKER
V	VOLUME CONTROLLER – WALL MOUNTED, + 48" AFF TO TOP OF BOX (U.O.N.)
B	AUDIBLE BELL, + 80" AFF U.O.N.
	SOLENOID
M	MIC OUTLET

COLORADO LICENSED PROFESSIONAL ENGINEER TRAVIS J. POFAHL 37558

05/28/20

GREELEY IG EVENT CENTER LIGHTING

GREELEY, COLORADO

+ ASSOCIATES, LLC.
ELECTRICAL ENGINEERS
4645 W. 18TH ST, SUITE #200
GREELEY, COLORADO 80634
GREELEY: (970) 330–3266

JOB	20029
DATE	04-30-2020
DRAWN	CAD
CHECKED	TJP

GENERAL CONSTRUCTION NOTES AND LEGEND

E001

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FLAG NOTES – THIS SHEET ONLY

1. NEW PANEL REPLACES EXISTING IN SAME PLACE RE-CONNECT FEEDER AND ALL BRANCH CIRUITS.
2. MAKE 120 VOLT, 20 AMP CIRCUIT CONNECTION TO LCP-MAIN. (2 #10 & #10 GRD) 3/4"C.
3. REFER TO LOW VOLTAGE LIGHTING CONTROL SYSTEM RISER, SHEET E700, FOR WIRE TYPE, NUMBER OF RUNS, ETC.

LIGHTING CONTROL SYMBOL LEGEND

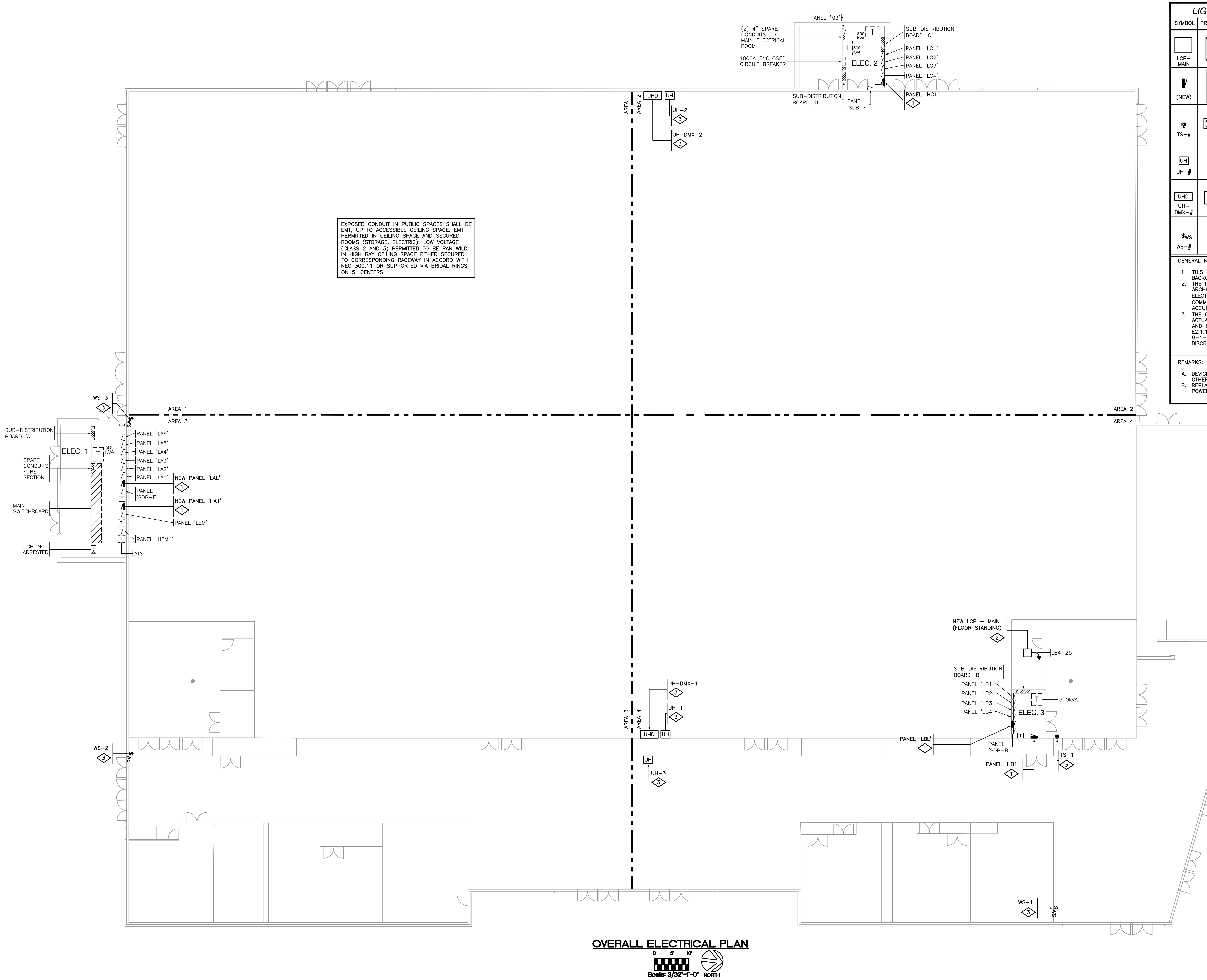
SYMBOL	PRODUCT	DESCRIPTION	REMARKS
LCP-MAIN		DRd HEAD END LIGHTING CONTROL EQUIPMENT RACK	A
(NEW)		SENSOR IQ INTELLIGENT RELAY PANEL	B
TS-#		P-TS7-WM – 7" PARADIGM TOUCHSCREEN CONTROLLER	A
UH UH-#		UH1RS – UNISON PORTABLE RECEPTACLE STATION	A
UHD UH-DMX-#		UH-DMX – DMX PLUG IN RECEPTACLE STATION	A
$WS WS-#		PI1008 – PARADIGM 8-BUTTON WALL STATION	A

GENERAL NOTES:

1. THIS PLAN IS FOR REFERENCE ONLY. ACCURACY OF BUILDING BACKGROUNDS IS NOT GUARANTEED.
2. THE INFORMATION ON THIS PLAN, INCLUDING THE BUILDING ARCHITECTURAL BACKGROUNDS, LIGHT FIXTURE LOCATIONS, AND ELECTRICAL CIRCUITING IS BASED ON PREVIOUS "ISLAND GROVE COMMUNITY BUILDING" PLANS DATED 9-1-00 PROVIDED TO GLS. ACCURACY IS NOT GUARANTEED.
3. THE CIRCUITS INDICATED FOR THE NEW TYPE 'SB' FIXTURES ARE ACTUAL EXISTING CIRCUITS SERVING THE CURRENT METAL HALIDE AND HIGH PRESSURE SODIUM LIGHTS, AS SPECIFIED ON SHEETS E2.1.1 – E2.1.4 OF THE PREVIOUS BUILDING PLANS DATED 9-1-00. EC TO CONFIRM AND NOTIFY ENGINEER OF DISCREPANCIES PRIOR TO DEMOLITION.

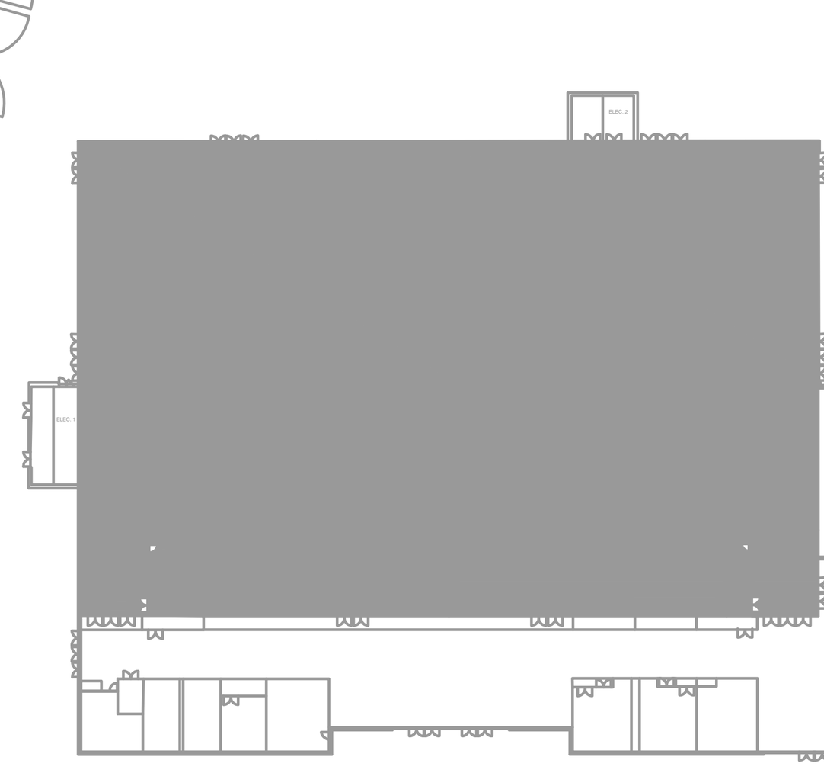
REMARKS:

A. DEVICES TO BE INSTALLED WHERE INDICATED, OR WHERE OTHERWISE DIRECTED BY THE OWNER.
B. REPLACE EXISTING LIGHTING CONTROL PANEL, REUSE EXISTING POWER FEEDERS AND BRANCH CIRCUITS.



OVERALL ELECTRICAL PLAN

Scale: 3/32"=1'-0"



KEY PLAN

COLORADO LICENSED TRAVIS J. POFAHL 37568 PROFESSIONAL ENGINEER
05/28/20

GREELEY IG EVENT CENTER LIGHTING

GREELEY, COLORADO

RMS Nuth + ASSOCIATES, LLC. ELECTRICAL ENGINEERS
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GREELEY: (970) 330-3266

JOB	20029
DATE	04-30-2020
DRAWN	CAD
CHECKED	TJP

LIGHTING PLAN

E100

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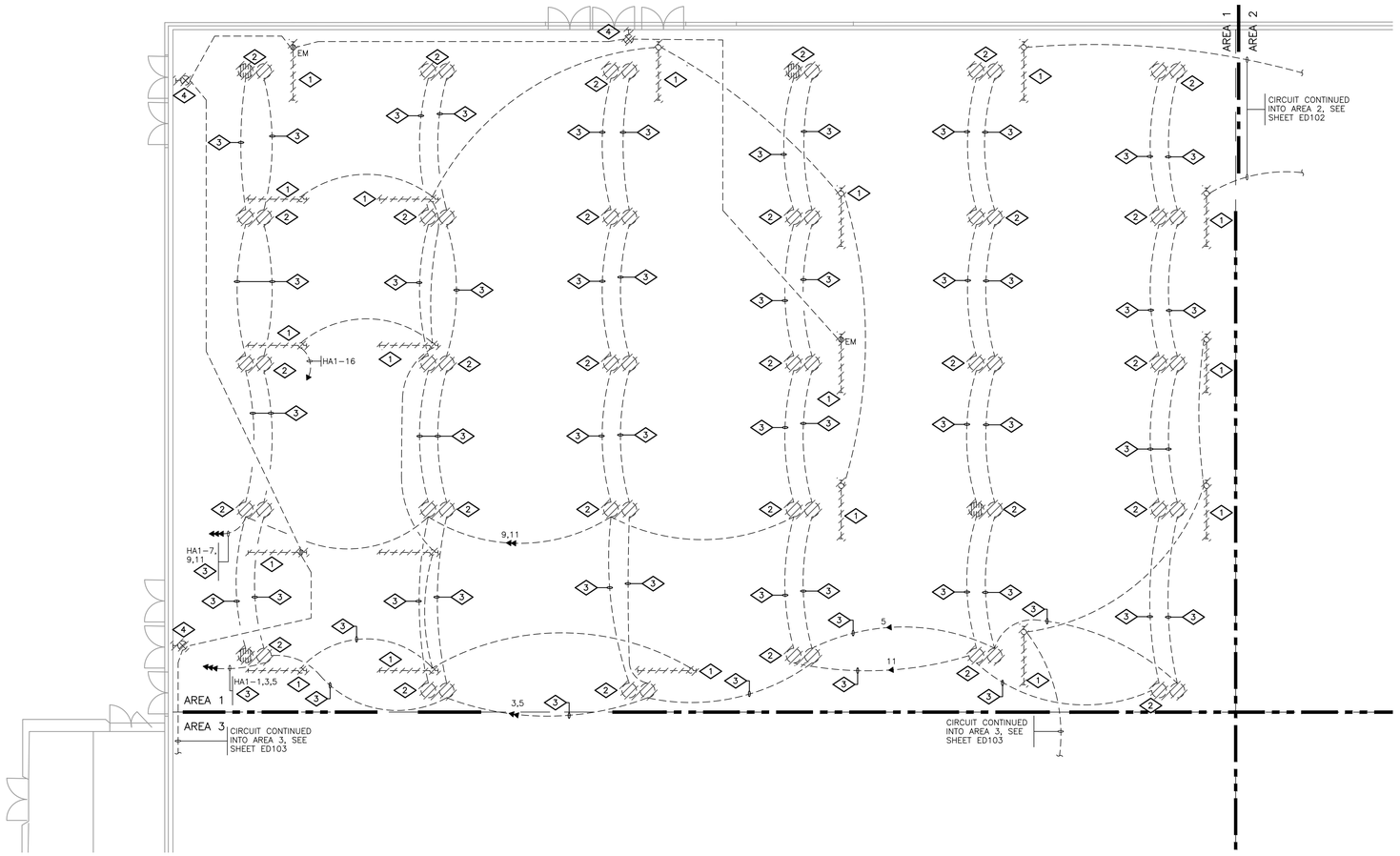
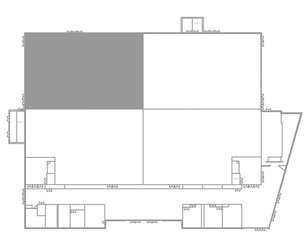
FLAG NOTES – DEMO LIGHTING PLANS ONLY	
1	REMOVE EXISTING 8'–0" FLOURESCENT STRIP. CIRCUIT TO REMIAN TO CONNECT NEW LED STRIP FIXTURES (U.O.N).
2	REMOVE EXISTING TWIN HEAD HID FIXTURES. EXISTING CIRCUITS TO REMAIN AND RECONNECT TO NEW SB SINGLE HEAD LED FIXTURE. IF CIRCUIT IS NOT USE MAINTAIN CIRCUIT FOR USE OR FUTURE. TYPICAL FOR ALL TWIN HEAD HID FIXTURES (U.O.N).
3	REMOVE #12 CONDUCTORS & GRD, REUSE EXISTING CONDUIT.
4	REMOVE EXISTING EXIT LIGHT CIRCUIT TO REMAIN RECONNECT TO NEW EXIT LIGHT.
5	REMOVE EXISTING F & F2 LIGHT FIXTURES, CIRCUIT TO REMAIN. RECONNECT TO NEW FIXTURES.
6	REMOVE EXISTING FIXTURE J4 & J7 LIGHT FIXTURES, CIRCUIT TO REMAIN. RECONNECT TO NEW FIXTURES.



