

425 Fawell Boulevard  
Glen Ellyn, Illinois 60137-6599  
PHONE (630) 942-2355  
FAX (630) 942-4322

**2018-B0031 Student Resource Center (SRC) 2000 EVENT SPACE UPGRADE**

**ADDENDUM # 2**

**January 4, 2018**

.....

This addendum is being issued to update the specifications and provide additional information.

This information becomes part of the Bid/RFP Documents upon receipt. Please review and incorporate into your Bid/Proposal accordingly.

**For which Bids are scheduled to be received on January 18, 2018 no later than 2:00 p.m., Central Time.**

Bids will be received by the College of DuPage, District 502, at the office of the Purchasing Manager, Berg Instructional Center (BIC) Building, **Room 1B03**, 425 Fawell Blvd., Glen Ellyn, IL 60137.

The signed Addendum acknowledgment is required to be returned with your Bid no later than the due date set forth for this Invitation to Bid.

Below are clarifications to this bid:

**Section I. Revisions**

**1. The Due Date Change:**

**Currently Reads:**

**BIDS DUE: THURSDAY, JANUARY 18, 2018 at 2:00 p.m. Central Time**

**Change To:**

**BIDS DUE: TUESDAY, JANUARY 23, 2018 at 2:00 p.m. Central Time**

## **2. The Requests for Information/Clarification Date Change:**

### **Currently Reads:**

Questions must be submitted in writing and be directed via email to the Purchasing Department at [purchasing@cod.edu](mailto:purchasing@cod.edu) no later than **January 5, 2018 at 12:00 p.m. Central Time.**

### **Change To:**

Questions must be submitted in writing and be directed via email to the Purchasing Department at [purchasing@cod.edu](mailto:purchasing@cod.edu) no later than **January 11, 2018 at 12:00 p.m. Central Time.**



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**Wayne P. Thomas**  
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**2018-B0031 Student Resource Center (SRC) 2000 Event Space Upgrade**

**ADDENDUM # 2**

**January 4, 2018**

.....

This signed Addendum is required to be returned with your Bid no later than the due date set forth for this Invitation to Bid. If you have already submitted your Bid, please submit this signed form via email to [purchasing@cod.edu](mailto:purchasing@cod.edu).

You can submit this completed addendum to the Purchasing Office by one of the means below:

*All issued addenda must be signed and returned to the College as per the instructions in the addenda or bid will not be accepted.*

**ACKNOWLEDGMENT**

You can submit this completed addendum to the Purchasing Office by one of the means below:

1. If you have not yet submitted your bid, please sign this addendum and include with your sealed bid.
2. If you have already submitted your bid, please sign and return to the Purchasing office via email at [purchasing@cod.edu](mailto:purchasing@cod.edu) no later than the scheduled bid deadline. We will make sure it accompanies your bid.

You also have the option of withdrawing your proposal, if necessary.

**ACKNOWLEDGEMENT:**

I HAVE RECEIVED THIS ADDENDUM # \_\_\_\_\_

**Company Name:** \_\_\_\_\_

**Address:** \_\_\_\_\_

**Authorized Signature:** \_\_\_\_\_

425 Fawell Boulevard  
Glen Ellyn, Illinois 60137-6599  
PHONE (630) 942-2355  
FAX (630) 942-4322

**2018-B0031 Student Resource Center (SRC) 2000 EVENT SPACE UPGRADE**

**ADDENDUM # 1**

**December 22, 2017**



This addendum is being issued to update the specifications and provide additional information.

This information becomes part of the Bid/RFP Documents upon receipt. Please review and incorporate into your Bid/Proposal accordingly.

**For which Bids are scheduled to be received on January 18, 2018 no later than 2:00 p.m., Central Time.**

Bids will be received by the College of DuPage, District 502, at the office of the Purchasing Manager, Berg Instructional Center (BIC) Building, **Room 1B03**, 425 Fawell Blvd., Glen Ellyn, IL 60137.

The signed Addendum acknowledgment is required to be returned with your Bid no later than the due date set forth for this Invitation to Bid.

Below are clarifications to this bid:

**Section I. Revisions**

**1. The Due Date Change:**

**Currently Reads:**

**BIDS DUE: TUESDAY, JANUARY 18, 2018 at 2:00 p.m. Central Time**

**Change To:**

**BIDS DUE: THURSDAY, JANUARY 18, 2018 at 2:00 p.m. Central Time**

**2018-B0031 Student Resource Center (SRC) 2000 Event Space Upgrade**

**ADDENDUM # 1**

**December 22, 2017**

.....

This signed Addendum is required to be returned with your Bid no later than the due date set forth for this Invitation to Bid. If you have already submitted your Bid, please submit this signed form via email to [purchasing@cod.edu](mailto:purchasing@cod.edu).

You can submit this completed addendum to the Purchasing Office by one of the means below:

*All issued addenda must be signed and returned to the College as per the instructions in the addenda or bid will not be accepted.*

**ACKNOWLEDGMENT**

You can submit this completed addendum to the Purchasing Office by one of the means below:

1. If you have not yet submitted your bid, please sign this addendum and include with your sealed bid.
2. If you have already submitted your bid, please sign and return to the Purchasing office via email at [purchasing@cod.edu](mailto:purchasing@cod.edu) no later than the scheduled bid deadline. We will make sure it accompanies your bid.

You also have the option of withdrawing your proposal, if necessary.

**ACKNOWLEDGEMENT:**

I HAVE RECEIVED THIS ADDENDUM # \_\_\_\_\_

**Company Name:** \_\_\_\_\_

**Address:** \_\_\_\_\_

**Authorized Signature:** \_\_\_\_\_



**BIDDER:** \_\_\_\_\_



**COMMUNITY COLLEGE DISTRICT NO. 502**

**BID NUMBER: 2018-B0031**

**STUDENT RESOURCE CENTER (SRC) 2000 EVENT SPACE UPGRADE**

**BIDS DUE: Tuesday, January 18, 2018 at 2:00 p.m. Central Time**

In the event of College closure due to inclement weather, bid deadline will be extended to the next business day at the same time.

**RETURN BIDS TO:**

**COLLEGE OF DUPAGE  
PURCHASING DEPARTMENT  
BIC BUILDING, ROOM 1B03  
425 FAWELL BLVD.  
GLEN ELLYN, ILLINOIS 60137**

**ISSUED BY THE COLLEGE OF DUPAGE PURCHASING DEPARTMENT**

**Purchasing Department**

425 Fawell Boulevard  
Glen Ellyn, Illinois 60137-6599  
<http://www.cod.edu>

PHONE (630) 942-2217

December 21, 2017

**INVITATION TO BID**

Sealed bids for **Student Resource Center (SRC) 2000 Event Space Upgrade** will be received by the College of DuPage, District 502, at the office of the Purchasing Manager, Berg Instructional Center (BIC) Building, Room 1B03, 425 Fawell Blvd., Glen Ellyn, IL 60137, until **2:00 p.m. Central Time, Thursday, January 18, 2018**, at which time they will be publicly opened. In the event of College closure due to inclement weather, bid deadline will be extended to the next business day at the same time.

A pre-bid conference and site visit is scheduled for Thursday, January 4, 2018 at 11:00 a.m. in the Purchasing Office, BIC 1B03 at 425 Fawell Blvd., Glen Ellyn, IL. 60137. A site visit will immediately follow. The pre-bid conference is not mandatory, but highly recommended.

**A Bid Security in the form of a bid bond, cashier's check or certified check in the amount of 10% of the total base bid is required for this project.**

Any bid received after the date and time stated above will be returned unopened. College of DuPage shall not be responsible for bids that are not received at the specific office location indicated above by the stated deadline. It is solely, the bidder's responsibility, to ensure that adequate time is allowed for timely and accurate delivery.

Prices offered shall be F.O.B. Destination, College of DuPage, 425 Fawell Blvd., Glen Ellyn, IL 60137. Prices must be firm. No bids will be accepted on the basis of a price prevailing at the time of shipment.

The award(s) of the contract will be made to the lowest responsible and qualified bidder whose bid complies with all the requirements prescribed. Brand or trade names in bid specifications are used for identification purpose only.

No bid shall be withdrawn for a period of ninety (90) days after the bid opening date without the consent of the College.

**LEGAL NOTICE**

**BID NOTICE**

**No. 2018-B0031**

The College of DuPage is accepting sealed bids for **Student Resource Center (SRC) 2000 Event Space Upgrade**. Bid documents may be downloaded from the Purchasing Website at [www.cod.edu/about/purchasing/requests/](http://www.cod.edu/about/purchasing/requests/) by clicking on the link for this bid and following the instructions.

Bids are due to the College of DuPage Purchasing Department in the Berg Instructional Center (BIC) Building, Room 1B03, 425 Fawell Blvd., Glen Ellyn, IL 60137 up to and no later than **2:00 p.m. Central Time, Thursday, January 18, 2018**, at which time they will publicly opened.

**A Bid Security in the form of a bid bond, cashier's check or certified check in the amount of 10% of the total base bid is required for this project.**

**A pre-bid conference and site visit is scheduled for Thursday, January 4, 2018 at 11:00 a.m.** in the Purchasing Office, BIC 1B03 at 425 Fawell Blvd, Glen Ellyn IL 60137. A site visit will immediately follow. The pre-bid conference is not mandatory, but highly recommended.

College of DuPage Board of Trustees Reserves the right to reject any and all responses. This invitation is issued in the name of the Board of Trustees of College of DuPage, Community College District 502, Glen Ellyn, Illinois.

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## BID SUBMISSION CHECKLIST

### Things to Remember When Submitting a Response to an Invitation to Bid for the College of DuPage

1.  **Read the *entire* document.** In your review, note critical items such as: blackout period, required goods and services, submittal dates, submission requirements, etc.
2.  **Note the contact information provided.** The Purchasing Office Buyer at [purchasing@cod.edu](mailto:purchasing@cod.edu) is the single point of contact for this Invitation to Bid and is the only person with whom you are allowed to communicate regarding this bid. This person is an excellent source of information for any questions you may have.
3.  **Take advantage of the “question and answer” period.** Submit your questions to the Purchasing Department by the date in the Invitation to Bid and view the answers given in the formal addenda issued for the Invitation to Bid. All addenda issued for an Invitation to Bid will be emailed to each company that downloaded the bid documents and will include all questions asked and answered concerning the Invitation to Bid. Please ensure when downloading the bid documents, you use a valid email address.
4.  **Do not alter, add to, or delete and part of the Bid documents without prior approval.** Please refer to the section titled *Exceptions* for instruction on how to request a deviation to the original Invitation to Bid.
5.  **Ensure all Addenda are signed.** Before submitting your response, check the College Purchasing website at <http://www.cod.edu/about/purchasing/requests/index.aspx> to see whether any addenda were issued for this Bid request. If so, you must submit a signed copy of the addenda along with your bid response.
6.  **Review and read the bid document again to make sure you have addressed all requirements.**  
\*Your original response and the requested electronic copy (flash drive) must be identical and be complete.  
\*Bids will not be accepted if Sections 6, 7 and 8 are not completed. (Please note there are two (2) signature lines in Section 7 that must be signed.)  
\*If your company is a Certified Women-Owned, Minority-owned, or Persons with Disability-owned business, please include a copy of any and all certifications.
7.  **Submit your response on time.** Note the date and time listed on the front page of the Invitation to Bid and be sure to submit all required items on time. Late responses will not be accepted and will be returned, unopened. Ensure the box (s) containing your proposal is appropriately labeled. Please allow adequate time for delivery to the Purchasing Department.
8.  **Important dates to know:**
  - Bid Publication Date – 12/21/17
  - Pre-Bid Meeting Date - 1/4/18 at 11:00 a.m.
  - Questions Due – on or before 12:00 p.m. on 1/5/18
  - Bids Due – 1/18/18 at 2:00 p.m.
  - Target Board Approval Date – 2/15/18

## 1.0 GENERAL INFORMATION

### 1.1 DEFINITIONS

- A. **BIDDER** shall mean the individual or business entity submitting a Bid to supply any or all of the services or goods required by the Bid Documents.
- B. **BID** shall mean the Bid Documents as completed by the Bidder which constitutes the Bidder's offer.
- C. **CONTRACT** shall mean the agreement between the College and Contractor as set forth in the Bid Documents and as awarded by the College of DuPage Board of Trustees.
- D. **BID DOCUMENTS** shall mean collectively the Instructions to Bidders, General Conditions, Special Conditions, Specifications, Attachments, and Addenda, if any, Bid, Site Inspection Certificate, Contractor Certifications and Forms for Minority Participation. The above documents shall be considered as one integrated document setting forth the obligations of the parties.
- E. **CONTRACTOR** shall mean the individual or business entity submitting a Bid and to whom the College of DuPage Board of Trustees awards the Contract.
- F. **COLLEGE** shall mean the College of DuPage, Community College District No. 502, a body politic and corporate of the State of Illinois.
- G. **DIRECTOR** shall mean the person or persons authorized by the College to act in connection with this Contract. Such authorization shall not include any power to change the scope of the Contract or to obligate the College to pay additional sums beyond the amount of the Contract awarded by the College of DuPage Board of Trustees.
- H. **PURCHASING MANAGER** shall mean the Purchasing Manager of the College of DuPage.
- I. **SPECIFICATIONS** shall mean the description of the required services, Contract Goods, equipment, personnel, volume and use statistics and all requirements for the scope of work set forth in the Bid Documents.