DEMO LIGHTING PLAN – AREA 1

0 5' 10'

Scale: 1/8"=1'-0" NORTH



KEY PLAN

COLORADO LICENSED TRAVIS J. POPMA 37566 PROFESSIONAL ENGINEER

05/28/20

GREELEY IG EVENT CENTER LIGHTING

GREELEY, COLORADO

RJ Nutt + ASSOCIATES, LLC
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4640 W. 10TH ST. SUITE #500
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GREELEY: (970) 330-3266

JOB	20029
DATE	04-30-2020
DRAWN	CAD
CHECKED	TJP

DEMO LIGHTING PLAN - AREA 1

ED101

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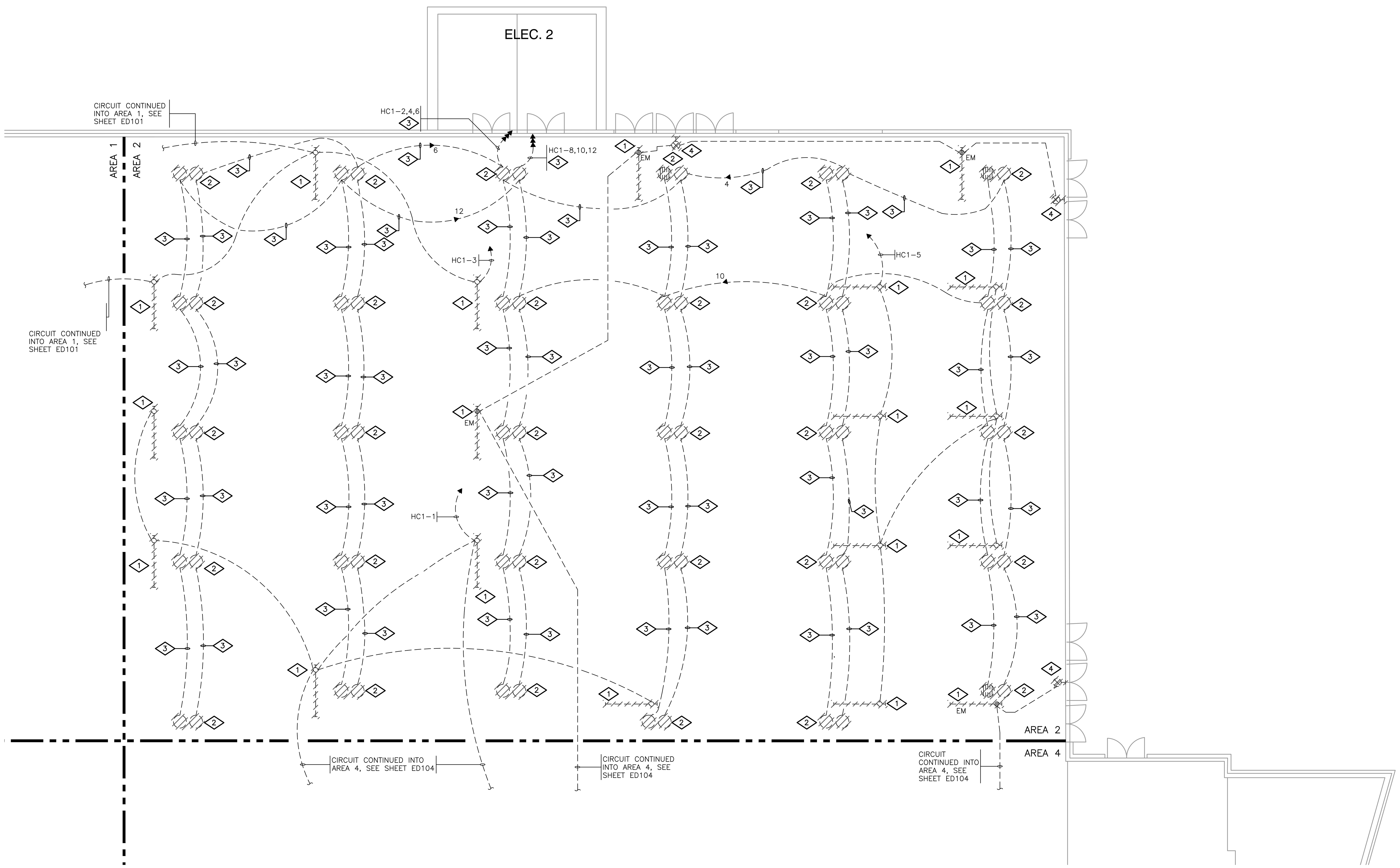
FLAG NOTES – DEMO LIGHTING PLANS ONLY	
1	REMOVE EXISTING 8'–0" FLOURESCENT STRIP. CIRCUIT TO REMIAN TO CONNECT NEW LED STRIP FIXTURES (U.O.N).
2	REMOVE EXISTING TWIN HEAD HID FIXTURES. EXISTING CIRCUITS TO REMAIN AND RECONNECT TO NEW SB SINGLE HEAD LED FIXTURE IF CIRCUIT IS NOT USE MAINTAIN CIRCUIT FOR USE OR FUTURE. TYPICAL FOR ALL TWIN HEAD HID FIXTURES (U.O.N).
3	REMOVE #12 CONDUCTORS & GRD, REUSE EXISTING CONDUIT.
4	REMOVE EXISTING EXIT LIGHT CIRCUIT TO REMAIN RECONNECT TO NEW EXIT LIGHT.
5	REMOVE EXISTING F & F2 LIGHT FIXTURES, CIRCUIT TO REMAIN. RECONNECT TO NEW FIXTURES.
6	REMOVE EXISTING FIXTURE J4 & J7 LIGHT FIXTURES, CIRCUIT TO REMAIN. RECONNECT TO NEW FIXTURES.



DEMO LIGHTING PLAN - AREA 2

Scale: 1/8"=1'-0"

NORTH

COLORADO LICENSED
TRAVIS J. POFAHL
37568
PROFESSIONAL ENGINEER
05/28/20

GREELEY IG EVENT CENTER LIGHTING

GREELEY, COLORADO

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JOB	20029
DATE	04-30-2020
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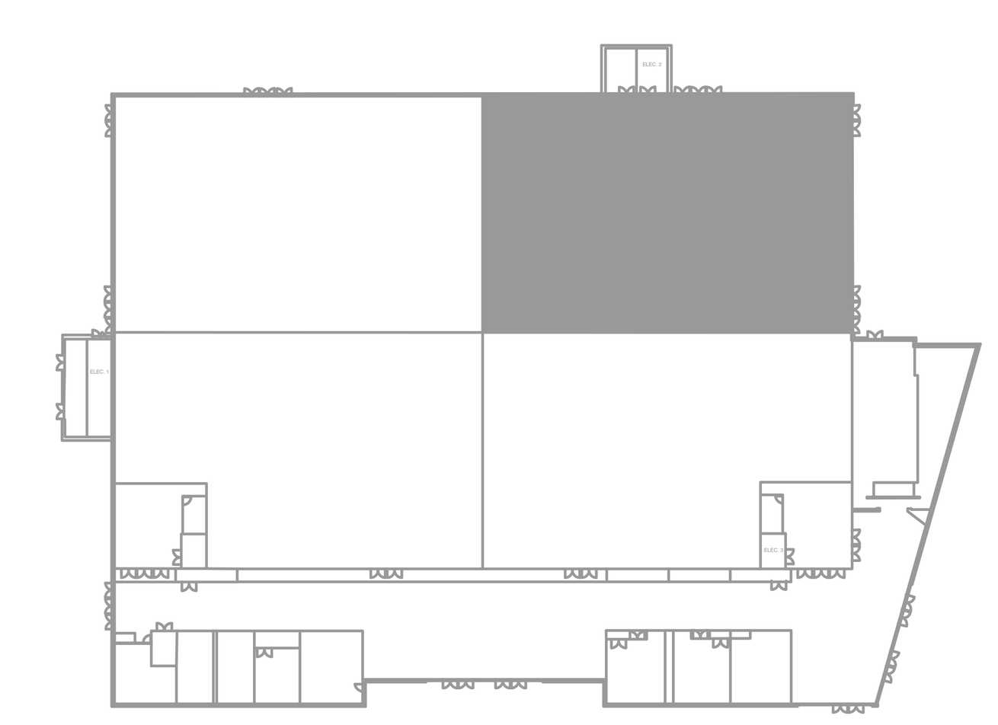

KEY PLAN

DEMO LIGHTING PLAN - AREA 2

ED102

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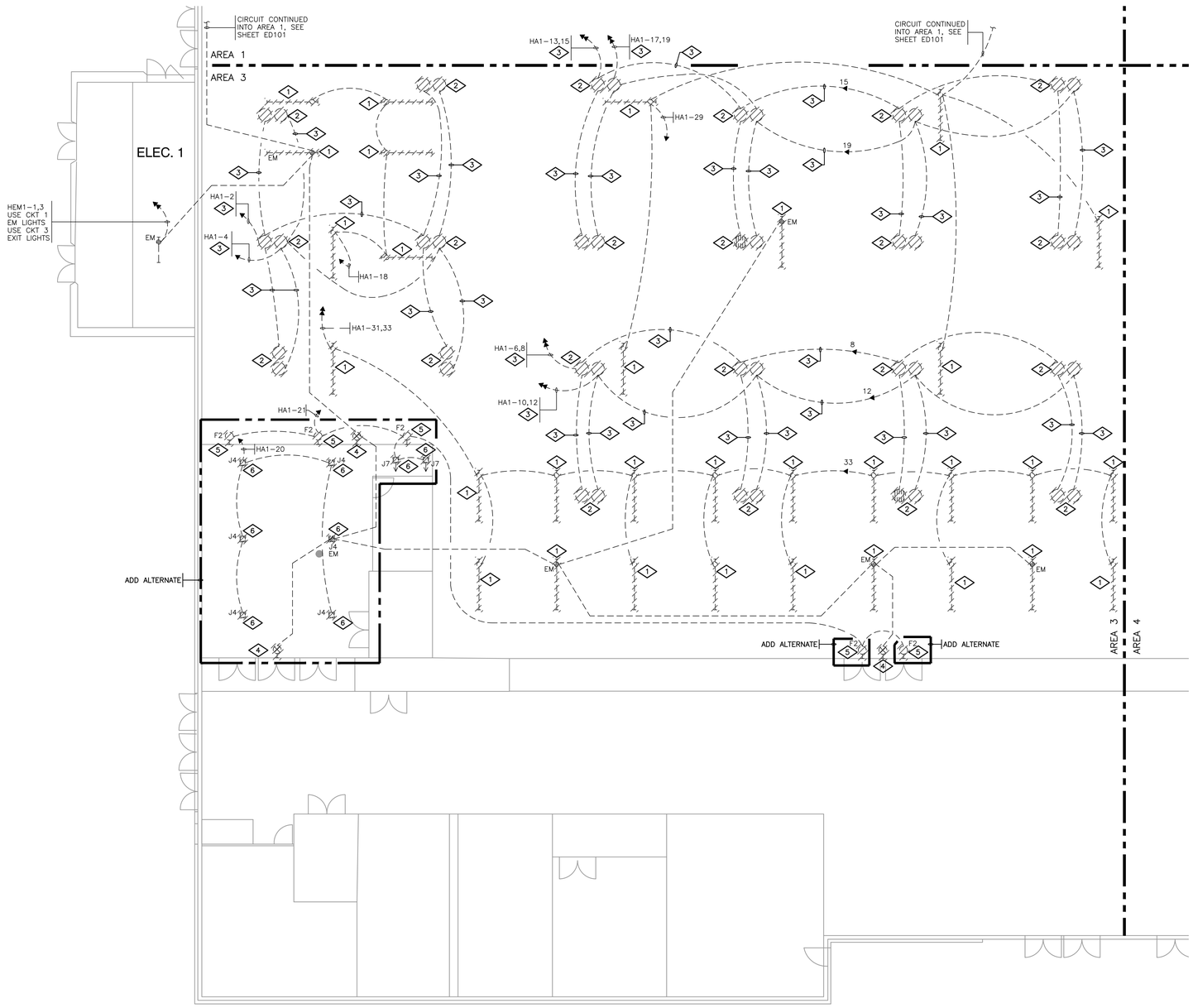
FLAG NOTES – DEMO LIGHTING PLANS ONLY	
1	REMOVE EXISTING 8'–0" FLOURESCENT STRIP. CIRCUIT TO REMIAN TO CONNECT NEW LED STRIP FIXTURES (U.O.N).
2	REMOVE EXISTING TWIN HEAD HID FIXTURES. EXISTING CIRCUITS TO REMAIN AND RECONNECT TO NEW SB SINGLE HEAD LED FIXTURE. IF CIRCUIT IS NOT USE MAINTAIN CIRCUIT FOR USE OR FUTURE. TYPICAL FOR ALL TWIN HEAD HID FIXTURES (U.O.N).
3	REMOVE #12 CONDUCTORS & GRD, REUSE EXISTING CONDUIT.
4	REMOVE EXISTING EXIT LIGHT CIRCUIT TO REMAIN RECONNECT TO NEW EXIT LIGHT.
5	REMOVE EXISTING F & F2 LIGHT FIXTURES, CIRCUIT TO REMAIN. RECONNECT TO NEW FIXTURES.
6	REMOVE EXISTING FIXTURE J4 & J7 LIGHT FIXTURES, CIRCUIT TO REMAIN. RECONNECT TO NEW FIXTURES.

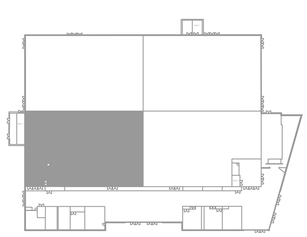


DEMO LIGHTING PLAN – AREA 3

0 5' 10'

Scale: 1/8"=1'-0"

NORTH



KEY PLAN

05/28/20

GREELEY IG EVENT CENTER LIGHTING

GREELEY, COLORADO

RJ Nutt + ASSOCIATES, LLC
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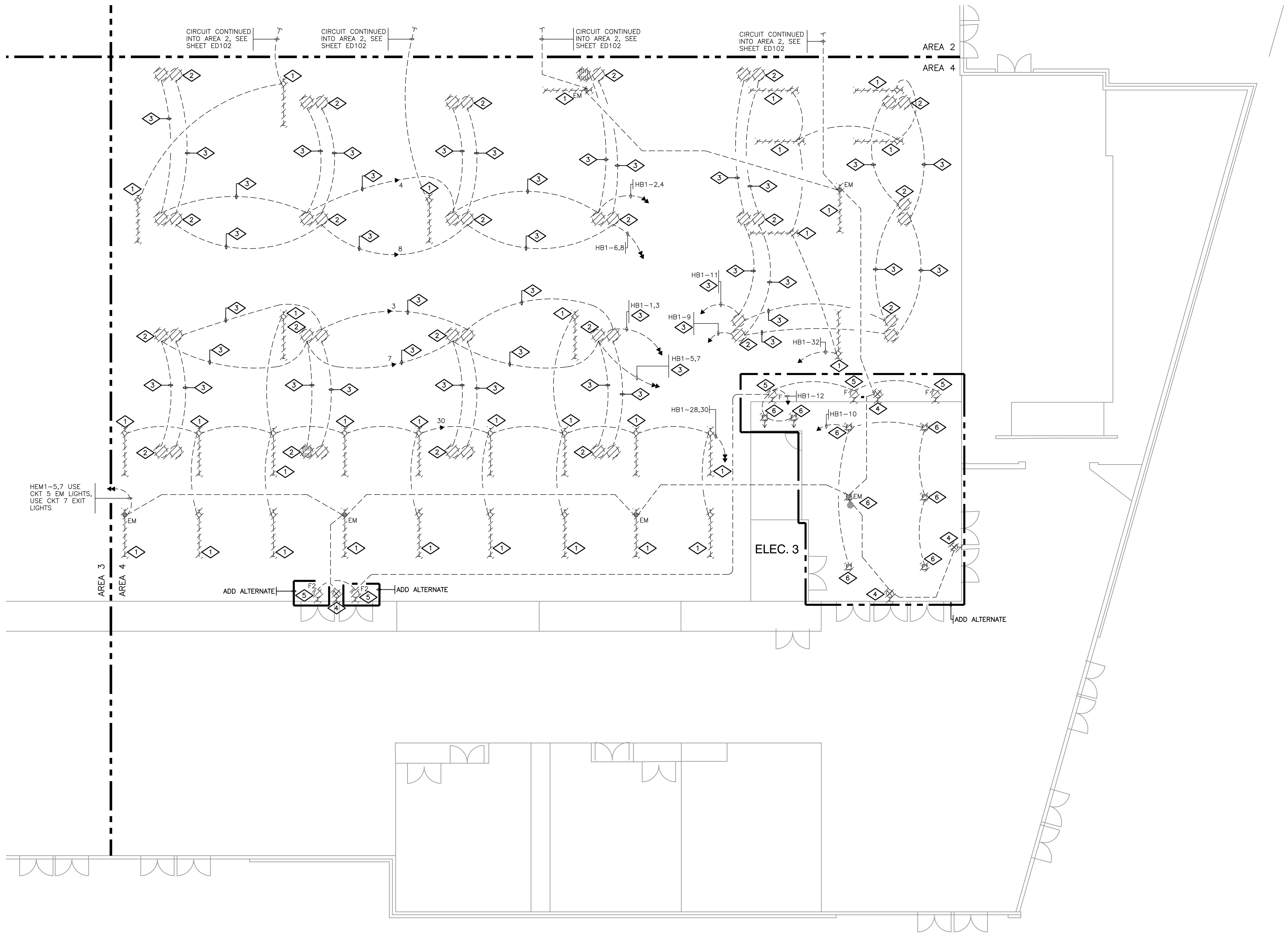
GREELEY: (970) 330-3266

JOB	20029
DATE	04-30-2020
DRAWN	CAD
CHECKED	TJP

DEMO LIGHTING PLAN - AREA 3

ED103

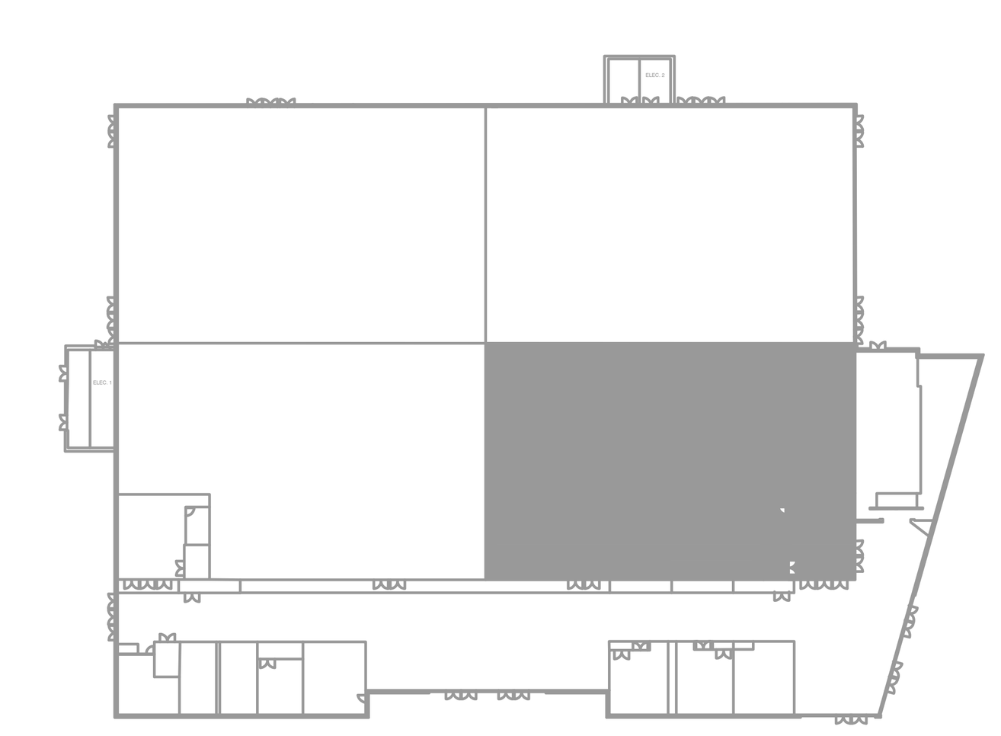
FLAG NOTES – DEMO LIGHTING PLANS ONLY	
1	REMOVE EXISTING 8'-0" FLOURESCENT STRIP. CIRCUIT TO REMIAN TO CONNECT NEW LED STRIP FIXTURES (U.O.N).
2	REMOVE EXISTING TWIN HEAD HID FIXTURES. EXISTING CIRCUITS TO REMAIN AND RECONNECT TO NEW SB SINGLE HEAD LED FIXTURE IF CIRCUIT IS NOT USE MAINTAIN CIRCUIT FOR USE OR FUTURE. TYPICAL FOR ALL TWIN HEAD HID FIXTURES (U.O.N).
3	REMOVE #12 CONDUCTORS & GRD, REUSE EXISTING CONDUIT.
4	REMOVE EXISTING EXIT LIGHT CIRCUIT TO REMAIN RECONNECT TO NEW EXIT LIGHT.
5	REMOVE EXISTING F & F2 LIGHT FIXTURES, CIRCUIT TO REMAIN. RECONNECT TO NEW FIXTURES.
6	REMOVE EXISTING FIXTURE J4 & J7 LIGHT FIXTURES, CIRCUIT TO REMAIN. RECONNECT TO NEW FIXTURES.



DEMO LIGHTING PLAN - AREA 4

Scale: 1/8"=1'-0"