### 1.2 BIDS TO CONFORM TO REQUIREMENTS OF LEGAL ADVERTISING

The College will not entertain or consider any Bid responses: (i) received after the exact time specified in the legal advertisements; (ii) not accompanied by the required bid deposit/bond, if required; or (iii) in any other way failing to comply fully with the conditions stated in the legal advertisement.

### 1.3 COMPLIANCE

Submissions under this Invitation to Bid shall be for items at least equal to or better than the quality and performance characteristics stated herein. The burden of proof that product and services meet specifications shall be documented by the bidder and be provided as part of the submitted bid. Failure to provide complete documentation of the product compliance with specifications required may result in bid rejection.

### 1.4 COMPLIANCE WITH LAWS - PUBLIC CONTRACTS

This Contract is a competitively bid public contract of the College of DuPage subject to laws and ordinances governing public contracts. The Bidder shall at all times observe and comply with all laws, ordinances, regulations and codes of the Federal, State and other local government agencies which may in any manner affect the preparation of the Bid or the performance of the Contract. If the Bidder observes that any of the Bid Documents are at variance therewith, it shall promptly notify the Purchasing Manager in writing and necessary changes shall be effected by appropriate modification.

## 1.5 REGULATIONS

The Contractor or Subcontractor, warrants that they are familiar with and they shall comply with all Federal, State, and Local Laws, statutes, ordinances, rules and regulations and the orders and decrees of any courts or administrative bodies or tribunals in any manner affecting the performance of the Contract, including, without limitation, Workmen's Compensation Laws, minimum salary and wage statutes and regulations, laws with respect to permits and licenses and fees in connection therewith, laws regarding maximum working hours and regulations with respect to use of explosives. No plea of misunderstanding or ignorance thereof will be considered. Whenever required, the Contractor, or Subcontractor, shall furnish the college with satisfactory proof of compliance with said Federal, State and Local Laws, statutes, ordinances, rules, regulations, orders, and decrees.

## 1.6 BID MODIFICATIONS

Unless indicated, it is understood that bids are in strict accordance with specification requirements. Bids shall be deemed final, conclusive, and irrevocable. No bid shall be subject to correction or amendment for any error or miscalculation. Bid prices shall include cost of materials as specified, any applicable discounts and shipping. Installation costs shall be included only when indicated on page one. Installation shall include, but is not limited to, all assembly required, setting in place, and mounting all materials at various campus locations.

## 1.7 PRICES FIRM

All prices quoted in the Bid shall be firm and will not be subject to increase during the term of the Contract awarded to the Contractor, except as otherwise provided in the Bid Documents.

## 1.8 AWARD OF CONTRACT

The award of the contract will be made within ninety (90) calendar days after the opening of bids to the lowest responsible and qualified bidder whose bid complies with all the requirements prescribed. The successful bidder will be notified by electronic mail that their bid has been accepted and that they have been awarded the contract. Notification will also be posted on the College's Purchasing website at <http://www.cod.edu/about/purchasing/> . Failure to execute performance as per accepted bid may result in legal action by the College of DuPage to recover damages.

If a contract is not awarded within ninety (90) days after the opening of bids, a bidder may file a written request with the Purchasing Manager on the withdrawal of their bid and the Purchasing Manager will permit such withdrawal.

The bid security (if required) of all except the three (3) low bidders will be returned promptly after the bids have been checked, tabulated, and the relation of the bids established. Bid security of the three (3) lowest bidders, if required in legal notice, will be returned as soon as the contract and the bond of the successful bidder have been promptly executed and approved. If contracts cannot be awarded promptly, the College may permit the three (3) lowest bidders to substitute bid bonds for bank cashier's checks, bank drafts or certified checks submitted with their bids. Bid bonds executed by corporate surety companies shall be satisfactory to the Owner, but such substitution shall not be made until a period of fifteen (15) days has elapsed after the date of opening of bids and bond forms furnished by the College shall be used.

## 1.9 CONSIDERATION OF BIDS

The College reserves the right to reject or accept any or all Bid responses, to extend the bidding period, to waive technicalities in the documents and/or to direct that the project be abandoned or rebid prior to award of the Contract.

## 1.10 COMPETENCY OF BIDDER

No Bid will be accepted from or Contract awarded to a Bidder that is in arrears or is in default to the College upon any debt or Contract, or that is a defaulter, as surety or otherwise upon any obligation to said College, or has failed to perform faithfully any previous contract with the College.

### **1.11 BIDDER WARRANTIES**

The submission of a Bid shall constitute a warranty that: (i) Bidder has carefully and thoroughly reviewed the Bid Documents and has found them complete and free from ambiguities and sufficient to describe the Contract work; (ii) Bidder and all workmen and/or employees it intends to use in the performance of this Contract are skilled and experienced in the type of work or services called for by the Bid Documents; and (iii) neither the Bidder nor any of its employees, agents, suppliers or subcontractors have relied on any verbal representations from the College, or any of the College's employees, agents, or consultants, in preparing the Bid.

### **1.12 PAYMENT REMITTANCE**

All College vendors are required to receive payment from the College via an Automated Clearing House (ACH) transfer. Instructions to register for ACH payments will be sent, upon request, to successful bidders. Failure to comply with the ACH requirements may result in termination of the contract or purchase order. College ACH transfers typically occur the third week of each month. Invoices must be received at least 3 weeks prior to each ACH payment release. You are strongly encouraged to set up your account upon notice of award to avoid a delay payment.

### **1.13 CASH BILLING DISCOUNTS**

Cash billing or percentage discounts for payment will not be considered in evaluating Bids.

### **1.14 LOCAL BUSINESS PREFERENCE**

When two (2) or more responsible bidders submit the same low bid, the contract award will be determined by drawing lots in a public meeting unless one bidder is a local bidder within the District boundaries and one is a non-local bidder, in which event the local bidder will be awarded the contract.

### **1.15 EQUAL EMPLOYMENT OPPORTUNITY**

In the hiring of employees for the performance of work under the Contract and any subcontract thereunder, no Contractor or Subcontractor shall, by reason of race, color, sex, religion, national origin, ancestry, age, marital status, disability, unfavorable military discharge or sexual orientation discriminate against any citizen of the United States, in the employment of Labor or workers, who are qualified and available to perform work to which the employment is related. Neither shall any Contractor or Subcontractor, or any person on behalf of either, discriminate against or intimidate any employee hired for the performance of work under this Contract on account of race, color, sex, religion, national origin, ancestry, age, marital status, disability, unfavorable military discharge or sexual orientation.

### **1.16 TAX EXEMPTION**

College of DuPage District #502 is exempt from Federal, State and Municipal taxes. Exemption certificates will be furnished upon request.

### **1.17 HOLD HARMLESS CLAUSE**

The Respondent agrees to indemnify, hold harmless and defend College of DuPage, its agents, servants, and employees, and each of them against, and hold it and them harmless from, any and all lawsuits, claims, demands, liabilities, losses and expenses, including court costs and attorney's fees, for or on account of any injury to any person, or any death at any time resulting from such injury, or any damage to property, which may arise or which may be alleged to have arisen out of or in connection with the work covered by this contract.



## 1.18 CONTRACTOR'S LIABILITY INSURANCE

The Contractor shall not commence work under this contract until all insurance required herein is obtained and approved by the Owner. Nor shall the Contractor allow any subcontractor to commence work until all similar insurance required of the subcontractor has been so obtained.

The Contractor shall furnish the College of DuPage with a Certificate of Insurance, with College of DuPage, its trustees, officers, agents, employees, and any other parties designated by COD named as an additional insured for Commercial General and Automobile Liability, showing the minimum coverage indicated below. Insurance companies must have a Best Rating of at least A VI and otherwise be acceptable to the College. Workers' compensation insurance shall include a waiver of subrogation in favor of the College of DuPage. The College will also be shown as the certificate holder. Further, the Certificate of Insurance shall state that coverage provided is primary to any other coverage available to College of DuPage. An endorsement page showing coverage must accompany the certificate of insurance. The foregoing certificate shall contain a provision that coverage afforded under the policies will not be cancelled or non-renewed until at least sixty (60) days prior written notice has been given to College of DuPage.

### TYPE OF INSURANCE

### MINIMUM INSURANCE COVERAGE

Combined Single Limit Per Occurrence/Aggregate

#### **Commercial General Liability** including:

- |   |                           |
|---|---------------------------|
| 1. Premises – Operations                      | \$1,000,000 / \$2,000,000 |
| 2. Explosion, Underground and Collapse Hazard |                           |
| 3. Products/Completed Operations              |                           |
| 4. Contractual Insurance                      |                           |
| 5. Broad Form Property Damage                 |                           |
| 6. Independent Contractors                    |                           |
| 7. Bodily Injury                              |                           |

#### **Automobile Liability**

Owned, Non-owned, or Rented	\$1,000,000 / \$2,000,000
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<b>Workers' Compensation and Employers' Liability</b>	As Required by Applicable Laws.
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<b>Professional Liability</b>	If Performance Specifications are Required by the Contract
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## 1.19 PREVAILING WAGE ACT

When applicable, and as a condition of receiving payment, Contractor must pay its employees prevailing wages in the locality in which the work is to be performed as establish for Public Works (construction and maintenance of a public work) prevailing wage and other requirements under Contract for Public Workers 820 ILCS 130/4. When required by the College Contractor shall provide a copy of the certified payroll on request. Contractor is responsible for contacting the Illinois Department of Labor to ensure understanding of prevailing wage requirements.

The prevailing rates of wages are determined by the Illinois Department of Labor and are available on the Department's official website: <http://www.illinois.gov/idol/Laws- Rules/CONMED/Pages/prevailing-wage-rates.aspx>. The College of DuPage has adopted the resolution regarding the prevailing wage rates for DuPage County in accordance with Illinois Prevailing Wage Act and are available the College's website: [http://www.cod.edu/about/purchasing/illinois\\_prevailing\\_wage\\_act.aspx](http://www.cod.edu/about/purchasing/illinois_prevailing_wage_act.aspx).

## 1.20 BUSINESS ENTERPRISE PROGRAM

The College of DuPage encourages the participation of qualified minorities, females, and persons with disabilities owned businesses in public contracts. It is the practice of the College to ensure full and equitable economic opportunities to persons and businesses that compete for business with the College of DuPage, including minorities, females, and persons with disabilities owned business enterprises. The College is committed to the economic development of disadvantaged business enterprises and the award of contracts

to businesses owned by minorities, females, and persons with disabilities for services to the extent provided by the Business Enterprise for Minorities, Females and Persons with Disabilities Act ("Act"), 30 ILCS 575.

**END OF SECTION**

## 2.0 INSTRUCTIONS TO BIDDERS

### 2.1 OUTSIDE DOCUMENT DISCLAIMER

The College of DuPage cannot warrant, represent, or guarantee the accuracy or completeness of documents which have not been obtained directly from the College. If you have obtained these documents from a third party source, the College is not responsible for any loss or damage including, but not limited to, time, money, or goodwill arising from errors, inaccuracies or omissions in any third party bid documents.

To obtain official documents, please visit: <https://www.cod.edu/about/purchasing/requests/index.aspx> . Click on the link for this project, and follow the prompts to enter your information onto our vendor list and download the original documents. This will ensure your contact information is registered on our vendor list, and we can send you any addenda that may be issued. This website is the only official website for prospective bidders to obtain digital copies of bid documents. It is the responsibility of each prospective bidder to verify the completeness of their printed bid documents before submitting a bid and accompanying executed addenda acknowledgement, and other required forms.