NORTH



KEY PLAN

COLORADO LICENSED TRAVIS J. POFAHL 37558 PROFESSIONAL ENGINEER

05/28/20

GREELEY IG EVENT CENTER LIGHTING

GREELEY, COLORADO

RJ McNutt + ASSOCIATES, LLC. ELECTRICAL ENGINEERS

JOB	20029
DATE	04-30-2020
DRAWN	CAD
CHECKED	TJP

DEMO LIGHTING PLAN - AREA 4

ED104

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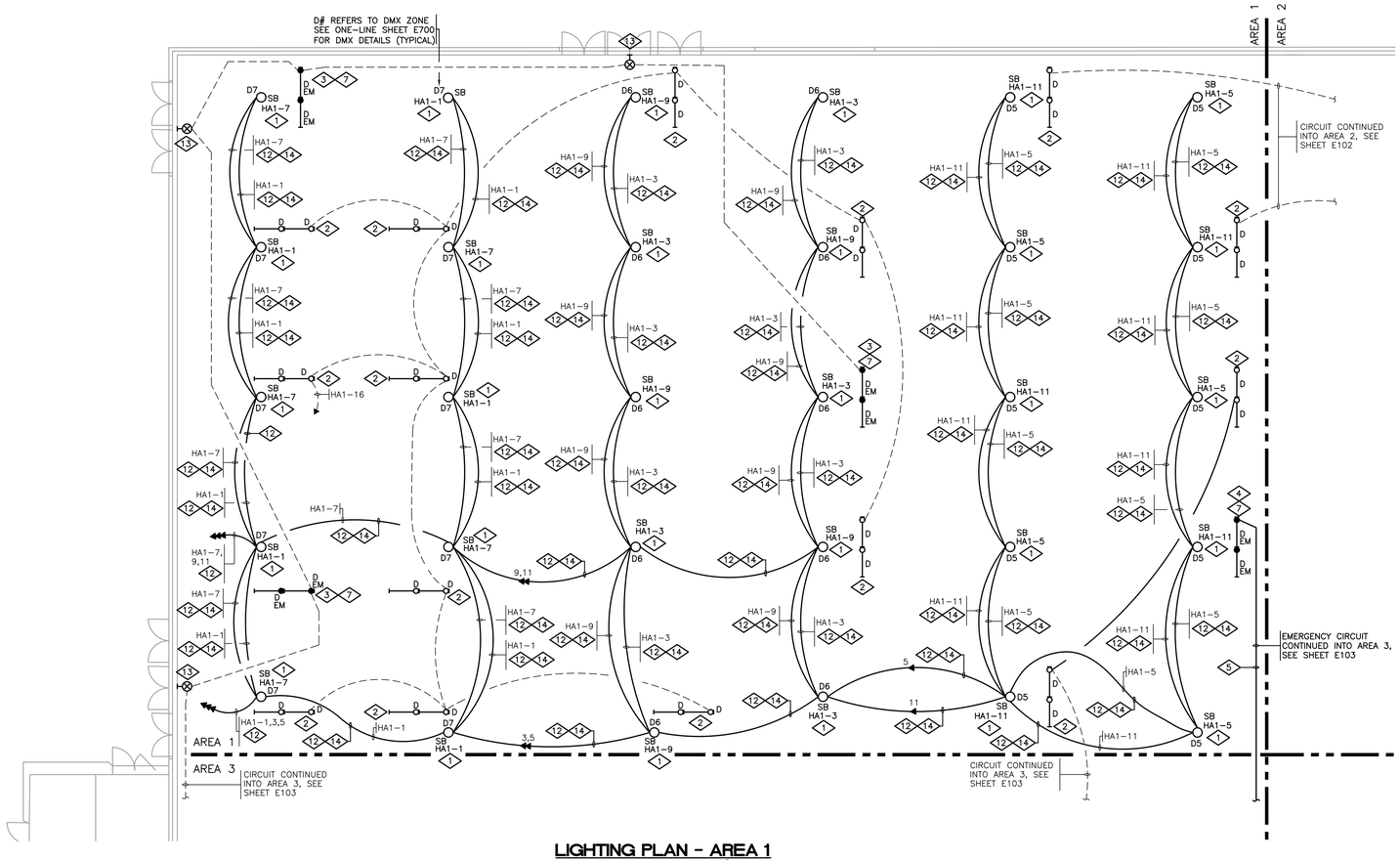
FLAG NOTES – LIGHTING PLANS ONLY	
1	AT 'SB' LIGHT FIXTURE CONNECT TO CIRCUIT & PANEL INDICATED, EXAMPLE 'HA1' IS PANEL, '9' IS CIRCUIT NUMBER, TYPICAL AT ALL 'SB' FIXTURES. SEE LOW VOLTAGE LIGHTING CONTROL SYSTEM RISER AND FIXTURE POWER AND DMX CONNECTION DETAILS ON SHEET E700 FOR LOW VOLTAGE CABLIING REQUIREMENTS TO FIXTURE..
2	NEW TYPE 'D' LIGHT FIXTURES RECONNECT TO EXISTING LIGHTING CIRCUIT FROM REMOVED FLUORESCENT STRIP FIXTURE.
3	NEW TYPE 'D' LIGHT FIXTURE RECONNECT TO EXISTING EMERGENCY LIGHTING CIRCUIT FROM REMOVE 'D' FLUORESCENT STRIP FIXTURE.
4	NEW TYPE 'D' LIGHT FIXTURE TO BE CONNECTED TO EMERGENCY LIGHTING CIRCUIT. EXISTING NORMAL LIGHTING FIXTURE CIRCUIT TO BE MAINTAINED. NOTE: EMERGENCY AND NORMAL CIRCUITS MUST BE ROUTED IN SEPARATE RACEWAYS.
5	EXTEND NEW EMERGENCY LIGHTING CIRCUIT TO NEW LIGHTS CONNECTED TO EMERGENCY SYSTEM, SEE FLAG NOTE #4.
6	NEW TYPE 'F' AND 'F2' LIGHT FIXTURES RECONNECT TO EXISTING LIGHTING CIRCUIT FROM REMOVED TYPE 'F' FIXTURES.
7	SWITCHED EMERGENCY FIXTURE – SEE ALCR DETAIL FOR CONTROL.
8	NEW TYPE 'J4' LIGHT FIXTURES, RECONNECT TO EXISTING LIGHTING CIRCUIT FROM REMOVED TYPE 'J4' FIXTURES.
9	NEW TYPE 'J4' LIGHT FIXTURE, RECONNECT TO EXISTING EMERGENCY LIGHTING CIRCUIT FROM REMOVED TYPE 'J4' FIXTURE.
10	NEW TYPE 'J7' LIGHT FIXTURES, RECONNECT TO EXISTING LIGHTING CIRCUIT FROM REMOVED TYPE 'J7' FIXTURES.
11	NEW TYPE 'J7' LIGHT FIXTURES, PROVIDE SAME MOUNTING AS OTHER TYPE 'J7' LIGHT FIXTURES. CONNECT INTO EXISTING TYPE 'J7' LIGHTING CIRCUIT.
12	EC TO PULL #10 CONDUCTORS AND GRD IN EXISTING CONDUIT ON ALL CIRCUITS FEEDING NEW 'SB' LIGHT FIXTURES.
13	NEW EXIT LIGHT RECONNECT TO EXISTING UNSWITCHED EMERGENCY CIRCUIT.
14	CONNECT CIRCUIT INDICATED AT EACH FIXTURE. MAINTAIN CIRCUIT CONTINUITY FOR THE OTHER EXISTING CIRCUIT.
15	LOCATE TWO ALCR EMERGENCY LIGHTING CONTROL RELAY AT PANEL 'HEM1' TO CONTROL EM LIGHTS IN AREA. PROVIDE LOW VOLTAGE CABLE TO MAIN LPC RACK TO TIE INTO NEW LIGHTING CONTROLS.
16	RUN CIRCUIT HEM1–1 THRU NEW ALCR CONTROL RELAY. CKT 3 TO REMAIN UNSWITCHED FOR EXIT LIGHTS.
17	RUN CIRCUIT HEM1–5 THRU NEW ALCR CONTROL RELAY. CKT 7 TO REMAIN UNSWITCHED FOR EXIT LIGHTS.
18	FIXTURE SHALL BE ON CONTINUOUSLY (NL).

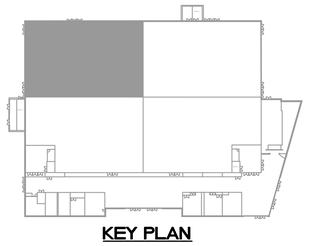


LIGHTING PLAN - AREA 1

0 5' 10'

Scale: 1/8"=1'-0"

NORTH



KEY PLAN

05/28/20

GREELEY IG EVENT CENTER LIGHTING

GREELEY, COLORADO

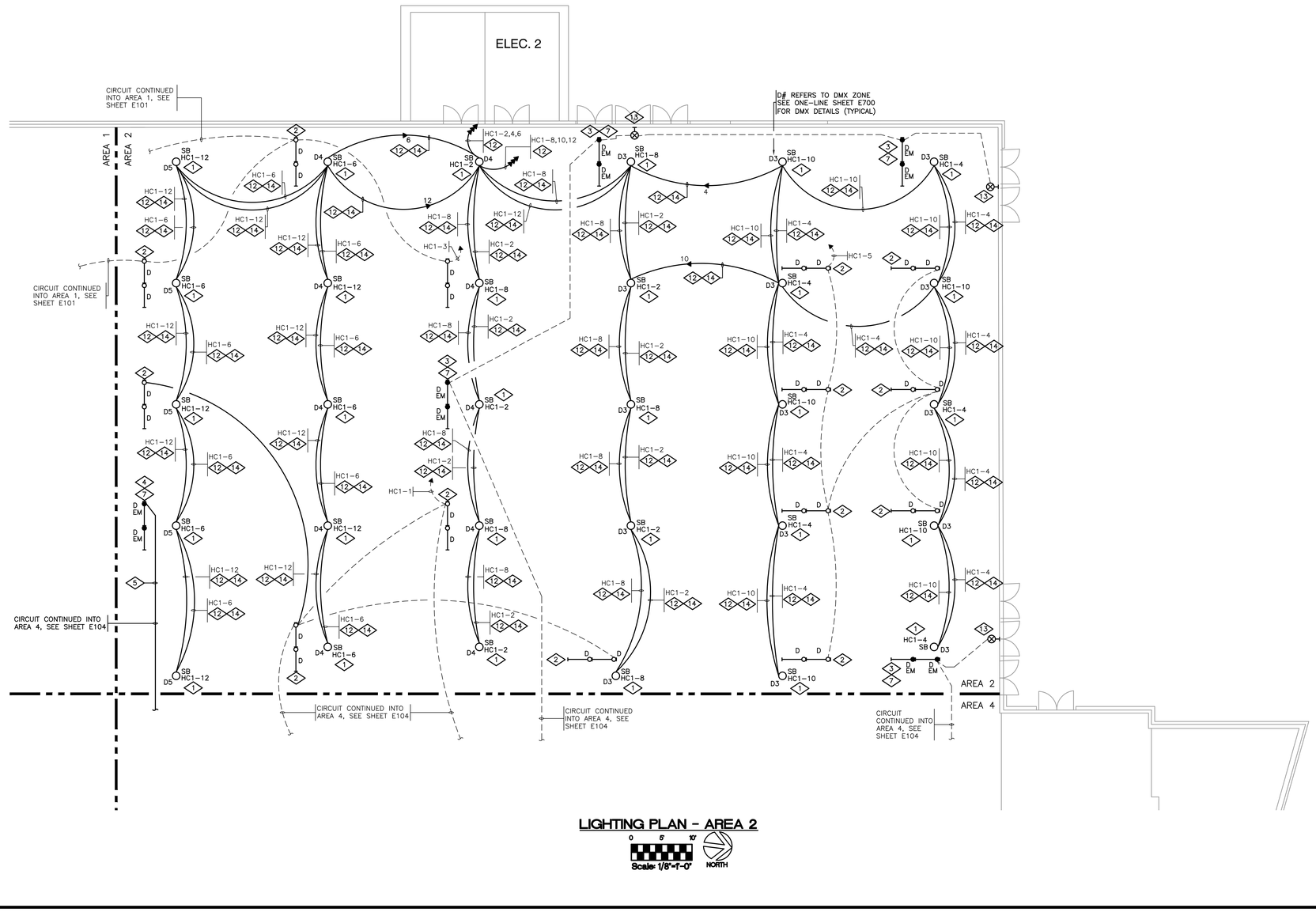
RENNUTT + ASSOCIATES, LLC.
ELECTRICAL ENGINEERS
4645 W. 20TH STREET, SUITE #200
GREELEY, COLORADO 80634
GREELEY: (970) 330-3266

JOB	20029
DATE	04-30-2020
DRAWN	CAD
CHECKED	TJP

LIGHTING PLAN - AREA 1

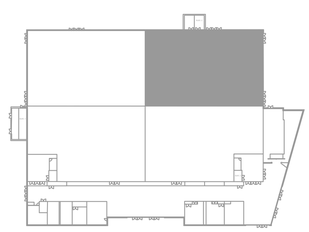
E101

FLAG NOTES – LIGHTING PLANS ONLY	
1	AT 'SB' LIGHT FIXTURE CONNECT TO CIRCUIT & PANEL INDICATED, EXAMPLE 'HA1' IS PANEL, '9' IS CIRCUIT NUMBER, TYPICAL AT ALL 'SB' FIXTURES. SEE LOW VOLTAGE LIGHTING CONTROL SYSTEM RISER AND FIXTURE POWER AND DMX CONNECTION DETAILS ON SHEET E700 FOR LOW VOLTAGE CABLIING REQUIREMENTS TO FIXTURE..
2	NEW TYPE 'D' LIGHT FIXTURES RECONNECT TO EXISTING LIGHTING CIRCUIT FROM REMOVED FLUORESCENT STRIP FIXTURE.
3	NEW TYPE 'D' LIGHT FIXTURE RECONNECT TO EXISTING EMERGENCY LIGHTING CIRCUIT FROM REMOVE 'D' FLUORESCENT STRIP FIXTURE.
4	NEW TYPE 'D' LIGHT FIXTURE TO BE CONNECTED TO EMERGENCY LIGHTING CIRCUIT. EXISTING NORMAL LIGHTING FIXTURE CIRCUIT TO BE MAINTAINED. NOTE: EMERGENCY AND NORMAL CIRCUITS MUST BE ROUTED IN SEPARATE RACEWAYS.
5	EXTEND NEW EMERGENCY LIGHTING CIRCUIT TO NEW LIGHTS CONNECTED TO EMERGENCY SYSTEM, SEE FLAG NOTE #4.
6	NEW TYPE 'F' AND 'F2' LIGHT FIXTURES RECONNECT TO EXISTING LIGHTING CIRCUIT FROM REMOVED TYPE 'F' FIXTURES.
7	SWITCHED EMERGENCY FIXTURE – SEE ALCR DETAIL FOR CONTROL.
8	NEW TYPE 'J4' LIGHT FIXTURES, RECONNECT TO EXISTING LIGHTING CIRCUIT FROM REMOVED TYPE 'J4' FIXTURES.
9	NEW TYPE 'J4' LIGHT FIXTURE, RECONNECT TO EXISTING EMERGENCY LIGHTING CIRCUIT FROM REMOVED TYPE 'J4' FIXTURE.
10	NEW TYPE 'J7' LIGHT FIXTURES, RECONNECT TO EXISTING LIGHTING CIRCUIT FROM REMOVED TYPE 'J7' FIXTURES.
11	NEW TYPE 'J7' LIGHT FIXTURES, PROVIDE SAME MOUNTING AS OTHER TYPE 'J7' LIGHT FIXTURES. CONNECT INTO EXISTING TYPE 'J7' LIGHTING CIRCUIT.
12	EC TO PULL #10 CONDUCTORS AND GRD IN EXISTING CONDUIT ON ALL CIRCUITS FEEDING NEW 'SB' LIGHT FIXTURES.
13	NEW EXIT LIGHT RECONNECT TO EXISTING UNSWITCHED EMERGENCY CIRCUIT.
14	CONNECT CIRCUIT INDICATED AT EACH FIXTURE. MAINTAIN CIRCUIT CONTINUITY FOR THE OTHER EXISTING CIRCUIT.
15	LOCATE TWO ALCR EMERGENCY LIGHTING CONTROL RELAY AT PANEL 'HEM1' TO CONTROL EM LIGHTS IN AREA. PROVIDE LOW VOLTAGE CABLE TO MAIN LPC RACK TO TIE INTO NEW LIGHTING CONTROLS.
16	RUN CIRCUIT HEM1–1 THRU NEW ALCR CONTROL RELAY. CKT 3 TO REMAIN UNSWITCHED FOR EXIT LIGHTS.
17	RUN CIRCUIT HEM1–5 THRU NEW ALCR CONTROL RELAY. CKT 7 TO REMAIN UNSWITCHED FOR EXIT LIGHTS.
18	FIXTURE SHALL BE ON CONTINUOUSLY (NL).



LIGHTING PLAN – AREA 2

Scale: 1/8"=1'-0"



KEY PLAN

COLORADO LICENSED TRAVIS J. POPAC 37558 PROFESSIONAL ENGINEER

05/28/20

GREELEY IG EVENT CENTER LIGHTING

GREELEY, COLORADO

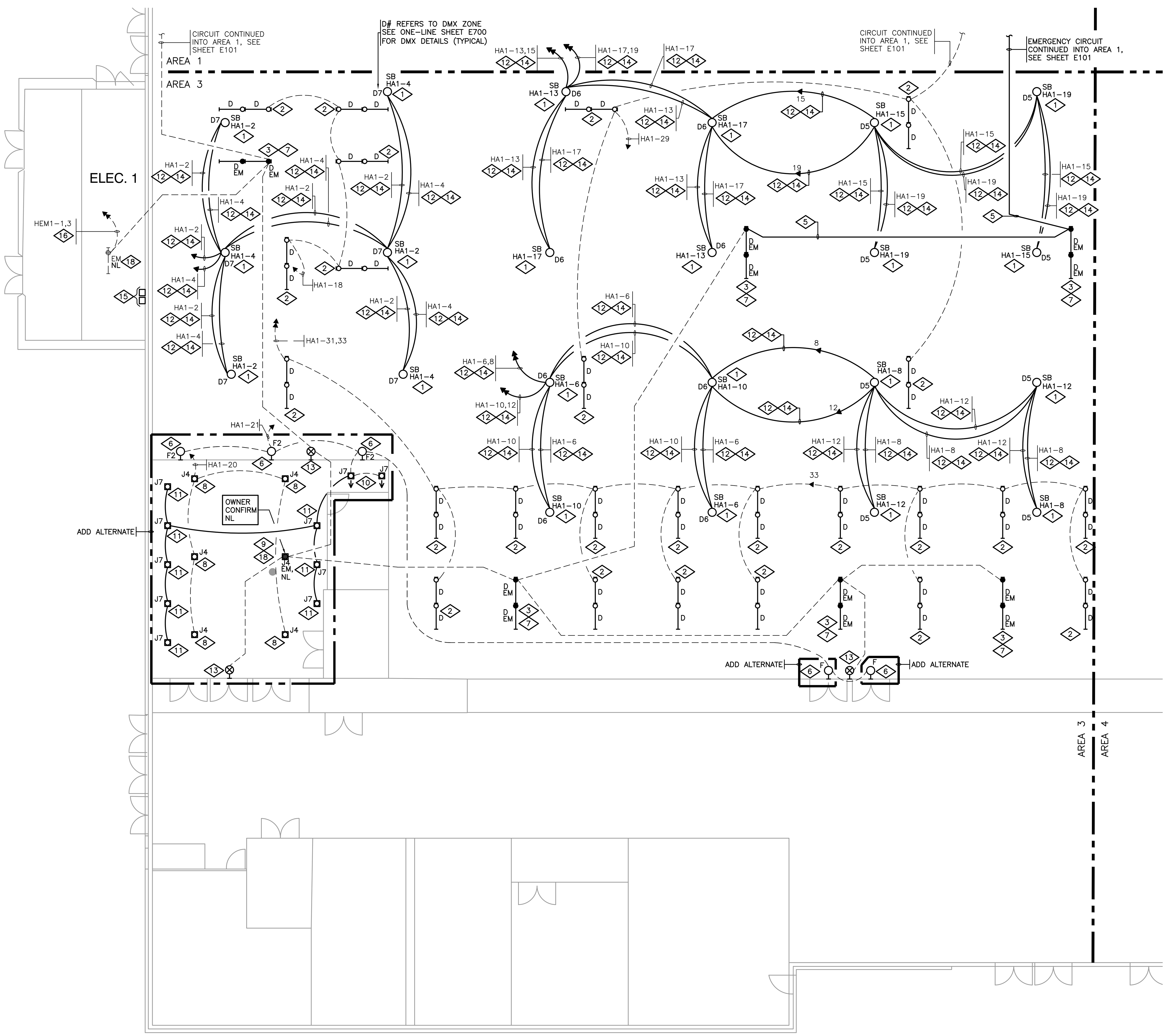
RJ Nutt + ASSOCIATES, LLC.
ELECTRICAL ENGINEERS
4645 N. 32ND STREET, SUITE #200
GREELEY, COLORADO 80634
GREELEY: (970) 330-3266

JOB	20029
DATE	04-30-2020
DRAWN	CAD
CHECKED	TJP

LIGHTING PLAN - AREA 2

E102

G:\Projects 2020\Greeley IG Event Center Lighting (T) – 20029\Drawings\20029–E102.dwg May 28,2020 – 4:31pm tan



LIGHTING PLAN - AREA 3

Scale: 1/8"=1'-0"

NORTH

FLAG NOTES – LIGHTING PLANS ONLY	
1	AT 'SB' LIGHT FIXTURE CONNECT TO CIRCUIT & PANEL INDICATED, EXAMPLE 'HA1' IS PANEL, '9' IS CIRCUIT NUMBER, TYPICAL AT ALL 'SB' FIXTURES. SEE LOW VOLTAGE LIGHTING CONTROL SYSTEM RISER AND FIXTURE POWER AND DMX CONNECTION DETAILS ON SHEET E700 FOR LOW VOLTAGE CABLIING REQUIREMENTS TO FIXTURE..
2	NEW TYPE 'D' LIGHT FIXTURES RECONNECT TO EXISTING LIGHTING CIRCUIT FROM REMOVED FLUORESCENT STRIP FIXTURE.
3	NEW TYPE 'D' LIGHT FIXTURE RECONNECT TO EXISTING EMERGENCY LIGHTING CIRCUIT FROM REMOVE 'D' FLUORESCENT STRIP FIXTURE.
4	NEW TYPE 'D' LIGHT FIXTURE TO BE CONNECTED TO EMERGENCY LIGHTING CIRCUIT. EXISTING NORMAL LIGHTING FIXTURE CIRCUIT TO BE MAINTAINED. NOTE: EMERGENCY AND NORMAL CIRCUITS MUST BE ROUTED IN SEPARATE RACEWAYS.
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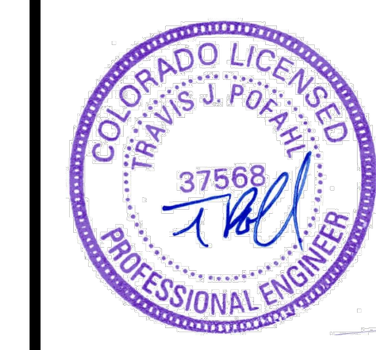
7	SWITCHED EMERGENCY FIXTURE – SEE ALCR DETAIL FOR CONTROL.
8	NEW TYPE 'J4' LIGHT FIXTURES, RECONNECT TO EXISTING LIGHTING CIRCUIT FROM REMOVED TYPE 'J4' FIXTURES.
9	NEW TYPE 'J4' LIGHT FIXTURE, RECONNECT TO EXISTING EMERGENCY LIGHTING CIRCUIT FROM REMOVED TYPE 'J4' FIXTURE.
10	NEW TYPE 'J7' LIGHT FIXTURES, RECONNECT TO EXISTING LIGHTING CIRCUIT FROM REMOVED TYPE 'J7' FIXTURES.
11	NEW TYPE 'J7' LIGHT FIXTURES, PROVIDE SAME MOUNTING AS OTHER TYPE 'J7' LIGHT FIXTURES. CONNECT INTO EXISTING TYPE 'J7' LIGHTING CIRCUIT.
12	EC TO PULL #10 CONDUCTORS AND GRD IN EXISTING CONDUIT ON ALL CIRCUITS FEEDING NEW 'SB' LIGHT FIXTURES.
13	NEW EXIT LIGHT RECONNECT TO EXISTING UNSWITCHED EMERGENCY CIRCUIT.
14	CONNECT CIRCUIT INDICATED AT EACH FIXTURE. MAINTAIN CIRCUIT CONTINUITY FOR THE OTHER EXISTING CIRCUIT.
15	LOCATE TWO ALCR EMERGENCY LIGHTING CONTROL RELAY AT PANEL 'HEM1' TO CONTROL EM LIGHTS IN AREA. PROVIDE LOW VOLTAGE CABLE TO MAIN LPC RACK TO TIE INTO NEW LIGHTING CONTROLS.
16	RUN CIRCUIT HEM1–1 THRU NEW ALCR CONTROL RELAY. CKT 3 TO REMAIN UNSWITCHED FOR EXIT LIGHTS.
17	RUN CIRCUIT HEM1–5 THRU NEW ALCR CONTROL RELAY. CKT 7 TO REMAIN UNSWITCHED FOR EXIT LIGHTS.
18	FIXTURE SHALL BE ON CONTINUOUSLY (NL).