### 2.2 BLACKOUT PERIOD

Under no circumstances are respondents to contact or discuss this Invitation to Bid, or any of the information contained herein or about this project in general, with any College of DuPage trustee, employee, vendor, contractor or subcontractor, other than using the methods outlined in this bid. Respondents are strictly forbidden from visiting the College's locations or approaching any College trustee, employee, vendor, contractor or subcontractor for any information related to this Invitation to Bid or this project without the direct knowledge and authorization in writing in advance from the Purchasing Manager or Buyer. Violation of these provisions may subject the respondent to immediate disqualification. **Initial your understanding of this requirement**

### 2.3 REQUESTS FOR INFORMATION/CLARIFICATION

If any firm submitting a bid for this project is in doubt as to the true meaning of the specifications or other documents or any part thereof, bidder shall request clarification from the Purchasing Department. Questions must be submitted in writing and be directed via email to the Purchasing Department at [purchasing@cod.edu](mailto:purchasing@cod.edu) no later than **January 5, 2018 at 12:00 p.m. Central Time**. Questions for which answers are provided will be communicated to all registered recipients of bid documents via addendum. All issued addenda must be signed and returned to the College as per the instructions in the addenda or bid will not be accepted.

### 2.4 SUBMISSION OF BIDS

All Bidders shall submit:

One (1) sealed original copy of the Bid;  
and one (1) flash drive containing all completed documents of the Bid.

Bids must be in a sealed envelope and delivered to:

Purchasing Manager  
**ATTN: Bid No. 2018-B0031**  
College of DuPage  
BIC Building - Room 1B03  
425 Fawell Blvd.  
Glen Ellyn, Illinois 60137

Bids must be received by the date and hour of the Bid Opening as shown in the legal advertisement. The sealed envelope submitted by the Bidder shall carry the following information on the face of the envelope: Bidder's name, address, Bid Notice Number, advertised date of Bid Opening and the hour designated for Bid Opening as shown in the legal advertisement. Unless otherwise stated, all blank spaces on the bid forms shall be fully completed. Bidder bears all responsibility for error or omissions in the submission of the Bid.

## 2.5 EXCEPTIONS

If any Respondent intends to take any deviations or exceptions from the Specifications or other bid Documents, Respondent shall submit to the Purchasing Manager/Buyer a written request for a deviation or exception at least 5 business days prior to the date and time of advertised bid opening date. If the Project Manager considers such deviation or exception acceptable, the Purchasing Manager/Buyer shall issue an Addendum setting forth such deviation or exception from the Specifications or other which shall be applicable to all Respondents submitting a response.

If no Addendum is issued by the Purchasing Manager/Buyer, then such deviation or exception shall be deemed rejected.

The College may reject any response containing deviations or exceptions not previously accepted through a written Addendum. A copy of such Addendum will be e-mailed or delivered to each Respondent receiving a set of such bid Documents. Respondent shall acknowledge receipt of each Addendum issued in the space provided on the bid form or via a signed addendum. Failure to acknowledge receipt of addenda may result in disqualification of the Bid. All written requests for deviations or exceptions shall be sent to [purchasing@cod.edu](mailto:purchasing@cod.edu).

### Initial understanding of this requirement:

## 2.6 ERROR IN BID

Where a bidder claims to have made a mistake, such mistake must be called to the attention of the Purchasing Manager within twenty-four (24) hours after the opening of bids. Within forty-eight (48) hours of the bid opening, bidder shall submit to the College's designated contracting officer original documentary evidence and a detailed explanation of how the mistake was made. Failure to conform to this requirement precludes the bidder from withdrawing its bid based upon a bid mistake. If such notice, proof and explanations have been tendered, and the contracting officer is convinced that a bona fide mistake has been made, the contracting officer may recommend to the Board of Trustees that the bidder be allowed to withdraw its bid and recommend that the bid be awarded to the next lowest responsible, responsive bidder. If the Board determines by majority vote, that the bidder has made a bona fide error, no award will be made upon such bid and the bid security will be returned.

## 2.7 WITHDRAWAL OF BIDS

Bidders may withdraw their Bids at any time prior to the time specified in the legal advertisement as the date and hour set for the Bid Opening. However, no Bidder shall withdraw, cancel or modify its Bid response for a period of ninety (90) calendar days after said advertised Bid Opening.

## 2.8 NOTICES

All communications and notices between the College and Bidders regarding the Bid Documents shall be in writing and hand delivered or delivered via United States mail, postage prepaid, or via email. Notices to the Bidders shall be addressed to the name and address or email address provided by the Bidders; notices to the Purchasing Manager shall be addressed to Purchasing Department, College of DuPage, BIC Building - Room 1B03, 425 Fawell Blvd., Glen Ellyn, Illinois 60137, or [purchasing@cod.edu](mailto:purchasing@cod.edu).

## 2.9 BID DEPOSIT

When required in the legal advertisement, the Bid shall be accompanied by cashier's check, certified check or surety bond in the amount shown in the legal advertisement or as may be prescribed in these Bid Documents. A certified or cashier's check shall be drawn on a responsible bank doing business in the United States and shall be made payable to the order of the College of DuPage. The Surety issuing the bond must have a general rating of "A", and shall be a Class VI or higher in the financial size category as defined by Best's Key Rating Guide - Property and Casualty. Failure to submit the bid deposit shall constitute an informal Bid and such Bid shall be rejected.

The Bidder hereby agrees that the bid deposit shall be forfeited to the College as liquidated damages and not as penalty in the event Bidder fails to comply with the terms of this invitation to bid, or otherwise fails or refuses to honor the Bid upon award of the Contract by the College.

The bid deposit of all bidders will be returned, with the exception of the winning Contractor, after the College has awarded the Contract. The bid deposit of the Contractor will be returned after the Contract has been awarded and the Contractor has submitted all insurance documentation and the Performance and Payment Bond, as required by the Bid Documents.

**\*This project requires a bid deposit in the amount of 10% of the total base bid.**

#### **2.10 PERFORMANCE AND PAYMENT BOND**

The successful Bidder shall furnish a Performance and Payment Bond in the full amount of the Contract. The Surety issuing the Performance and Payment Bond must have a general rating of "A" and shall be a Class V or higher in the financial size category as defined by Best's Key Rating Guide-Property and Casualty.

In the event that the Bidder fails to furnish the Performance and Payment Bond within fourteen (14) calendar days after service of the Notice of Award, the College may elect to retain Bidder's bid deposit as liquidated damages and not as a penalty and the Contract may be terminated. The parties agree that the sum of the bid deposit is a fair estimate of the amount of damages that the College will sustain due to the Bidder's failure to furnish the Performance and Payment Bond and the termination of the Contract.

**END OF SECTION**

### **3.0 SCOPE OF WORK AND GENERAL CONDITIONS-SRC 2000 EVENT SPACE UPGRADE**

This project is located on the second floor of the Student Resource Center (SRC), see [Exhibit B](#) and [Exhibit C](#) for specifications and drawings. The freight elevator from the SRC Dock serves the back of house for this project space and will be the primary means of delivering material and equipment to the work area. Material and equipment used will be stored in the project area only, no other staging areas are available.

Deliveries at the SRC dock must be scheduled in advance. Employees' personal or company service vehicles will park in the public parking areas.

This project includes minor demolition, rebuilding and system/equipment installation and commissioning as defined in the drawings and specifications.

Generally, the Board is anticipated to approve the bids for this work in February, with contract execution and submittals to begin immediately following. The work is scheduled to begin in the project area beginning May 1, 2018 and needs to be completed prior to August 20, 2018. As a revenue generating space, failure to complete the project prior to August 20, 2018 has financial penalties of \$500.00 for each day past the contractual deadline.

The permitting agency (AHJ) for this project is the Village of Glen Ellyn, Glen Ellyn Illinois. The successful bidder, and all subcontractors/trades required by the AHJ, will need to be registered with the County before the permit for the work can be obtained. Contractors have included the registration costs in their bid, and will insure all necessary parties are registered in a timely manner so as not to impede the issuance of the construction permit. (all other permit fees for drawing reviews and inspections will be paid by the College of DuPage).

This project is prevailing wage. Successful bidder will provide company contact information for itself and all subcontractors prior to release of final payment in order for the College to comply with state survey information. (see [Exhibit A](#))

Certified payrolls for each employee or subcontracted employee who has worked on the College campus are be required to accompany pay applications will be required prior to releasing payments.

The Contractor shall not commence work under this contract until all insurance required herein is obtained and approved by the Owner.

Successful bidder will execute unaltered the College's modified AIA A107 – 2007, Standard Form of Agreement Between Owner and Contractor for a Project of Limited Scope.

**END OF SECTION**

**4.0 BID FORM**

**BID FORM FOR 2018-B0031 – Student Resource Center 2000 Event Space Upgrade**

FIRM NAME, CONTACT NAME and PHONE NUMBER

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

The below prices include all stipulations and requirements of Addenda No. , and \_

Proposes to furnish all labor, materials, equipment and services as required to satisfactorily complete all work described here in as required for the construction and completion of the project where bid below.

<b>SRC 2000 Event Space Upgrade</b>	
Base Bid	\$

Submitted by : \_\_\_\_\_(printed)

Submitted by : \_\_\_\_\_(signed)

**END OF SECTION**

## 5.0 BUSINESS ENTERPRISE PROGRAM

### STATE OF ILLINOIS BUSINESS ENTERPRISE PROGRAM MINORITIES, FEMALES, PERSONS WITH DISABILITY PARTICIPATION AND UTILIZATION PLAN

The Business Enterprise for Minorities, Females and Persons with Disabilities Act (BEP) establishes a goal for community colleges contracting with businesses that have been certified as owned and controlled by persons who are minorities (MBE), female (FBE/ also referred to as WBE), or persons with disabilities (PDBE) (collectively, BEP certified vendor(s)). 30 ILCS 575

**Contract Goal to be Achieved by Vendor:** This solicitation includes a specific **BEP** participation goal of 20% based on the availability of BEP certified vendors to perform or provide the anticipated services and/or supplies required by this solicitation.

**The BEP participation goal is applicable to all bids or offers.** In addition to the award criteria established for this solicitation, the College will award this contract to a Vendor that meets the goal or demonstrates good faith efforts to meet the goal. This goal is applicable to change orders and allowances within the scope of work provided by the BEP certified vendors. If Vendor is an MBE and FBE certified vendor, the entire goal is met and no subcontracting with a BEP certified vendors is required; however, **Vendor must submit a Utilization Plan indicating that the goal will be met by self-performance.**

Following are guidelines for Vendor's completion of the Utilization Plan. The Utilization Plan must demonstrate that Vendor has either: (1) met the entire contract goal; or (2) made good faith efforts towards meeting the goal.

At the time of bid or offer, Vendor, or Vendor's proposed Subcontractor, must be certified with the Illinois Department of Central Management Services as a BEP certified vendor.

Failure to complete a Utilization Plan or provide Good Faith Effort documentation shall render the bid or offer non-responsive; and subject to rejection and/or disqualification in the College's sole discretion.