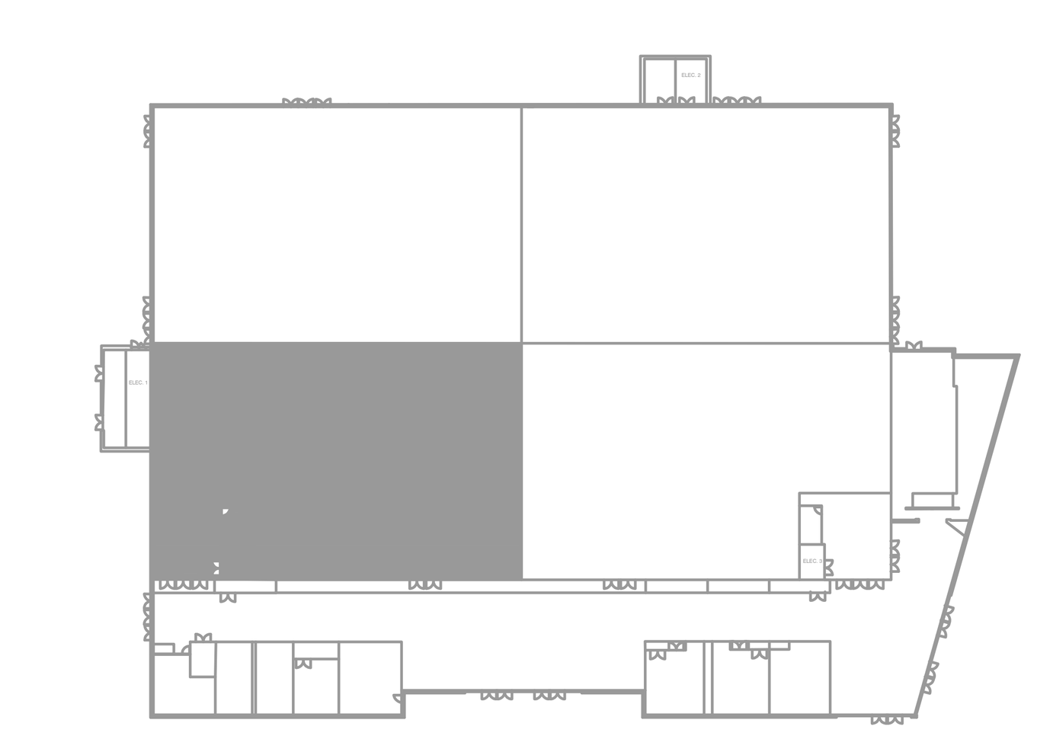
05/28/20

GREELEY IG EVENT CENTER LIGHTING

GREELEY, COLORADO

RMcNutt + ASSOCIATES, LLC.
ELECTRICAL ENGINEERS

JOB	20029
DATE	04-30-2020
DRAWN	CAD
CHECKED	TJP

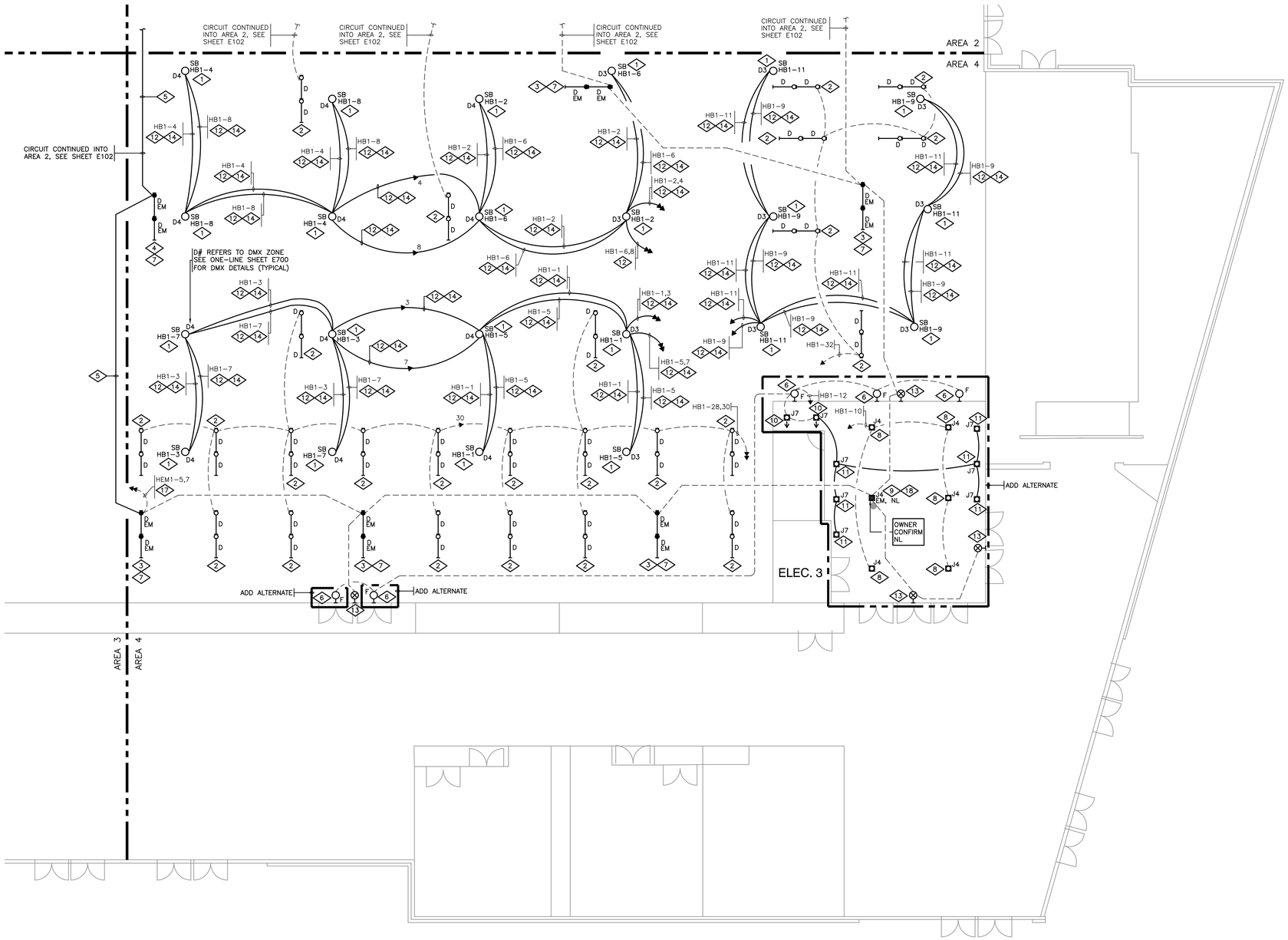


KEY PLAN

LIGHTING PLAN - AREA 3

E103

G:\Projects 2020\Greeley IG Event Center Lighting (T) – 20029\Drawings\20029-E103.dwg May 28,2020 – 4:32pm tom

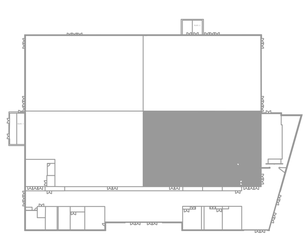


LIGHTING PLAN - AREA 4

0 5' 10'

Scale: 1/8"=1'-0"

NORTH



KEY PLAN

FLAG NOTES – LIGHTING PLANS ONLY	
1	AT 'SB' LIGHT FIXTURE CONNECT TO CIRCUIT & PANEL INDICATED, EXAMPLE 'HA1' IS PANEL, '9' IS CIRCUIT NUMBER, TYPICAL AT ALL 'SB' FIXTURES. SEE LOW VOLTAGE LIGHTING CONTROL SYSTEM RISER AND FIXTURE POWER AND DMX CONNECTION DETAILS ON SHEET E700 FOR LOW VOLTAGE CABLIING REQUIREMENTS TO FIXTURE..
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13	NEW EXIT LIGHT RECONNECT TO EXISTING UNSWITCHED EMERGENCY CIRCUIT.
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16	RUN CIRCUIT HEM1-1 THRU NEW ALCR CONTROL RELAY. CKT 3 TO REMAIN UNSWITCHED FOR EXIT LIGHTS.
17	RUN CIRCUIT HEM1-5 THRU NEW ALCR CONTROL RELAY. CKT 7 TO REMAIN UNSWITCHED FOR EXIT LIGHTS.
18	FIXTURE SHALL BE ON CONTINUOUSLY (NL).

COLORADO LICENSED TRAVIS J. PORATH 37558 PROFESSIONAL ENGINEER

05/28/20

GREELEY IG EVENT CENTER LIGHTING

GREELEY, COLORADO

RJ Nuth + ASSOCIATES, LLC
ELECTRICAL ENGINEERS
4640 W. 10TH STREET, SUITE #300
GREELEY, COLORADO 80634
GREELEY: (970) 330-3266

JOB	20029
DATE	04-30-2020
DRAWN	CAD
CHECKED	TJP

LIGHTING PLAN - AREA 4

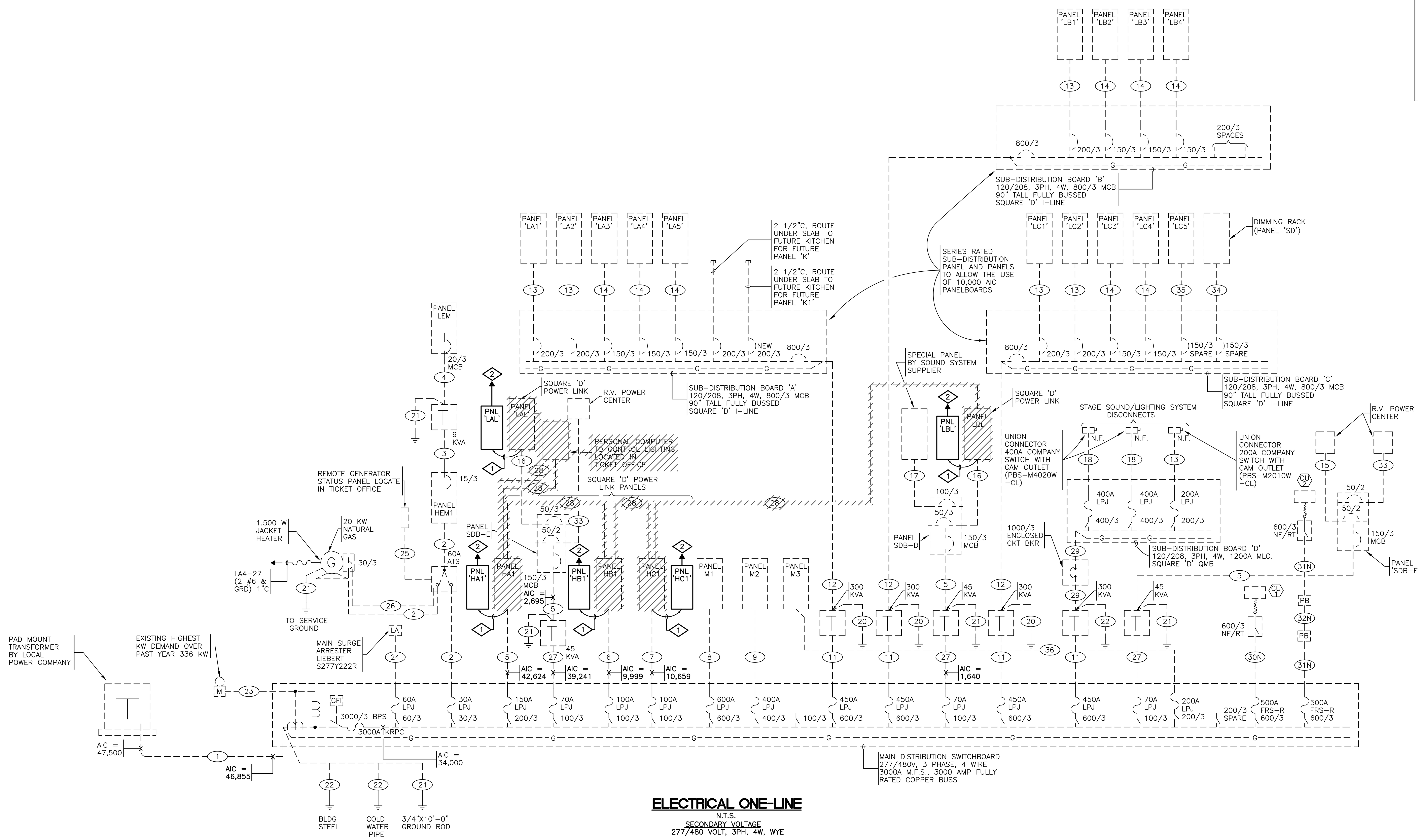
E104

G:\Projects 2020\Greeley IG Event Center Lighting (T) - 20029\Drawings\20029-E104.dwg May 28,2020 - 4:32pm tsn

FLAG NOTES – THIS SHEET ONLY	
1	NEW ETC LIGHTING CONTROL PANEL TO REPLACE SQUARE 'D' POWER LINK PANEL. RECONNECT TO EXISTING FEEDER AND BRANCH CIRCUITS, SEE PANEL SCHEDULES, SHEET E600.
2	REFER TO LIGHTING CONTROL PANEL DETAIL, SHEET E700, FOR LIGHTING CONTROL PANEL CONNECTIONS AND REQUIREMENTS.

EXISTING FEEDER SCHEDULE

KEY	DESCRIPTION
1	8 RUNS [(4 #500 MCM THWN CU) 3 1/2"C]
2	(4 #8 & GRD) 1"C
3	(3 #12 & GRD) 1/2"C
4	(4 #10 & GRD) 3/4"C
5	(4 #1/0 THWN CU & 1 #6 GRD) 2"C
6	(4 #2/0 THWN CU & 1 #6 GRD) 2"C
7	(4 #2/0 THWN CU & 1 #6 GRD) 2"C
8	2 RUNS [(4 #350 MCM THWN CU & 1 #1/0 GRD) 3"C]
9	(4 #500 MCM THWN CU & 1 #3 GRD) 3 1/2"C
10	(4 #1/0 THWN CU & 1 #6 GRD) 2"C
11	2 RUNS [(3 #4/0 THWN CU & 1 #2 GRD) 2 1/2"C
12	2 RUNS [(4 #500 MCM THWN CU & 1 #1/0 GRD) 3 1/2"C]
13	(4 #3/0 THWN CU & 1 #6 GRD) 2 1/2"C
14	(4 #1/0 THWN CU & 1 #6 GRD) 2"C
15	(3 #6 THWN CU & 1 #10 GRD) 1"C
16	(4 #6 THWN CU & 1 #10 GRD) 1 1/4"C
17	(4 #1 THWN CU & 1 #8 GRD) 2"C
18	(4 #500 MCM THWN CU & 1 #3 GRD) 3 1/2"C
19	(4 #3/0 THWN CU & 1 #6 GRD) 2 1/2"C
20	(#2/0 CU GRD) 3/4"C
21	(#6 CU GRD) 1/2"C
22	(#3/0 CU GRD) 3/4"C
23	1 1/4"C
24	(4 #6 TWHN CU & 1 #6 GRD) 1 1/4"C TWIST CONDUCTORS
25	(16 #18) 1"C
26	(16 #18 & 2 #10) 1 1/4'C
27	(3 #4 THWN & 1 #8 GRD) 1 1/4"C
28	(BELDEN CONTROL CABLE SIZE AND TYPE PER MANUFACTURER) 3/4"C
29	3 RUNS [(4 #500 MCM THWN CU & #2/0 GRD) 3 1/2"C]
30	2 RUNS [(3 #500 KCMIL THWN CU GRD) 4"C]
31	2 RUNS [(3 #500 KCMIL THWN & #2/0 GRD) 4"C]
32	2 RUNS [(3 #500 KCMIL THWN CU & #2/0 GRD) 4"C]
33	(3 #6 THWN CU & 1 #10 CU GRD) 1"C.
34	(4 #1/0 THWN CU & #6 CU GRD) 2"C.
35	(4 #1/0 THWN CU & #6 CU GRD) 2"C.
36	(4 #4/0 THWN CU & #4 CU GRD) IN EXISTING 2"C



ELECTRICAL ONE-LINE
N.T.S.
SECONDARY VOLTAGE
277/480 VOLT, 3PH, 4W, WYE

——— NEW
– – – – EXISTING

COLORADO LICENSED
TRAVIS J. POFAHL
37568
PROFESSIONAL ENGINEER
05/28/20

GREELEY IG EVENT CENTER LIGHTING

GREELEY, COLORADO

RMH Nutt + ASSOCIATES, LLC.
ELECTRICAL ENGINEERS
4645 W. 18TH ST, SUITE #200
GREELEY, COLORADO 80634
GREELEY: (970) 330-3266

JOB	20029
DATE	04-30-2020
DRAWN	CAD
CHECKED	TJP

ELECTRICAL ONE-LINE

E500

Panel 'HA1'

277/480 Voltage | 3 Phase, 4 Wire | NEMA 1 Enclosure Rating | AIC 65000 @ 480V | ◇1 | ETC PANEL | Surface Mountings | 225A MLO Mains | 100% Neutral Rating | No Isolated Ground Bar