1. If applicable where there is more than one prime vendor, the Utilization Plan should include an executed Joint Venture Agreement specifying the terms and conditions of the relationship between the parties and their relationship and responsibilities to the contract. The Joint Venture Agreement must clearly evidence that the BEP certified vendor will be responsible for a clearly defined portion of the work and that its responsibilities, risks, profits and contributions of capital, and personnel are proportionate to its ownership percentage. It must include specific details related to the parties' contributions of capital, personnel, and equipment and share of the costs of insurance and other items; the scopes to be performed by the BEP certified vendor under its supervision; and the commitment of management, supervisory personnel, and operative personnel employed by the BEP certified vendor to be dedicated to the performance of the contract. Established Joint Venture Agreements will only be credited toward BEP goal achievements for specific work performed by the BEP certified vendor. **Each party to the Joint Venture Agreement must execute the bid or offer prior to submission of the bid or offer to the College.**
2. An agreement between a vendor and a BEP certified vendor in which a BEP certified vendor promises not to provide subcontracting or pricing quotations to other vendors is prohibited. The College may



request additional information to demonstrate compliance. Vendor agrees to cooperate promptly with the College in submitting to interviews, allowing entry to places of business, providing further documentation, and to soliciting the cooperation of a proposed BEP certified vendor. Failure to cooperate by Vendor and BEP certified vendor may render the bidder or offeror non-responsive or not responsible. **The contract will not be awarded to Vendor unless Vendor's Utilization Plan is approved by the College.**

3. **BEP Certified Vendor Locator References:** Vendor may consult CMS' BEP Vendor Directory at [www.sell2.illinois.gov/cms/business](http://www.sell2.illinois.gov/cms/business), as well as the directories of other certifying agencies, but firms **must be certified with CMS as BEP certified vendors at the time of bid or offer.**
4. **Vendor Assurance:** Vendor shall not discriminate on the basis of race, color, national origin, sexual orientation or sex in the performance of this contract. Failure by Vendor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy, as the College deems appropriate. This assurance must be included in each subcontract that Vendor signs with a subcontractor or supplier.
5. **Calculating BEP Certified Vendor Participation:** The Utilization Plan documents work anticipated to be performed, or goods/equipment provided by all BEP certified vendors and paid for upon satisfactory completion/delivery. Only the value of payments made for the work actually performed by BEP certified vendors, by subcontractors or suppliers to such vendors, is counted toward the contract goal. Applicable guidelines for counting payments attributable to contract goals are summarized below:
  - 5.1 The value of the work actually performed or goods/equipment provided by the BEP certified vendor shall be counted towards the goal. The entire amount of that portion of the contract that is performed by the BEP certified vendor, including supplies purchased or equipment leased by the BEP certified vendor shall be counted, except supplies purchased and equipment rented from the Prime Vendor submitting this bid or offer.
  - 5.2 A vendor shall count the portion of the total dollar value of the BEP contract equal to the distinct, clearly defined portion of the work of the contract that the BEP certified vendor performs toward the goal. A vendor shall also count the dollar value of work subcontracted to other BEP certified vendor. Work performed by the non- BEP certified party shall not be counted toward the goal. **Work that a BEP certified vendor subcontracts to a non-BEP certified vendor will not count towards the goal.**
  - 5.3 A Vendor shall count toward the goal 100% of its expenditures for materials and supplies required under the contract and obtained from a BEP certified vendor manufacturer, BEP certified regular dealer, or BEP certified supplier. A Vendor shall count toward the goal the following expenditures to BEP certified vendors that are not manufacturers, regular dealers, or suppliers:
    - 5.3.1 The fees or commissions charged for providing a bona fide service, such as professional, technical, consultant or managerial services and assistance in the procurement of essential personnel, facilities, equipment, materials or supplies required for performance of the contract, provided that the fee or commission is determined by College to be reasonable and not excessive as compared with fees customarily allowed for similar services.

- 5.3.2** The fees charged for delivery of materials and supplies required by the contract (but not the cost of the materials and supplies themselves) when the hauler, trucker, or delivery service is not also the manufacturer or a supplier of the materials and supplies being procured, provided that the fee is determined by the College to be reasonable and not excessive as compared with fees customarily allowed for similar services. The BEP certified vendor's trucking firm must be responsible for the management and supervision of the entire trucking operation for which it is responsible on the contract, and must itself own and operate at least one fully licensed, insured and operational truck used on the contract.
- 5.3.3** The fees or commissions charged for providing any bonds or insurance specifically required for the performance of the contract, provided that the fee or commission is determined by the College to be reasonable and not excessive as compared with fees customarily allowed for similar services.
- 5.4** BEP certified vendors who are performing on contract as second tier subcontractors may be counted in meeting the established BEP goal for this contract as long as the Prime Vendor can provide documentation indicating the utilization of these vendors.
- 5.5** A Vendor shall count towards the goal only expenditures to firms that perform a commercially useful function in the work of the contract.
- 5.5.1** A firm is considered to perform a commercially useful function when it is responsible for execution of a distinct element of the work of a contract and carries out its responsibilities by actually performing, managing, and supervising the work involved. The BEP certified vendor must also be responsible, with respect to materials or supplies used on the contract, for negotiating price, determining quality and quantity, ordering the materials or supplies, and installing the materials (where applicable) and paying for the material or supplies. To determine whether a firm is performing a commercially useful function, the College shall evaluate the amount of work subcontracted, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing and the credit claimed for its performance of the work, industry practices, and other relevant factors.
- 5.5.2** A BEP certified vendor does not perform a commercially useful function if its role is limited to that of an extra participant in a transaction or contract through which funds are passed through in order to obtain BEP certified vendor participation. In determining whether a BEP certified vendor is such an extra participant, the College shall examine similar transactions, particularly those in which BEP certified vendors do not participate, and industry practices.
- 5.6** A Vendor shall not count towards the goal expenditures that are not direct, necessary and related to the work of the contract. Only the amount of services or goods that are directly attributable to the performance of the contract shall be counted. Ineligible expenditures include general office overhead or other Vendor support activities.
- 6. Good Faith Effort Procedures:** Vendor must submit Utilization Plans, subcontract documents, and/or Letters of Intent that meet or exceed the published goal. If Vendor cannot meet the stated goal, Vendor must document and explain within the Utilization Plan the good faith efforts it undertook to meet the goal. Utilization Plans are due at the time of and must be enclosed and sealed with the bid

or offer submission. Copies of subcontract documents and/or Letters of Intent shall be due upon request.

7. **Contract Compliance:** Compliance with this section is an essential part of the contract. The following administrative procedures and remedies govern Vendor's compliance with the contractual obligations established by the Utilization Plan. **After approval of the Plan and award of the contract, the Utilization Plan becomes part of the contract.** If Vendor did not succeed in obtaining BEP certified vendor participation to achieve the goal and the Utilization Plan was approved and contract awarded based upon a determination of good faith, the total dollar value of BEP certified vendor work calculated in the approved Utilization Plan as a percentage of the awarded contract value shall become the contract goal.
  - 7.1. The Utilization Plan may not be amended after contract execution without the College's prior written approval.
  - 7.2. **Vendor may not make changes to its contractual BEP certified vendor commitments or substitute BEP certified vendors without the prior written approval of the College.** Unauthorized changes or substitutions, including performing the work designated for a BEP certified vendor with Vendor's own forces, shall be a violation of the utilization plan and a breach of the contract, and shall be cause to terminate the contract, and/or seek other contract remedies or sanctions.
  - 7.3. If it becomes necessary to substitute a BEP certified vendor or otherwise change the Utilization Plan, Vendor must notify the College in writing of the request to substitute a BEP certified vendor or otherwise change the Utilization Plan. The request must state specific reasons for the substitution or change. The College shall notify the Council or its delegate of the request to substitute a BEP certified vendor or change the Utilization Plan. The College reserves the right to approve or deny a request for substitution or other change in the Utilization Plan.
  - 7.4. Where Vendor has established the basis for the substitution to the College's satisfaction, it must make good faith efforts to meet the contract goal by substituting a BEP certified vendor. Documentation of a replacement BEP certified vendor, or of good faith efforts to replace the BEP certified vendor, must meet the requirements of the initial Utilization Plan. If the goal cannot be reached and good faith efforts have been made, Vendor may substitute with a non- BEP certified vendor or Vendor may perform the work.
  - 7.5. If a Vendor plans to hire a subcontractor for any scope of work that was not previously disclosed in the Utilization Plan, Vendor must obtain the approval of the College to modify the Utilization Plan and must make good faith efforts to ensure that BEP certified vendors have a fair opportunity to submit a bid or offer on the new scope of work.
  - 7.6. A new BEP certified vendor agreement must be executed and submitted to the College within five business days of Vendor's receipt of the College's approval for the substitution or other change.
  - 7.7. Vendor shall maintain a record of all relevant data with respect to the utilization of BEP certified vendors, including but without limitation, payroll records, invoices, canceled checks and books of account for a period of at least three years after the completion of the contract. Full access to these records shall be granted by Vendor upon 48 hours written demand by the College to any duly authorized representative thereof, or to any

municipal, state or federal authorities. The College shall have the right to obtain from Vendor any additional data reasonably related or necessary to verify any representations by Vendor. After the performance of the final item of work or delivery of material by the BEP certified vendor and final payment to the BEP certified vendor by Vendor, but not later than 30 calendar days after such payment, Vendor shall submit a statement confirming the final payment and the total payments made to the BEP certified vendor under the contract.

- 7.8.** The College will periodically review Vendor's compliance with these provisions and the terms of its contract. Without limitation, Vendor's failure to comply with these provisions or its contractual commitments as contained in the Utilization Plan, failure to cooperate in providing information regarding its compliance with these provisions or its Utilization Plan, or provision of false or misleading information or statements concerning compliance, certification status or eligibility of the BEP certified vendor, good faith efforts or any other material fact or representation shall constitute a material breach of this contract and entitle the College to declare a default, terminate the contract, or exercise those remedies provided for in the contract or at law or in equity.
- 7.9.** The College reserves the right to withhold payment to Vendor to enforce these provisions and Vendor's contractual commitments. Final payment shall not be made pursuant to the contract until Vendor submits sufficient documentation demonstrating compliance with its Utilization Plan.

## UTILIZATION PLAN

**The Utilization Plan and Letter of Intent must be sealed and submitted with Bid.**

\_\_\_\_\_ (Vendor) submits the following Utilization Plan as part  
Respondent Name  
of our bid or offer in accordance with the requirements of the BEP Program Status and Participation section of the solicitation for **Student Resource Center 2000 Event Space Upgrade, BID Number 2018-B0031**. We understand that all subcontractors must be certified with the CMS BEP Program at the time of submission of all bids and offers. **We understand that compliance with this section is an essential part of this contract and that the Utilization Plan will become a part of the contract, if awarded.**

Vendor submits the following statement:

- Vendor is a BEP certified firm and plans to fully meet the goal through self-performance.
- Vendor has identified BEP certified subcontractor(s) to fully meet the established goal and submits the attached executed Letter(s) of Intent; or
- Vendor has made good faith efforts towards meeting the entire goal as indicated on the attached Utilization Plan, or a portion of the goal, and hereby requests a waiver (complete checklist below).

Vendor's person responsible for compliance with this BEP goal:

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Telephone: \_\_\_\_\_ Email: \_\_\_\_\_

## DEMONSTRATION OF GOOD FAITH EFFORTS TO ACHIEVE GOAL AND REQUEST FOR WAIVER

If the BEP participation goal was not achieved, the vendor must provide documented evidence of good faith efforts to achieve the goal.

Below is a checklist of actions that will be used to evaluate a Vendor's Demonstration of Good Faith Efforts and Request for Waiver. **Please check the actions which you completed.** If any other efforts were made to obtain BEP participation in addition to the items listed below, attach a detailed description of such efforts. The College reserves the right to review and audit the results of the vendor's efforts as described below.

- Utilize the Sell2Illinois website: [www2.illinois.gov/cms/business](http://www2.illinois.gov/cms/business) to identify BEP certified vendors within the respective commodity/service codes denoted above and at a minimum email all listed vendors and solicit quotes from all vendors who express an interest via follow-up emails or telephone calls.
- Solicit through all reasonable and available means (e.g., attendance at a vendor conference, advertising and/or written notices) the interest of BEP certified vendors that have the capability to perform the work of the contract. Vendor must solicit this interest within sufficient time to allow the BEP certified vendors to respond to the solicitation. Vendor must determine with certainty if the BEP certified vendors are interested by taking appropriate steps to follow up initial solicitations and encourage them to submit a bid or proposal. Vendor must provide interested BEP certified vendors with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding promptly to the solicitation.
- Select portions of the work to be performed by BEP certified vendors in order to increase the likelihood that the goal will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate BEP certified vendor participation, even when Vendor might otherwise prefer to perform these work items with its own forces.
- Make a portion of the work available to BEP certified vendors and selecting those portions of the work or material needs consistent with their availability, so as to facilitate BEP certified vendor participation.
- Negotiate in good faith with interested BEP certified vendors. Evidence of such negotiation must include the names, addresses, email addresses, and telephone numbers of BEP certified vendors that were considered and an explanation as to why an agreement could not be reached.
- Thoroughly investigate the capabilities of BEP certified vendors and not reject them as unqualified without sound reasons.
- Make efforts to assist interested BEP certified vendors in obtaining lines of credit or insurance as required by the College.
- Make efforts to assist interested BEP certified vendors in obtaining necessary equipment, supplies, materials, or related assistance or services.

**6.0 CERTIFICATIONS **\*\*Required\*\*****

**IMPORTANT:** All bidders are required to complete and sign this form. Completed form must be returned with bid no later than the advertised bid deadline. Failure to return this completed form may result in disqualification of bid.

THE UNDERSIGNED IS CAUTIONED TO CAREFULLY READ THESE CERTIFICATIONS PRIOR TO SIGNING THE SIGNATURE PAGE. SIGNING THE SIGNATURE PAGE SHALL CONSTITUTE A WARRANTY BY THE UNDERSIGNED THAT ALL THE STATEMENTS, CERTIFICATIONS AND INFORMATION SET FORTH WITHIN THESE CERTIFICATIONS ARE TRUE, COMPLETE AND CORRECT AS OF THE DATE THE SIGNATURE PAGE IS SIGNED. THE UNDERSIGNED IS NOTIFIED THAT IF THE COLLEGE LEARNS THAT ANY OF THE FOLLOWING CERTIFICATIONS WERE FALSELY MADE, THAT ANY CONTRACT ENTERED INTO WITH THE UNDERSIGNED SHALL BE SUBJECT TO TERMINATION.

- A. Prevailing Wage Act. To the extent required by law, Contractor shall not pay less than the prevailing wage as established pursuant to an Act Regulating the Wages of Laborers, Mechanics, and Other Workman employed under Contract for Public Workers 820 ILCS 130/1 *et seq.* Our company certifies that it is eligible for bidding on public contracts and has complied with section 11a of the Prevailing Wage Act, 820 ILCS 130.01-12. **Yes** \_\_\_\_\_ **No** \_\_\_\_\_
- B. Human Rights Act. To the extent required by law, Contractor shall abide by the Illinois Human Rights Act, 775 ILCS 10/0.01 *et seq.*
- C. Drug Free Workplace. To the extent required by law, Contractor shall abide with the requirements of the Drug Free Workplace Act 30 ILCS 580.1 *et seq.*
- D. Sexual Harassment Policy. Contractor represents by the signing of this agreement that it has a written sexual harassment policy that is in accordance with 775 ILCS 5/2-105 (A) (4).
- E. Non-debarment. By executing this agreement Contractor certifies that it has not been debarred from public contracts in the State of Illinois for violating either 33E-3 or 33E-4 of the Public Contracts Act, 720 ILCS 5/33E-1 *et seq.*
- F. Fair Employment Practice: Company is in compliance with all State and Federal laws regarding Fair Employment Practice as well as all rules and regulations. **Yes** \_\_\_\_\_ **No** \_\_\_\_\_
- G. Our company has an Equal Employment Opportunity and Affirmative Action Program which complies with Executive Order 11246, the Vietnam Era Veterans' Readjustment Assistance Act of 1974, and the Rehabilitation Act of 1973.  
**Yes** \_\_\_\_\_ **No** \_\_\_\_\_
- H. Our company certifies that it is eligible for bidding on public contracts and is not in violation of either paragraph 33E-3 or 33E-4 of Public Act 86-150, 720ILCS 5 with regards to bid rigging/bid rotating.  
**Yes** \_\_\_\_\_ **No** \_\_\_\_\_
- I. When required by law, the bidder and all bidder's subcontractors must participate in applicable apprenticeship and training programs approved by and registered with the United States Department of Labor's Bureau of Apprenticeship and Training as required by Illinois Public Act 093-0642.

**ADVICE**

- A. MINORITY/WOMAN-OWNED, DISADVANTAGED BUSINESS? YES \_\_\_\_\_ NO \_\_\_\_\_. If yes, please attach copy of certification and advise certification number and expiration date below:

Name of Certifying Entity: \_\_\_\_\_

Certification #: \_\_\_\_\_ Expiration Date: \_\_\_\_\_

- B. STATE NEGOTIATED COOPERATIVE AGREEMENT: YES \_\_\_\_\_ NO \_\_\_\_\_ Contract No. \_\_\_\_\_

Signature

Respondent/Company Official: \_\_\_\_\_ Date: \_\_\_\_\_

**7.0 SIGNATURE PAGE \*\*Required\*\***

**IMPORTANT:** All bidders are required to complete and sign this form. Completed form must be returned with bid to [purchasing@cod.edu](mailto:purchasing@cod.edu) no later than the advertised bid deadline. Failure to return this completed form may result in disqualification of bid.

Check One:

**SOLE PROPRIETOR**     **PARTNERSHIP** (and/or JOINT VENTURE)     **LIMITED LIABILITY COMPANY**

**CORPORATION**

The undersigned acknowledges receipt of a full set of Bid Documents and Addenda Numbers \_\_\_\_\_ (None unless indicated here). **All issued addenda must be signed and returned to the College as per the instructions in the addenda or bid will not be accepted.**

The undersigned makes the foregoing Bid subject to all of the terms and conditions of the Bid Documents. The undersigned certifies that all of the foregoing statements of the Vendor Certifications are true and correct. The undersigned warrants that all of the facts and information submitted by the undersigned in connection with this Bid are true and correct. Upon award and execution of this Contract by the College of DuPage Board of Trustees, the undersigned agrees that execution of this Bid shall stand as the undersigned's execution of this Contract.

BUSINESS NAME: \_\_\_\_\_

BUSINESS ADDRESS: \_\_\_\_\_

BUSINESS TELEPHONE: \_\_\_\_\_ FAX NUMBER: \_\_\_\_\_

EMAIL ADDRESS: \_\_\_\_\_

CELLULAR TELEPHONE NUMBER: \_\_\_\_\_

FEIN/SSN: \_\_\_\_\_

AUTHORIZED SIGNATURE: \_\_\_\_\_

PRINT NAME: \_\_\_\_\_

TITLE: \_\_\_\_\_

DATE: \_\_\_\_\_

Subscribed to and sworn before me this

\_\_\_\_\_ Day of \_\_\_\_\_, 2018.                      My commission expires: \_\_\_\_\_

X \_\_\_\_\_

Notary Public Signature

Notary Seal

**\* Attach hereto a partnership resolution or other document authorizing the individual signing this Signature Page to so sign on behalf of the Partnership.**

**\*\* If the LLC is not registered in the State of Illinois, a copy of a current Certificate of Good Standing from the state of incorporation must be submitted with this Signature Page.**

**\*\*\* Attach either a certified copy of the by-laws, articles, resolution or other authorization demonstrating such persons to sign the Signature Page on behalf of the LLC.**

**\*\*\* If the corporation is not registered in the State of Illinois, a copy of the Certificate of Good Standing from the state of incorporation must be submitted with this Signature Page.**

**\*\*\*\*\* In the event that this Signature Page is signed by any persons other than the President and Secretary, attach either a certified copy of the corporate by-laws, a resolution or other authorization by the corporation, authorizing such persons to sign the Signature Page on behalf of the corporation.**



**8.0 CONFLICT OF INTEREST DISCLOSURE AND NON-COLLUSION FORM **\*\*Required\*\*****

**IMPORTANT:** All bidders are required to complete and sign this form. Completed form must be returned with bid no later than the advertised bid deadline. Failure to return this completed form may result in disqualification of bid.

BID #: \_\_\_\_\_ DATE: \_\_\_\_\_

**CONFLICT OF INTEREST DISCLOSURE**

College of DuPage (COD) reserves the right, at its sole discretion, to reject any and all bids, revise the submission timeline as described in the solicitation, and to discontinue at any time the submission process as described in the solicitation. College of DuPage is requiring that any and all relationships with the College, its Administrators, Trustees, Committee members, COD Foundation Trustees, or any other Employee of the College be disclosed in writing as a part of any bid submitted. Contact with any employee of the College of DuPage during the pre-award period, except as noted in the solicitation, is strictly forbidden and is considered sufficient grounds for dismissal from the Bid/RFP process.

**VENDOR CONFLICT OF INTEREST DISCLOSURE**

Define the relationship with any College of DuPage Administrator, Trustee, Employee, COD Foundation Board member, Committee member, or their immediate family member, with which your company or any of its owners, officers, Trustees, employees, or their immediate family, does business or is likely to do business with, or for which there is an opportunity to influence a related College decision; include the name and relationship to any immediate family member.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Vendor certifies that there is no known conflict of interest with any COD Administrator, Employee, Trustee, Committee member, or COD Foundation Trustee, or their immediate family.

Vendor Printed Name: \_\_\_\_\_ Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**NON-COLLUSION STATEMENT**

The undersigned affirms that he/she is duly authorized to execute this contract and that this company, corporation, firm, partnership or individual has not prepared this bid in collusion with any other bidder, and that the contents of this bid as to prices, terms or conditions of said bid have not been Communicated by the undersigned nor by any employee or agent to any other person engaged in this type of business prior to the official opening of this bid.

Company Name: \_\_\_\_\_ Owners/Principal(s)  
Name(s)/Title(s): \_\_\_\_\_

Vendor Address: \_\_\_\_\_ City, State, Zip: \_\_\_\_\_

Phone Number: \_\_\_\_\_ Fax Number: \_\_\_\_\_

Email Address: \_\_\_\_\_

Signature

Bidder/Company Official: \_\_\_\_\_ Date: \_\_\_\_\_

# EXHIBIT A – PREVAILING WAGE FORM



## Prevailing Wage Form

In an effort to meet the Prevailing Wage Survey requirements of the State of Illinois, the College of DuPage has established the Prevailing Wage Form that will assist in reporting Prevailing Wage information. Please complete the information below and return to the College of DuPage Project Manager.

**Project Name:** \_\_\_\_\_

**Project Bid/RFP#:** \_\_\_\_\_

### Contractor Information:

Company Name	_____		
Address:	_____	Suite/Floor	_____
City:	_____	ST	_____
Phone:	_____	Zip Code	_____
		Fax:	_____

### Contractor Contact Information:

First Name	_____	MI	_____	Last Name	_____
Title	_____	Email	_____		
City	_____	ST	_____	Zip	_____
Primary Phone:	_____				

College of DuPage Project Manager: \_\_\_\_\_ Date: \_\_\_\_\_

## EXHIBIT B SPECIFICATIONS



# DLR Group

Architecture  
Engineering  
Planning  
Interiors

## **SRC 2000 College of DuPage Glen Ellyn, IL**

100% Construction Documents  
**DLR Group Project No. 22-17142-00**

December 18, 2017

**NOTICE:** These documents are instruments of professional service, and information contained therein is incomplete unless used in conjunction with DLR Group's interpretations, decisions, observations and administrations. Use or reproduction of these documents in whole or in part without DLR Group's consent is in violation of common law, copyrights, statutory and other reserved rights, which preempts state and local public records act.



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*General Requirements Subgroup*

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## SECTION 011000 - SUMMARY

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Project information.
  - 2. Work covered by Contract Documents.
  - 3. Work by Owner.
  - 4. Owner-furnished products.
  - 5. Contractor-furnished, Owner-installed products.
  - 6. Access to site.
  - 7. Work restrictions.
  - 8. Specification and Drawing conventions.

#### 1.3 PROJECT INFORMATION

- A. Project Identification: College of DuPage, SRC 2000
  - 1. Project Location: 425 Fawell Blvd., Glen Ellyn, IL 60137
- B. Owner: College of DuPage
- C. Architect: DLR Group, 333 West Wacker Drive, Suite 400, Chicago, Illinois 60606, 312-380-7018
- D. Contractor: TBD
- E. Web-Based Project Software: Project software administered by Contractor will be used for purposes of managing communication and documents during the construction stage.
  - 1. See Section 013100 "Project Management and Coordination." for requirements for establishing administering and using web-based Project software.

#### 1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Interior renovation of existing conference room with audio visual, lighting and electrical upgrades.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.5 WORK BY OWNER

- A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

1. Reference the "Owner and Contractor Responsibility Matrix" for additional information.

- B. Concurrent Work: Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with Work under this Contract.

1. Reference the "Owner and Contractor Responsibility Matrix" for additional information.

- C. Subsequent Work: Owner will perform the following additional work at site after Substantial Completion. Completion of that work will depend on successful completion of preparatory Work under this Contract.

1. Reference the "Owner and Contractor Responsibility Matrix" for additional information.

1.6 OWNER-FURNISHED PRODUCTS

- A. Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products and making building services connections.

B. Owner-Furnished Products:

1. Per Owners Responsibility Matrix.

1.7 CONTRACTOR-FURNISHED, OWNER-INSTALLED PRODUCTS

- A. Contractor shall furnish products indicated. The Work includes unloading, handling, storing, and protecting Contractor-furnished products as directed and turning them over to Owner at Project closeout.

B. Contractor-Furnished, Owner-Installed Products:

1. Per Owners Responsibility Matrix.

1.8 ACCESS TO SITE

- A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.



1. Limits: Confine construction operations to areas within the Contract limits indicated. Do not disturb portions of the Project site beyond areas in which the Work is indicated.