Description	Load (kW)	BKR.	CKT #	PH.	CKT #	BKR.	Load (kW)	Description
LTG	4.15	20/1	1	A	2	20/1	2.49	LTG
LTG	4.15	20/1	3	B	4	20/1	2.49	LTG
LTG	4.15	20/1	5	C	6	20/1	1.66	LTG
LTG	4.15	20/1	7	A	8	20/1	1.66	LTG
LTG	4.15	20/1	9	B	10	20/1	1.66	LTG
LTG	4.15	20/1	11	C	12	20/1	1.66	LTG
LTG	1.66	20/1	13	A	14	20/1	2.70	Ltg
LTG	1.66	20/1	15	B	16	20/1	0.40	LTG
LTG	1.66	20/1	17	C	18	20/1	0.34	LTG
LTG	1.66	20/1	19	A	20	20/1	0.38	LTG
LTG	0.45	20/1	21	B	22	20/1	0.83	Ltg
Spare		20/1	23	C	24	20/1	1.00	Ltg
Ltg	1.00	20/1	25	A	26	20/1	0.25	Ltg
Ltg	3.15	20/1	27	B	28	20/1	0.40	Ltg
Ltg	3.57	20/1	29	C	30	20/1	0.90	Ltg
Ltg	0.41	20/1	31	A	32	20/1	0.60	Ext Lights
LTG	0.80	20/1	33	B	34	20/1		Spare
LTG	0.48	20/1	35	C	36	20/1		Spare
Space			37	A	38	20/1		Spare
Space			39	B	40	20/1		Spare
Space			41	C	42	20/1		Spare

ADD ALTERNATE (circuit 21; circuit 20)

Lighting 60.81 kW AT 125 % Demand = 76.01 kW

Total Demand = 76.01 kW AT 90 % PF= 84.5 kVA
Feeder Size 84.5 kVA DIVIDED BY VLL x SQRT(3) = 101.6 AMPS
20% SPARE CAPACITY = 20.3 AMPS
121.9 AMPS TOTAL

OVERCURRENT PROTECTION =150A

Panel 'HB1'

277/480 Voltage | 3 Phase, 4 Wire | NEMA 1 Enclosure Rating | AIC 14000 @ 480V | ◇1 | ETC PANEL | Surface Mountings | 225A MLO Mains | 100% Neutral Rating | No Isolated Ground Bar

Description	Load (kW)	BKR.	CKT #	PH.	CKT #	BKR.	Load (kW)	Description
LTG	1.66	20/1	1	A	2	20/1	1.66	LTG
LTG	1.66	20/1	3	B	4	20/1	1.66	LTG
LTG	1.66	20/1	5	C	6	20/1	1.66	LTG
LTG	1.66	20/1	7	A	8	20/1	1.66	LTG
LTG	2.49	20/1	9	B	10	20/1	0.33	LTG
LTG	2.49	20/1	11	C	12	20/1	0.37	LTG
Ltg	0.55	20/1	13	A	14	20/1	0.56	Ltg
Ltg	1.10	20/1	15	B	16	20/1	2.52	Ltg
Ltg	0.20	20/1	17	C	18	20/1	3.16	Ltg
Ltg	0.60	20/1	19	A	20	20/1	3.25	Ltg
Ltg	0.30	20/1	21	B	22	20/1	3.00	Ltg
Ltg	1.00	20/1	23	C	24	20/1	0.40	Ltg
Ltg	1.80	20/1	25	A	26	20/1	0.90	Ltg
Ltg	1.80	20/1	27	B	28	20/1	0.64	LTG
Space			29	C	30	20/1	0.72	LTG
Space			31	A	32	20/1	0.48	LTG
Space			33	B	34	20/1		Spare
Space			35	C	36	20/1		Spare
Space			37	A	38	20/1		Spare
Space			39	B	40	20/1		Spare
Space			41	C	42	20/1		Spare

ADD ALTERNATE (circuits 10, 12)

Lighting 41.94 kW AT 125 % Demand = 52.42 kW

Total Demand = 52.42 kW AT 90 % PF= 58.2 kVA
Feeder Size 58.2 kVA DIVIDED BY VLL x SQRT(3) = 70.1 AMPS
20% SPARE CAPACITY = 14.0 AMPS
84.1 AMPS TOTAL

OVERCURRENT PROTECTION =100A

Panel 'HC1'

277/480 Voltage | 3 Phase, 4 Wire | NEMA 1 Enclosure Rating | AIC 14000 @ 480V | ◇1 | ETC PANEL | Surface Mountings | 225A MLO Mains | 100% Neutral Rating | No Isolated Ground Bar

Description	Load (kW)	BKR.	CKT #	PH.	CKT #	BKR.	Load (kW)	Description
LTG	0.41	20/1	1	A	2	20/1	4.15	LTG
LTG	0.48	20/1	3	B	4	20/1	4.15	LTG
LTG	0.56	20/1	5	C	6	20/1	4.15	LTG
Ext Lights	2.70	20/1	7	A	8	20/1	4.15	LTG
Back Office Lighting	1.00	20/1	9	B	10	20/1	4.15	LTG
Space			11	C	12	20/1	4.15	LTG
Space			13	A	14	20/1	1.00	Bathrooms
Space			15	B	16	20/1		Spare
Space			17	C	18	20/1		Spare
Space			19	A	20	20/1		Spare
Space			21	B	22	20/1		Spare
Space			23	C	24	20/1		Spare

Lighting 31.05 kW AT 125 % Demand = 38.81 kW

Total Demand = 38.81 kW AT 90 % PF= 43.1 kVA
Feeder Size 43.1 kVA DIVIDED BY VLL x SQRT(3) = 51.9 AMPS
20% SPARE CAPACITY = 10.4 AMPS
62.2 AMPS TOTAL

OVERCURRENT PROTECTION =100A

Panel Exist. 'HEM1'

277/480 Voltage | 3 Phase, 4 Wire | NEMA 1 Enclosure Rating | AIC 14000 @ 480V | Surface Mountings | 225A MLO Mains | 100% Neutral Rating | No Isolated Ground Bar

Description	Load (kW)	BKR.	CKT #	PH.	CKT #	BKR.	Load (kW)	Description
EM LIGHTS	0.94	20/1	1	A	2	15/3	5.70	Panel 'LEM'
Exits	0.50	20/1	3	B	4	//		-
EM LIGHTS	0.95	20/1	5	C	6	///3		-
Exits	0.50	20/1	7	A	8	20/1		Spare
Em Lights	2.00	20/1	9	B	10	20/1		Spare
Exits	0.50	20/1	11	C	12	20/1		Spare
Space			13	A	14			Space
Space			15	B	16			Space
Space			17	C	18			Space

Lighting 5.39 kW AT 125 % Demand = 6.73 kW
Misc. 5.70 kW AT 100 % Demand = 5.70 kW

Total Demand = 12.43 kW AT 90 % PF= 13.8 kVA
Feeder Size 13.8 kVA DIVIDED BY VLL x SQRT(3) = 16.6 AMPS
0% SPARE CAPACITY = 0.0 AMPS
16.6 AMPS TOTAL

OVERCURRENT PROTECTION: 30A

Panel 'LAL'

120/208 Voltage | 3 Phase, 4 Wire | NEMA 1 Enclosure Rating | AIC 10000 @ 240V | ◇1 | ETC PANEL | Surface Mountings | 125A MLO Mains | 100% Neutral Rating | No Isolated Ground Bar

Description	Load (kW)	BKR.	CKT #	PH.	CKT #	BKR.	Load (kW)	Description
Spare		20/1	1	A	2	20/1	0.70	Lights
Spare		20/1	3	B	4	20/1	1.35	Lights
Spare		20/1	5	C	6	20/1	0.65	Lights
Space			7	A	8	20/1	0.55	Lights
Space			9	B	10			Space
Space			11	C	12			Space

Lighting 3.25 kW AT 125 % Demand = 4.06 kW

Total Demand = 4.06 kW AT 90 % PF= 4.5 kVA
Feeder Size 4.5 kVA DIVIDED BY VLL x SQRT(3) = 12.5 AMPS
20% SPARE CAPACITY = 2.5 AMPS
15.0 AMPS TOTAL

OVERCURRENT PROTECTION =50A

Panel 'LBL'

120/208 Voltage | 3 Phase, 4 Wire | NEMA 1 Enclosure Rating | AIC 10000 @ 240V | ◇1 | ETC PANEL | Surface Mountings | 125A MLO Mains | 100% Neutral Rating | No Isolated Ground Bar

Description	Load (kW)	BKR.	CKT #	PH.	CKT #	BKR.	Load (kW)	Description
Lights	0.50	20/1	1	A	2	20/1	1.13	Ltg
Lights	1.25	20/1	3	B	4	20/1	1.30	Ltg
Lights	0.90	20/1	5	C	6	20/1	0.75	Ltg
Lights	0.80	20/1	7	A	8	20/1	0.98	Ltg
Spare		20/1	9	B	10	20/1	0.75	Ltg
Spare		20/1	11	C	12			Space

Lighting 8.35 kW AT 125 % Demand = 10.44 kW

Total Demand = 10.44 kW AT 90 % PF= 11.6 kVA
Feeder Size 11.6 kVA DIVIDED BY VLL x SQRT(3) = 32.2 AMPS
20% SPARE CAPACITY = 6.4 AMPS
38.6 AMPS TOTAL

OVERCURRENT PROTECTION =50A

Panel Exist. 'LB4'

120/208 Voltage | 3 Phase, 4 Wire | NEMA 1 Enclosure Rating | AIC 10000 @ 240V | Surface Mountings | 225A MLO Mains | 100% Neutral Rating | No Isolated Ground Bar

Description	Load (kW)	BKR.	CKT #	PH.	CKT #	BKR.	Load (kW)	Description
Hand Dryer	2.00	30/1	1	A	2	30/1	2.00	Hand Dryer
Hand Dryer	2.00	30/1	3	B	4	30/1	2.00	Hand Dryer
Hand Dryer	2.00	30/1	5	C	6	30/1	2.00	Hand Dryer
Hand Dryer	2.00	30/1	7	A	8	20/1	0.54	Rcpt
Hand Dryer	2.00	30/1	9	B	10	20/2	3.00	Wh-4
Hand Dryer	2.00	30/1	11	C	12	//2		-
Ewh-1	3.00	20/2	13	A	14	20/1	0.12	Ef-6
-		//2	15	B	16	20/1	1.44	Wh-1
Lights	0.50	20/1	17	C	18	30/2	3.95	C2
Roof Rcpt	0.18	20/1	19	A	20	//2		-
Disp Case Rcpt	0.18	20/1	21	B	22	20/1	0.50	Smoke Dampers
Disp Case Rcpt	0.18	20/1	23	C	24	20/1	1.00	Temp Control Pnl
LTG CONTROL PANEL	**1.00**	20/1	25	A	26	20/1	0.96	Louvers
Spare		20/1	27	B	28	20/1	0.80	Louvers
Spare		20/1	29	C	30	20/1		Space
Spare		20/1	31	A	32	20/1		Space
Space		20/1	33	B	34	20/1		Space
Space		20/1	35	C	36	20/1		Space
Space		20/1	37	A	38	20/1		Space
Space		20/1	39	B	40	20/1		Space
Space		20/1	41	C	42	20/1		Space

Lighting 0.50 kW AT 125 % Demand = 0.63 kW
Receptacle 1.08 kW AT 100 % Demand = 1.08 kW
Misc. 33.77 kW AT 100 % Demand = 33.77 kW

Total Demand = 35.48 kW AT 90 % PF= 39.4 kVA
Feeder Size 39.4 kVA DIVIDED BY VLL x SQRT(3) = 109.4 AMPS
0% SPARE CAPACITY = 0.0 AMPS
109.4 AMPS TOTAL

OVERCURRENT PROTECTION: 150A

FLAG NOTES – THIS SHEET ONLY

◇1 EXISTING SQUARE D POWERLINK PANEL REPLACED WITH NEW ETC PANEL.