## 1.9 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
  1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor-air intakes.
- C. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.
- D. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- E. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.
  1. Maintain list of approved screened personnel with Owner's representative.
- F. Delivery restrictions and requirements. Contractor shall inform Owner of unusual deliveries that could impact students, faculty or staff (e.g. long span bar joist deliveries, etc.)
- G. Contractor shall inform Owner during construction document phase of any conditions resulting from construction operations that will negatively impact students, faculty or staff (e.g. fumes from roofing, noise, etc.)

## 1.10 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
  1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

DECEMBER 18, 2017

## SECTION 012100 - ALLOWANCES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
- B. Types of allowances include the following:
  - 1. Lump-sum allowances.
  - 2. Unit-cost allowances.
- C. Related Requirements:
  - 1. Section 012200 "Unit Prices" for procedures for using unit prices, including adjustment of quantity allowances when applicable.
  - 2. Section 014000 "Quality Requirements" for procedures governing the use of allowances for field testing by an independent testing agency.

#### 1.3 DEFINITIONS

- A. Allowance is a quantity of work or dollar amount established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

#### 1.4 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

## 1.5 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

## 1.7 LUMP-SUM ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
  - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

## 1.8 UNIT-COST ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
  - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

## 1.9 QUANTITY ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
  - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

## 1.10 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
  - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
  - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.
  - 3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.
  - 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
  - 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.
  - 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

END OF SECTION 012100

DECEMBER 18, 2017

## SECTION 012500 - SUBSTITUTION PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.

#### 1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
  - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

#### 1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Substitution Request Form: Use electronic copy of form provided in Project Manual.
  - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
    - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
    - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size,

durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
  - e. Samples, where applicable or requested.
  - f. Certificates and qualification data, where applicable or requested.
  - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
  - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
  - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
  - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
  - k. Cost information, including a proposal of change, if any, in the Contract Sum.
  - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
  - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
  - n. All requests for substitution shall contain a side-by-side comparison of the proposed substitute against the originally specified product or system, clearly demonstrating the equality or superiority of the proposed substitution.
  - o. Substitutions after Contract award shall only be permitted under the following circumstances:
    - 1) Required for compliance with interpretation of codes or insurance requirements in force at time of bidding (i.e. code or code insurance requirements in force at time of bidding (i.e. code or code interpretation changed after Contract award.)
    - 2) Unavailability of product through no fault of Contractor. Failure to allow sufficient time to procure specified product or systems shall not be a valid reason for substitution.
    - 3) Subsequent information discloses inability of specified products to perform properly or fit into designated space.
    - 4) Manufacturer/Fabricator refuses to certify or guarantee performance of specified product as required.
    - 5) When it is clearly seen, in the judgement of the A/E that a substitution would be substantially in the Owner's best interest in terms of time, cost or other considerations.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.



- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
- b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

## 1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

## 1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

## 1.7 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
  - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
    - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - b. Substitution request is fully documented and properly submitted.
    - c. Requested substitution will not adversely affect Contractor's construction schedule.
    - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
    - e. Requested substitution is compatible with other portions of the Work.
    - f. Requested substitution has been coordinated with other portions of the Work.
    - g. Requested substitution provides specified warranty.
    - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

- B. Substitutions for Convenience: Not allowed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

DECEMBER 18, 2017

## SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

#### 1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions".

#### 1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.
    - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
    - e. Quotation Form: Use forms acceptable to Architect.

- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
  2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
  3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
  4. Include costs of labor and supervision directly attributable to the change.
  5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
  6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
  7. Proposal Request Form: Use form acceptable to Architect.

#### 1.5 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Change Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

#### 1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

DECEMBER 18, 2017

## SECTION 012900 - PAYMENT PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

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

#### 1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

#### 1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
  - 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
  - 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
  - 1. Identification: Include the following Project identification on the schedule of values:
    - a. Project name and location.
    - b. Name of Architect.
    - c. Architect's Project number.
    - d. Contractor's name and address.
    - e. Date of submittal.
  - 2. Arrange schedule of values consistent with format of AIA Document G703.
  - 3. Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:

- a. Description of the Work.
  - b. Name of subcontractor.
  - c. Name of manufacturer or fabricator.
  - d. Name of supplier.
  - e. Change Orders (numbers) that affect value.
  - f. All invoices shall contain College of DuPage purchase order number.
4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
  5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
    - a. Differentiate between items stored on-site and items stored off-site.
  6. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

#### 1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
  1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
  2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
  3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
  4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
  2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
  3. Provide summary documentation for stored materials indicating the following:
    - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  2. When an application shows completion of an item, submit conditional final or full waivers.
  3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
  5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
  2. Schedule of values.
  3. Contractor's construction schedule (preliminary if not final).
  4. Products list (preliminary if not final).
  5. Sustainable design action plans, including preliminary project materials cost data.
  6. Schedule of unit prices.
  7. Submittal schedule (preliminary if not final).
  8. List of Contractor's staff assignments.
  9. List of Contractor's principal consultants.
  10. Copies of building permits.
  11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.

12. Initial progress report.
  13. Report of preconstruction conference.
  14. Certificates of insurance and insurance policies.
  15. Performance and payment bonds.
  16. Data needed to acquire Owner's insurance.
- I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
  2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
  2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  3. Updated final statement, accounting for final changes to the Contract Sum.
  4. AIA Document G706.
  5. AIA Document G706A.
  6. AIA Document G707.
  7. Evidence that claims have been settled.
  8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
  9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900



DECEMBER 18, 2017

## SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. General coordination procedures.
  - 2. Coordination drawings.
  - 3. RFIs.
  - 4. Digital project management procedures.
  - 5. Project meetings.

#### 1.3 DEFINITIONS

- A. BIM: Building Information Modeling.
- B. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
  - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
  - 2. Number and title of related Specification Section(s) covered by subcontract.
  - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, in web-based Project software directory, and in prominent location in each built facility. Keep list current at all times.

## 1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
  1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
  3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  1. Preparation of Contractor's construction schedule.
  2. Preparation of the schedule of values.
  3. Installation and removal of temporary facilities and controls.
  4. Delivery and processing of submittals.
  5. Progress meetings.
  6. Preinstallation conferences.
  7. Project closeout activities.
  8. Startup and adjustment of systems.

## 1.6 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
  1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

- a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
- b. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
- c. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
- d. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
- e. Indicate required installation sequences.
- f. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:
  - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
  - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
  - c. Fire-rated enclosures around ductwork.
7. Electrical Work: Show the following:
  - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
  - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
  - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor-control center locations.
  - d. Location of pull boxes and junction boxes, dimensioned from column center lines.

8. Fire-Protection System: Show the following:
    - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
  9. Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
  2. File Submittal Format: Submit or post coordination drawing files using PDF format.
  3. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
    - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
    - b. Digital Data Software Program: Drawings are available in Revit 2015.
    - c. Contractor shall execute a data licensing agreement in the form of AIA Document C106 as provided by Architect.

#### 1.7 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
  2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
  2. Project number.
  3. Date.
  4. Name of Contractor.
  5. Name of Architect.
  6. RFI number, numbered sequentially.
  7. RFI subject.
  8. Specification Section number and title and related paragraphs, as appropriate.
  9. Drawing number and detail references, as appropriate.

10. Field dimensions and conditions, as appropriate.
  11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  12. Contractor's signature.
  13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Form bound in Project Manual.
1. Attachments shall be electronic files in PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for approval of Contractor's means and methods.
    - d. Requests for coordination information already indicated in the Contract Documents.
    - e. Requests for adjustments in the Contract Time or the Contract Sum.
    - f. Requests for interpretation of Architect's actions on submittals.
    - g. Incomplete RFIs or inaccurately prepared RFIs.
  2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
  3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use software log that is part of web-based Project software. Include the following:
1. Project name.
  2. Name and address of Contractor.
  3. Name and address of Architect.
  4. RFI number including RFIs that were returned without action or withdrawn.
  5. RFI description.
  6. Date the RFI was submitted.

7. Date Architect's response was received.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

## 1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Use of Architect's Digital Data Files: Digital data files of Architect's BIM model will be provided by Architect for Contractor's use during construction.
1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
  2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
  3. Digital Drawing Software Program: Contract Drawings are available in Revit 2015.
  4. Contractor shall execute a data licensing agreement in the form of AIA Document C106 Digital Data Licensing Agreement provide by Architect.
  5. The following digital data files will be furnished for each appropriate discipline:
    - a. Floor plans.
    - b. Reflected ceiling plans.
    - c. Exterior building elevations.
- B. Web-Based Project Software: Provide, administer, and use web-based Project software site for purposes of hosting and managing Project communication and documentation until Final Completion.
1. Provide Project Web site user licenses for use of the Owner, Architect, and Architect's consultants.
  2. On completion of Project, provide one complete archive copy(ies) of Project Web site files to Owner and to Architect in a digital storage format acceptable to Architect.
  3. Provide the following Project Web site software packages under their current published licensing agreements:
  4. Submittal Exchange - [www2.submittalexchange.com](http://www2.submittalexchange.com)
  5. Contractor, subcontractors, and other parties granted access by Contractor to Project Web site shall execute a data licensing agreement in the form of AIA Document C106.
- C. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
  2. Name file with submittal number or other unique identifier, including revision identifier.
  3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

## 1.9 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
  - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
  - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
  - 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
  
- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
  - 1. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Responsibilities and personnel assignments.
    - b. Tentative construction schedule.
    - c. Phasing.
    - d. Critical work sequencing and long lead items.
    - e. Designation of key personnel and their duties.
    - f. Lines of communications.
    - g. Use of web-based Project software.
    - h. Procedures for processing field decisions and Change Orders.
    - i. Procedures for RFIs.
    - j. Procedures for testing and inspecting.
    - k. Procedures for processing Applications for Payment.
    - l. Distribution of the Contract Documents.
    - m. Submittal procedures.
    - n. Preparation of Record Documents.
    - o. Use of the premises
    - p. Work restrictions.
    - q. Working hours.
    - r. Owner's occupancy requirements.
    - s. Responsibility for temporary facilities and controls.
    - t. Procedures for moisture and mold control.
    - u. Procedures for disruptions and shutdowns.
    - v. Construction waste management and recycling.
    - w. Parking availability.
    - x. Office, work, and storage areas.
    - y. Equipment deliveries and priorities.
    - z. First aid.
    - aa. Security.

- bb. Progress cleaning.
3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, and Owner's Commissioning Authority of scheduled meeting dates.
  2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. Contract Documents.
    - b. Options.
    - c. Related RFIs.
    - d. Related Change Orders.
    - e. Purchases.
    - f. Deliveries.
    - g. Submittals.
    - h. Review of mockups.
    - i. Possible conflicts.
    - j. Compatibility requirements.
    - k. Time schedules.
    - l. Weather limitations.
    - m. Manufacturer's written instructions.
    - n. Warranty requirements.
    - o. Compatibility of materials.
    - p. Acceptability of substrates.
    - q. Temporary facilities and controls.
    - r. Space and access limitations.
    - s. Regulations of authorities having jurisdiction.
    - t. Testing and inspecting requirements.
    - u. Installation procedures.
    - v. Coordination with other work.
    - w. Required performance results.
    - x. Protection of adjacent work.
    - y. Protection of construction and personnel.
  3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
  4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
  5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.



- D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
  2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
    - a. Preparation of Record Documents.
    - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    - c. Procedures for completing and archiving web-based Project software site data files.
    - d. Submittal of written warranties.
    - e. Requirements for preparing operations and maintenance data.
    - f. Requirements for delivery of material samples, attic stock, and spare parts.
    - g. Requirements for demonstration and training.
    - h. Preparation of Contractor's punch list.
    - i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    - j. Submittal procedures.
    - k. Owner's partial occupancy requirements.
    - l. Installation of Owner's furniture, fixtures, and equipment.
    - m. Responsibility for removing temporary facilities and controls.
  4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E. Progress Meetings: Conduct progress meetings at monthly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
  2. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

- 1) Review schedule for next period.
- b. Review present and future needs of each entity present, including the following:
- 1) Interface requirements.
  - 2) Sequence of operations.
  - 3) Status of submittals.
  - 4) Deliveries.
  - 5) Off-site fabrication.
  - 6) Access.
  - 7) Site use.
  - 8) Temporary facilities and controls.
  - 9) Progress cleaning.
  - 10) Quality and work standards.
  - 11) Status of correction of deficient items.
  - 12) Field observations.
  - 13) Status of RFIs.
  - 14) Status of Proposal Requests.
  - 15) Pending changes.
  - 16) Status of Change Orders.
  - 17) Pending claims and disputes.
  - 18) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
- a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- F. Coordination Meetings: Conduct Project coordination meetings at weekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: Each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

- b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
  - c. Review present and future needs of each contractor present, including the following:
    - 1) Interface requirements.
    - 2) Sequence of operations.
    - 3) Status of submittals.
    - 4) Deliveries.
    - 5) Off-site fabrication.
    - 6) Access.
    - 7) Site use.
    - 8) Temporary facilities and controls.
    - 9) Work hours.
    - 10) Hazards and risks.
    - 11) Progress cleaning.
    - 12) Quality and work standards.
    - 13) Status of RFIs.
    - 14) Proposal Requests.
    - 15) Change Orders.
    - 16) Pending changes.
3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

DECEMBER 18, 2017

## SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Startup construction schedule.
  - 2. Contractor's Construction Schedule.
  - 3. Daily construction reports.
  - 4. Site condition reports.
  - 5. Unusual event reports.