LIGHTING FIXTURE SCHEDULE

TYPE	LAMPS	DESCRIPTION	FINISH	MOUNTING	MANUFACT.	CATALOG #	VOLT.	NOTES
D	34W LED 4000K 5,000 LUMENS	4' LED STRIP LIGHT WITH 120° DIFFUSED LENS.	WHITE	SURFACE	GE	ALC6-4-4T-05-T-48-1D-S-Q-Q-Q-ST-K-Q-W	277	1
F	16W LED 4000K 2,000 LUMENS	WALL MOUNTED FIXTURE, WIDE DISTRBUTION WITH DOME LENS.	GALVANIZED	WALL MOUNTED	ANP LIGHTING	R920-M016LDDW40K-RTCW-E3-100GLFR-49-UNV	MVOLT	5
F2	16W LED 4000K 2,000 LUMENS	WALL MOUNTED FIXTURE, WIDE DISTRBUTION WITH DOME LENS.	GALVANIZED	WALL MOUNTED	ANP LIGHTING	D612-M016LDDW40K-RTCW-E8-49-GR12-100GLFR-43-UNV	MVOLT	5
J4	62.4W LED 4000K 6,000 LUMENS	6" ROUND LED DOWNLIGHT WITH WIDE 70° WIDEBEAM SPREAD. SEMI DIFFUSE REFLECTOR AND WHITE PAINT FLANGE	PER OWNER	RECESSED	GE	LDX6RA460840VQ/RDI6RVSDWT	277	5
J7	34.2W LED 4000K 3,000 LUMENS	6" ROUND LED DOWNLIGHT WITH WALL WASH BEAM SPREAD.	PER OWNER	RECESSED	GE	LDX6RA430840VQ/RDI6RWWSDWT	277	5
SB	830W LED 4000K 50,856 LUMENS	800W LED CHROMABEAMS FIXTURE.	PER OWNER	SURFACE	SPORTSBEAMS	S800-C-3-90-277	277	2,3,4,6
⊗	LED	COMMERCIAL GRADE EXIT LIGHT WITH ALUMINUM HOUSING. GREEN LETTERS.	PER OWNER	UNIVERSAL	CARPENTER	DXT-AC-G-1-W	MVOLT	

NOTES:
1. MATCH EXISTING MOUNTED AS REMOVED TYPE 'D' STRIPS.
2. CONTRACTOR TO PROVIDE AIRCRAFT CABLE SAFETY CHAIN FROM FIXTURE TO STRUCTURE.
3. MANUFACTURER/CONTRACTOR TO FIELD COORDINATE MOUNTING DETAILS.
4. DMX CONNECTION REQUIRED TO EACH FIXTURE (NOT SHOWN).
5. PRICE FIXTURE AND INSTALLATION AS ADD ALTERNATE. INCLUDE ALL PATCH/REPAIR WORK TO WALLS AND AND CEILINGS AS PART OF ADD ALTERNATE.
6. INCLUDE ONE SPARE FIXTURE FOR OWNER'S STOCK. (TURN OVER TO OWNER AT PROJECT COMPLETION)

COLORADO LICENSED PROFESSIONAL ENGINEER TRAVIS J. POFAHL 37568
05/28/20

GREELEY IG EVENT CENTER LIGHTING

GREELEY, COLORADO

RMcNutt + ASSOCIATES, LLC.
ELECTRICAL ENGINEERS
4645 W. 18TH ST, SUITE #200
GREELEY, COLORADO 80634
GREELEY: (970) 330-3266

JOB 20029
DATE 04-30-2020
DRAWN CAD
CHECKED TJP

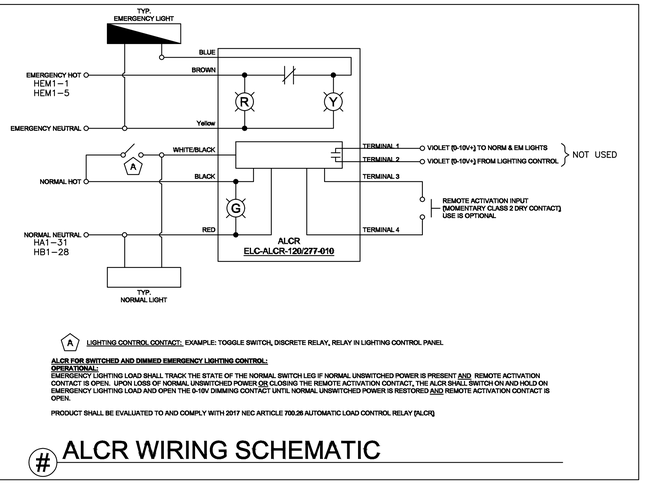
ELECTRICAL SCHEDULES

E600

PANEL 'LBL'
120/208V, 3PH, 4W
FEED FROM SUB-DISTRIBUTION B,
CKT 9,11,13
OCP=150A
A=BLACK, B=RED, C=BLUE
N=WHITE, G=GREEN

TYPICAL PANEL NAME PLATE
N.T.S.

NOTES
1. PROVIDE NEW PHENOLIC ENGRAVED NAME PLATES FOR ALL NEW EQUIPMENT.
2. ALL NEW AND EXISTING PANELS SHALL HAVE UPDATED TYPED PANEL DIRECTORY CARDS INSTALLED.



A LIGHTING CONTROL CONTACT: EXAMPLE: TOGGLE SWITCH, DISCRETE RELAY, RELAY IN LIGHTING CONTROL PANEL

ALCR FOR SWITCHED AND DIMMED EMERGENCY LIGHTING CONTROL:
OPERATIONAL:
EMERGENCY LIGHTING LOAD SHALL TRACK THE STATE OF THE NORMAL SWITCH LEG IF NORMAL UNSWITCHED POWER IS PRESENT AND REMOTE ACTIVATION CONTACT IS OPEN. UPON LOSS OF NORMAL UNSWITCHED POWER OR CLOSING THE REMOTE ACTIVATION CONTACT, THE ALCR SHALL SWITCH ON AND HOLD ON EMERGENCY LIGHTING LOAD AND OPEN THE 0-10V DIMMING CONTACT UNTIL NORMAL UNSWITCHED POWER IS RESTORED AND REMOTE ACTIVATION CONTACT IS OPEN.

PRODUCT SHALL BE EVALUATED TO AND COMPLY WITH 2017 NEC ARTICLE 700.28 AUTOMATIC LOAD CONTROL RELAY [ALCR]

(#) ALCR WIRING SCHEMATIC

EMERGENCY FIXTURE 'D' Calculation Summary

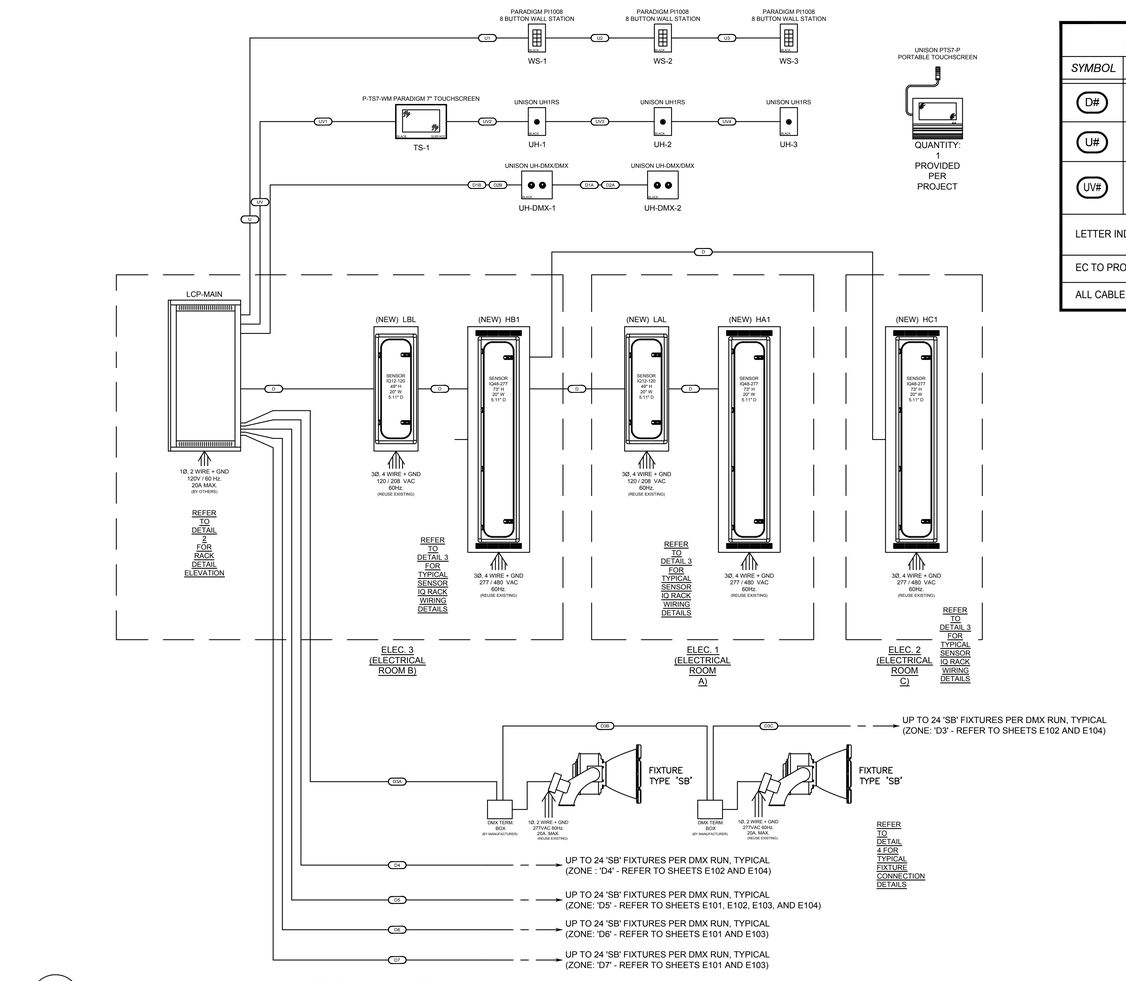
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
Event_Hall_Plan_East	Illuminance	Fc	2.80	6.8	0.9	3.11	7.56
Event_Hall_Plan_West	Illuminance	Fc	2.60	7.5	0.8	3.25	9.38

NORMAL FIXTURE 'D' Calculation Summary

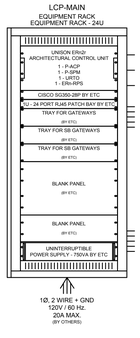
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
Event_Hall_Plan_East	Illuminance	Fc	12.98	28.4	7.2	1.80	3.94
Event_Hall_Plan_West	Illuminance	Fc	12.85	28.3	7.1	1.81	3.99

FIXTURE 'SB' Calculation Summary

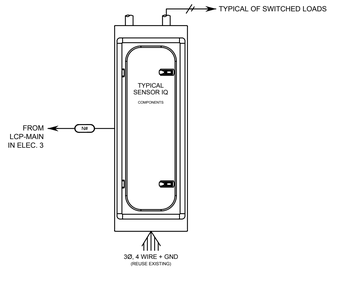
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
AREA 1 - 5700K	Illuminance	Fc	85.0	107	56	1.52	1.91
AREA 2 - 5700K	Illuminance	Fc	85.4	105	58	1.47	1.81
AREA 3 - 5700K	Illuminance	Fc	81.2	94	48	1.69	1.96
AREA 4 - 5700K	Illuminance	Fc	80.6	94	45	1.79	2.09
AREA 1 - 4000K	Illuminance	Fc	76.5	96	51	1.50	1.88
AREA 2 - 4000K	Illuminance	Fc	76.8	94	53	1.45	1.77
AREA 3 - 4000K	Illuminance	Fc	73.1	84	43	1.70	1.95
AREA 4 - 4000K	Illuminance	Fc	72.6	84	40	1.81	2.10
AREA 1 - Red	Illuminance	Fc	5.2	15	1	5.24	15.00
AREA 2 - Red	Illuminance	Fc	5.2	11	1	5.19	11.00
AREA 3 - Red	Illuminance	Fc	5.3	9	2	2.63	4.50
AREA 4 - Red	Illuminance	Fc	5.3	10	2	2.64	5.00
AREA 1 - Green	Illuminance	Fc	9.0	26	1	9.04	26.00
AREA 2 - Green	Illuminance	Fc	9.0	20	2	4.51	10.00
AREA 3 - Greed	Illuminance	Fc	9.2	16	3	3.05	5.33
AREA 4 - Green	Illuminance	Fc	9.1	17	3	3.04	5.67
AREA 1 - Blue	Illuminance	Fc	2.5	7	0	N.A.	N.A.
AREA 2 - Blue	Illuminance	Fc	2.6	6	0	N.A.	N.A.
AREA 3 - Blue	Illuminance	Fc	2.6	4	1	2.58	4.00
AREA 4 - Blue	Illuminance	Fc	2.6	5	1	2.55	5.00
AREA 1 - Amber	Illuminance	Fc	20.9	66	1	20.85	66.00
AREA 2 - Amber	Illuminance	Fc	20.5	46	1	20.54	46.00
AREA 3 - Amber	Illuminance	Fc	21.0	40	2	10.49	20.00
AREA 4 - Amber	Illuminance	Fc	20.9	45	1	20.92	45.00



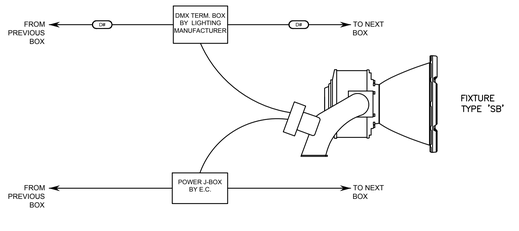
1 LOW VOLTAGE LIGHTING CONTROL SYSTEM RISER



2 LCP-MAIN FLOOR STANDING RACK DETAILS



3 SENSOR IQ (12 & 48) RACK DETAILS



4 FIXTURE POWER AND DMX CONNECTION DETAILS

CONTROL WIRING LEGEND

SYMBOL	WIRE TYPE(S)	SIGNAL
D#	(1) BELDEN #89729	DMX
U#	(1) BELDEN #88471 (1) #14 AWG. STRANDED WIRE	UNISON
UV#	(1) BELDEN #88471 (1) #14 AWG. STRANDED WIRE (2) #16 AWG. STRANDED WIRES	UNISON (WITH +24V POWER)

LETTER INDICATES WIRE TYPE, # INDICATES INDIVIDUAL RUN OF WIRE

EC TO PROVIDE MINIMUM 3/4"C. FOR EACH FEEDER RUN.

ALL CABLE TO BE PLENUM RATED.

COLORADO LICENSED
TRAVIS J. POPAT
37568
PROFESSIONAL ENGINEER
05/28/20

GREELEY IG EVENT CENTER LIGHTING

GREELEY, COLORADO

RJN + ASSOCIATES, LLC.
ELECTRICAL ENGINEERS
4643 S. ULSTER ST. SUITE #200
GREELEY, COLORADO 80634
GREELEY: (970) 330-3266

JOB	20029
DATE	04-30-2020
DRAWN	CAD
CHECKED	TJP

ELECTRICAL DETAILS

E700