#### 1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.
  - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
  - 2. Predecessor Activity: An activity that precedes another activity in the network.
  - 3. Successor Activity: An activity that follows another activity in the network.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
  - 1. Working electronic copy of schedule file, where indicated.
  - 2. PDF file.
- B. Startup construction schedule.
- C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

- D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- E. Construction Schedule Updating Reports: Submit with Applications for Payment.
- F. Daily Construction Reports: Submit at weekly intervals.
- G. Site Condition Reports: Submit at time of discovery of differing conditions.
- H. Unusual Event Reports: Submit at time of unusual event.

#### 1.5 COORDINATION

- A. Coordinate Contractor's Construction Schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
  - 1. Secure time commitments for performing critical elements of the Work from entities involved.
  - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

#### 1.6 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.
  - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
  - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
  - 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
  - 3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
  - 4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
  - 5. Commissioning Time: Include no fewer than 15 days for commissioning.
  - 6. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.

7. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
  2. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  3. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
    - a. Submittals.
    - b. Mockups.
    - c. Sample testing.
    - d. Deliveries.
    - e. Installation.
    - f. Tests and inspections.
    - g. Adjusting.
    - h. Curing.
    - i. Building flush-out.
    - j. Startup and placement into final use and operation.
    - k. Commissioning.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
1. Unresolved issues.
  2. Unanswered Requests for Information.
  3. Rejected or unreturned submittals.
  4. Notations on returned submittals.
  5. Pending modifications affecting the Work and the Contract Time.
- F. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.

#### 1.7 STARTUP CONSTRUCTION SCHEDULE

- A. Gantt-Chart Schedule: Submit startup, horizontal, Gantt-chart-type construction schedule within seven days of date established for the Notice to Proceed.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90

days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

## 1.8 GANTT-CHART SCHEDULE REQUIREMENTS

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice to Proceed.
  - 1. Base schedule on the startup construction schedule and additional information received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
  - 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

## 1.9 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
  - 1. List of subcontractors at Project site.
  - 2. List of separate contractors at Project site.
  - 3. Approximate count of personnel at Project site.
  - 4. Equipment at Project site.
  - 5. Material deliveries.
  - 6. High and low temperatures and general weather conditions, including presence of rain or snow.
  - 7. Testing and inspection.
  - 8. Accidents.
  - 9. Meetings and significant decisions.
  - 10. Unusual events.
  - 11. Stoppages, delays, shortages, and losses.
  - 12. Meter readings and similar recordings.
  - 13. Emergency procedures.
  - 14. Orders and requests of authorities having jurisdiction.
  - 15. Change Orders received and implemented.
  - 16. Construction Change Directives received and implemented.
  - 17. Services connected and disconnected.
  - 18. Equipment or system tests and startups.
  - 19. Partial completions and occupancies.
  - 20. Substantial Completions authorized.
- B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

- C. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.
1. Submit unusual event reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200



DECEMBER 18, 2017

## SECTION 013300 - SUBMITTAL PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Submittal schedule requirements.
  - 2. Administrative and procedural requirements for submittals.

#### 1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

#### 1.4 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
  - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
  - 2. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
    - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
  - 3. Format: Arrange the following information in a tabular format:

- a. Scheduled date for first submittal.
- b. Specification Section number and title.
- c. Submittal Category: Action; informational.
- d. Name of subcontractor.
- e. Description of the Work covered.
- f. Scheduled date for Architect's final release or approval.
- g. Scheduled date of fabrication.

## 1.5 SUBMITTAL FORMATS

### A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Architect.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
8. Category and type of submittal.
9. Submittal purpose and description.
10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
11. Drawing number and detail references, as appropriate.
12. Indication of full or partial submittal.
13. Location(s) where product is to be installed, as appropriate.
14. Other necessary identification.
15. Remarks.
16. Signature of transmitter.

### B. Options: Identify options requiring selection by Architect.

### C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

### D. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

### E. Submittals for Web-Based Project Software: Prepare submittals as PDF files, or other format indicated by Project software website.

## 1.6 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
  - 1. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
  - 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
  - 4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  - 1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
  - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  - 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
  - 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
  - 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
    - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
- D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
  - 1. Note date and content of previous submittal.

2. Note date and content of revision in label or title block and clearly indicate extent of revision.
  3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

## 1.7 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
  2. Mark each copy of each submittal to show which products and options are applicable.
  3. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts.
    - b. Manufacturer's product specifications.
    - c. Standard color charts.
    - d. Statement of compliance with specified referenced standards.
    - e. Testing by recognized testing agency.
    - f. Application of testing agency labels and seals.
    - g. Notation of coordination requirements.
    - h. Availability and delivery time information.
  4. For equipment, include the following in addition to the above, as applicable:
    - a. Wiring diagrams that show factory-installed wiring.
    - b. Printed performance curves.
    - c. Operational range diagrams.
    - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
  5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Identification of products.
    - b. Schedules.
    - c. Compliance with specified standards.

- d. Notation of coordination requirements.
  - e. Notation of dimensions established by field measurement.
  - f. Relationship and attachment to adjoining construction clearly indicated.
  - g. Seal and signature of professional engineer if specified.
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
    - a. Project name and submittal number.
    - b. Generic description of Sample.
    - c. Product name and name of manufacturer.
    - d. Sample source.
    - e. Number and title of applicable Specification Section.
    - f. Specification paragraph number and generic name of each item.
  3. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
  4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
    - a. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
  5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
    - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
  6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
    - a. Number of Samples: Submit sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.
      - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.

- 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
  2. Manufacturer and product name, and model number if applicable.
  3. Number and name of room or space.
  4. Location within room or space.
- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- G. Certificates:
1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
  2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
  3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
  4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
  5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
  6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- H. Test and Research Reports:
1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
  - a. Name of evaluation organization.
  - b. Date of evaluation.
  - c. Time period when report is in effect.
  - d. Product and manufacturers' names.
  - e. Description of product.
  - f. Test procedures and results.
  - g. Limitations of use.

## 1.8 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file and paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
  1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

## 1.9 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents.

Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
  - 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

#### 1.10 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it.
  - 1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.
    - a. Reviewed.
    - b. Reviewed - Additional Information Required.
    - c. Furnish as Corrected.
    - d. Revise and Resubmit.
    - e. Rejected.
  - 2. Submittals by Web-Based Project Software: Architect will indicate, on Project software website, the appropriate action.
- B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- D. Architect will return without review or discard submittals received from sources other than Contractor.
- E. Submittals not required by the Contract Documents will be returned by Architect without action.



PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

DECEMBER 18, 2017

## SECTION 014000 - QUALITY REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, Commissioning Authority, or authorities having jurisdiction are not limited by provisions of this Section.
  - 4. Specific test and inspection requirements are not specified in this Section.

#### 1.3 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of [five] <Insert number> previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- D. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
    1. Integrated Exterior Mockups: Mockups of the exterior envelope constructed on-site as freestanding temporary built elements or as part of permanent construction, consisting of multiple products, assemblies, and subassemblies.
    2. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes; doors; windows; millwork; casework; specialties; furnishings and equipment; and lighting.
  - E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
  - F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
  - G. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.
  - H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
  - I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
  - J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect[ **or Construction Manager**].
- 1.4 DELEGATED-DESIGN SERVICES
- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

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

#### 1.5 CONFLICTING REQUIREMENTS

- A. **Conflicting Standards and Other Requirements:** If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for direction before proceeding.
- B. **Minimum Quantity or Quality Levels:** The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

#### 1.6 ACTION SUBMITTALS

- A. **Shop Drawings:** For integrated exterior mockups.
  1. Include plans, sections, and elevations, indicating materials and size of mockup construction.
  2. Indicate manufacturer and model number of individual components.
  3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.
- B. **Delegated-Design Services Submittal:** In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

#### 1.7 INFORMATIONAL SUBMITTALS

- A. **Contractor's Quality-Control Plan:** For quality-assurance and quality-control activities and responsibilities.
- B. **Qualification Data:** For Contractor's quality-control personnel.
- C. **Contractor's Statement of Responsibility:** When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:
  1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.

2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
1. Specification Section number and title.
  2. Entity responsible for performing tests and inspections.
  3. Description of test and inspection.
  4. Identification of applicable standards.
  5. Identification of test and inspection methods.
  6. Number of tests and inspections required.
  7. Time schedule or time span for tests and inspections.
  8. Requirements for obtaining samples.
  9. Unique characteristics of each quality-control service.
- F. Reports: Prepare and submit certified written reports and documents as specified.
- G. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.
1. Contractor shall obtain building permit with assistance from A/E from all applicable jurisdictions.

## 1.8 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's Construction Schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
1. Project quality-control manager may also serve as Project superintendent.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections including Subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
  2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
  3. Owner-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by Commissioning Authority].
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

#### 1.9 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue.
  2. Project title and number.
  3. Name, address, telephone number, and email address of testing agency.
  4. Dates and locations of samples and tests or inspections.
  5. Names of individuals making tests and inspections.
  6. Description of the Work and test and inspection method.
  7. Identification of product and Specification Section.
  8. Complete test or inspection data.
  9. Test and inspection results and an interpretation of test results.
  10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
  11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  12. Name and signature of laboratory inspector.
  13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of technical representative making report.
  2. Statement on condition of substrates and their acceptability for installation of product.
  3. Statement that products at Project site comply with requirements.

4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  6. Statement whether conditions, products, and installation will affect warranty.
  7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of factory-authorized service representative making report.
  2. Statement that equipment complies with requirements.
  3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  4. Statement whether conditions, products, and installation will affect warranty.
  5. Other required items indicated in individual Specification Sections.

#### 1.10 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
  - 1. Contractor responsibilities include the following:
    - a. Provide test specimens representative of proposed products and construction.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
    - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
    - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
    - f. When testing is complete, remove test specimens and test assemblies, and mockups, and laboratory mockups; do not reuse products on Project.
  - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect and Commissioning Authority, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
  - 1. Build mockups of size indicated.
  - 2. Build mockups in location indicated or, if not indicated, as directed by Architect.
  - 3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
  - 4. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed to perform same tasks during the construction at Project.
  - 5. Demonstrate the proposed range of aesthetic effects and workmanship.



6. Obtain Architect's approval of mockups before starting corresponding work, fabrication, or construction.
    - a. Allow seven days for initial review and each re-review of each mockup.
  7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  8. Demolish and remove mockups when directed unless otherwise indicated.
- L. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials. Comply with requirements in "Mockups" Paragraph.
- M. Off-site Model Room Mockups: Construct room mockups as indicated on Model Room Drawings incorporating required materials and assemblies, finished according to requirements. Provide required lighting and additional lighting where required to enable Architect to evaluate quality of the Work. Comply with requirements in "Mockups" Paragraph.

#### 1.11 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
  2. Engage a qualified testing agency to perform quality-control services.
    - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
  3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
  4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with Architect, Commissioning Authority and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect, Commissioning Authority, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
  3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
  5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
  6. Do not perform duties of Contractor.
- E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."
- F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- G. Associated Contractor Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
  2. Incidental labor and facilities necessary to facilitate tests and inspections.
  3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
  4. Facilities for storage and field curing of test samples.
  5. Delivery of samples to testing agencies.
  6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  7. Security and protection for samples and for testing and inspection equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update as the Work progresses.
1. Distribution: Distribute schedule to Owner, Architect, Commissioning Authority, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

#### 1.12 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
  2. Notifying Architect, Commissioning Authority, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
  3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect and Commissioning Authority with copy to Contractor and to authorities having jurisdiction.
  4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
  5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
  6. Retesting and reinspecting corrected work.

#### PART 2 - PRODUCTS (Not Used)

#### PART 3 - EXECUTION

##### 3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
  2. Description of the Work tested or inspected.
  3. Date test or inspection results were transmitted to Architect.
  4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's, Commissioning Authority's, reference during normal working hours.
1. Submit log at Project closeout as part of Project Record Documents.

### 3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

DECEMBER 18, 2017

## SECTION 014200 - REFERENCES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

#### 1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if

bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

#### 1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.
  - 1. DIN - Deutsches Institut fur Normung e.V.; [www.din.de](http://www.din.de).
  - 2. IAPMO - International Association of Plumbing and Mechanical Officials; [www.iapmo.org](http://www.iapmo.org).
  - 3. ICC - International Code Council; [www.iccsafe.org](http://www.iccsafe.org).
  - 4. ICC-ES - ICC Evaluation Service, LLC; [www.icc-es.org](http://www.icc-es.org).
- C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.
  - 1. COE - Army Corps of Engineers; [www.usace.army.mil](http://www.usace.army.mil).
  - 2. CPSC - Consumer Product Safety Commission; [www.cpsc.gov](http://www.cpsc.gov).
  - 3. DOC - Department of Commerce; National Institute of Standards and Technology; [www.nist.gov](http://www.nist.gov).
  - 4. DOD - Department of Defense; [www.quicksearch.dla.mil](http://www.quicksearch.dla.mil).
  - 5. DOE - Department of Energy; [www.energy.gov](http://www.energy.gov).
  - 6. EPA - Environmental Protection Agency; [www.epa.gov](http://www.epa.gov).
  - 7. FAA - Federal Aviation Administration; [www.faa.gov](http://www.faa.gov).
  - 8. FG - Federal Government Publications; [www.gpo.gov/fdsys](http://www.gpo.gov/fdsys).
  - 9. GSA - General Services Administration; [www.gsa.gov](http://www.gsa.gov).
  - 10. HUD - Department of Housing and Urban Development; [www.hud.gov](http://www.hud.gov).
  - 11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; [www.eetd.lbl.gov](http://www.eetd.lbl.gov).
  - 12. OSHA - Occupational Safety & Health Administration; [www.osha.gov](http://www.osha.gov).
  - 13. SD - Department of State; [www.state.gov](http://www.state.gov).

14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; [www.trb.org](http://www.trb.org).
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; [www.ars.usda.gov](http://www.ars.usda.gov).
16. USDA - Department of Agriculture; Rural Utilities Service; [www.usda.gov](http://www.usda.gov).
17. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; [www.ojp.usdoj.gov](http://www.ojp.usdoj.gov).
18. USP - U.S. Pharmacopeial Convention; [www.usp.org](http://www.usp.org).
19. USPS - United States Postal Service; [www.usps.com](http://www.usps.com).

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; [www.gpo.gov/fdsys](http://www.gpo.gov/fdsys).
2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; [www.quicksearch.dla.mil](http://www.quicksearch.dla.mil).
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).
5. FS - Federal Specification; Available from DLA Document Services; [www.quicksearch.dla.mil](http://www.quicksearch.dla.mil).
  - a. Available from Defense Standardization Program; [www.dsp.dla.mil](http://www.dsp.dla.mil).
  - b. Available from General Services Administration; [www.gsa.gov](http://www.gsa.gov).
  - c. Available from National Institute of Building Sciences/Whole Building Design Guide; [www.wbdg.org/ccb](http://www.wbdg.org/ccb).
6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; [www.access-board.gov](http://www.access-board.gov).
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; [www.bearhfti.ca.gov](http://www.bearhfti.ca.gov).
2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; [www.calregs.com](http://www.calregs.com).
3. CDHS; California Department of Health Services; (See CDPH).
4. CDPH; California Department of Public Health; Indoor Air Quality Program; [www.cal-iaq.org](http://www.cal-iaq.org).
5. CPUC; California Public Utilities Commission; [www.cpuc.ca.gov](http://www.cpuc.ca.gov).
6. SCAQMD; South Coast Air Quality Management District; [www.aqmd.gov](http://www.aqmd.gov).
7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; [www.txforestservation.tamu.edu](http://www.txforestservation.tamu.edu).

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200



DECEMBER 18, 2017

## SECTION 016000 - PRODUCT REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

#### 1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved by Architect through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.

#### 1.4 ACTION SUBMITTALS

- A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
  - 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
    - a. Form of Architect's Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
    - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

#### 1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

#### 1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
  - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  - 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.

## 1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
  1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
  1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
  3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

## PART 2 - PRODUCTS

### 2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
  1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.

4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  - a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: ..."
2. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
  - a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: ..."
3. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, which complies with requirements.
  - a. Non-limited list of products is indicated by the phrase: "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following: ..."
4. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
  - a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: ..."
5. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, which complies with requirements.
  - a. Non-limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following: ..."
6. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics

that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

- a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.
- C. Visual Matching Specification: Where Specifications require "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
  1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## 2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
  1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
  2. Evidence that proposed product provides specified warranty.
  3. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
  4. Samples, if requested.
- B. Submittal Requirements: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

DECEMBER 18, 2017

## SECTION 017300 - EXECUTION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Field engineering and surveying.
  - 3. Installation of the Work.
  - 4. Cutting and patching.
  - 5. Coordination of Owner-installed products.
  - 6. Progress cleaning.
  - 7. Starting and adjusting.
  - 8. Protection of installed construction.

#### 1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For land surveyor.
- B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- D. Certified Surveys: Submit two copies signed by land surveyor.

## 1.5 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
  - 1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
  - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
    - a. Primary operational systems and equipment.
    - b. Fire separation assemblies.
    - c. Air or smoke barriers.
    - d. Fire-suppression systems.
    - e. Plumbing piping systems.
    - f. Mechanical systems piping and ducts.
    - g. Control systems.
    - h. Communication systems.
    - i. Fire-detection and -alarm systems.
    - j. Conveying systems.
    - k. Electrical wiring systems.
    - l. Operating systems of special construction.
  - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
    - a. Water, moisture, or vapor barriers.
    - b. Membranes and flashings.
    - c. Exterior curtain-wall construction.
    - d. Sprayed fire-resistive material.
    - e. Equipment supports.
    - f. Piping, ductwork, vessels, and equipment.
    - g. Noise- and vibration-control elements and systems.
  - 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
  - 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
  - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
  - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.
  - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
  - 1. Description of the Work.
  - 2. List of detrimental conditions, including substrates.



3. List of unacceptable installation tolerances.
  4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

### 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
  1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  2. Establish limits on use of Project site.
  3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  4. Inform installers of lines and levels to which they must comply.
  5. Check the location, level and plumb, of every major element as the Work progresses.
  6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
  7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

### 3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
  - 1. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
  - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
  - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
  - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

### 3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  - 1. Make vertical work plumb and make horizontal work level.
  - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
  - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
  - 2. Allow for building movement, including thermal expansion and contraction.
  - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Repair or remove and replace damaged, defective, or nonconforming Work.
  - 1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

### 3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 011000 "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
  - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  - 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
  - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
  - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
    - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    - b. Restore damaged pipe covering to its original condition.
  - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall

coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

- a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

### 3.7 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
  1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
  2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

### 3.8 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
  1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
  3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Use containers intended for holding waste materials of type to be stored.
  4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### 3.9 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 019113 "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

DECEMBER 18, 2017

## SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
  - 1. Salvaging nonhazardous construction waste.
  - 2. Recycling nonhazardous construction waste.
  - 3. Disposing of nonhazardous construction waste.

#### 1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- C. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- D. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- E. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. General: Achieve end-of-Project rates for salvage/recycling of 75 percent by weight of total non-hazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials.



## 1.5 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 7 days of date established for the Notice to Proceed.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:
  - 1. Material category.
  - 2. Generation point of waste.
  - 3. Total quantity of waste in tons.
  - 4. Quantity of waste salvaged, both estimated and actual in tons.
  - 5. Quantity of waste recycled, both estimated and actual in tons.
  - 6. Total quantity of waste recovered (salvaged plus recycled) in tons.
  - 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- D. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- E. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. Qualification Data: For refrigerant recovery technician.
- G. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

## 1.7 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
  - 1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."
- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
  - 1. Distribute waste management plan to everyone concerned within three days of submittal return.
  - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
  - 2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

### 3.2 RECYCLING CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
  - 1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
    - a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

### 3.3 RECYCLING CONSTRUCTION WASTE

#### A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

#### B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

#### C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

### 3.4 DISPOSAL OF WASTE

#### A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

#### B. Burning: Do not burn waste materials.

#### C. Burning: Burning of waste materials is permitted only at designated areas on Owner's property, provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.

- D. Disposal: Remove waste materials and dispose of at designated spoil areas on Owner's property.
- E. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION 017419

DECEMBER 18, 2017

## SECTION 017700 - CLOSEOUT PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Substantial Completion procedures.
  - 2. Final completion procedures.
  - 3. Warranties.
  - 4. Final cleaning.
  - 5. Repair of the Work.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- B. Certified List of Incomplete Items: Final submittal at final completion.

#### 1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

#### 1.5 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
  3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
    - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.
  5. Submit testing, adjusting, and balancing records.
  6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
  2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  3. Complete startup and testing of systems and equipment.
  4. Perform preventive maintenance on equipment used prior to Substantial Completion.
  5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
  6. Advise Owner of changeover in utility services.
  7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
  8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  9. Complete final cleaning requirements. Contractor shall provide professionally cleaned building at substantial completion.
  10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

## 1.6 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
  2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  4. Submit pest-control final inspection report.
  5. Submit final completion photographic documentation.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

## 1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
  2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Architect and Construction Manager.
    - d. Name of Contractor.
    - e. Page number.
  4. Submit list of incomplete items in the following format:

- a. MS Excel electronic file. Architect will return annotated file.

## 1.8 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
  - 1. Submit on digital media acceptable to Architect by uploading to web-based project software site.
- D. Warranties in Paper Form:
  - 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
  - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- E. Provide additional copies of each warranty to include in operation and maintenance manuals.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
  - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.



## PART 3 - EXECUTION

### 3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Remove snow and ice to provide safe access to building.
    - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - h. Sweep concrete floors broom clean in unoccupied spaces.
    - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
    - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
    - k. Remove labels that are not permanent.
    - l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
    - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
    - o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
      - 1) Clean HVAC system in compliance with NADCA ACR. Provide written report on completion of cleaning.

- p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
  - q. Leave Project clean and ready for occupancy.
- C. Construction Waste Disposal: Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls." Section 017419 "Construction Waste Management and Disposal."

### 3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
  - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
  - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
    - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
  - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
  - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700

DECEMBER 18, 2017

## SECTION 017823 - OPERATION AND MAINTENANCE DATA

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory manuals.
  - 2. Emergency manuals.
  - 3. Systems and equipment operation manuals.
  - 4. Systems and equipment maintenance manuals.
  - 5. Product maintenance manuals.
- B. Related Requirements:
  - 1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

#### 1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
  - 1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
  - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:

1. Submit on digital media acceptable to Architect. Enable reviewer comments on draft submittals.
  2. Submit three paper copies of final to Owner.
- C. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.
1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.
- D. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

## 1.5 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
  2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- B. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.
1. Binders: Heavy-duty, three-ring, vinyl-covered, post-type binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
    - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
    - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
  2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.

3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment. Enclose title pages and directories in clear plastic sleeves.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch (215-by-280-mm) white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
  - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
  - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

## 1.6 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
  1. Title page.
  2. Table of contents.
  3. Manual contents.
- B. Title Page: Include the following information:
  1. Subject matter included in manual.
  2. Name and address of Project.
  3. Name and address of Owner.
  4. Date of submittal.
  5. Name and contact information for Contractor.
  6. Name and contact information for Construction Manager.
  7. Name and contact information for Architect.
  8. Name and contact information for Commissioning Authority.
  9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
  10. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
  1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

## 1.7 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:
  - 1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
  - 2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
  - 3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

## 1.8 EMERGENCY MANUALS

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Content: Organize manual into a separate section for each of the following:
  - 1. Type of emergency.
  - 2. Emergency instructions.
  - 3. Emergency procedures.
- C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
  - 1. Fire.
  - 2. Flood.
  - 3. Gas leak.
  - 4. Water leak.
  - 5. Power failure.
  - 6. Water outage.
  - 7. System, subsystem, or equipment failure.
  - 8. Chemical release or spill.
- D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- E. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

## 1.9 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
  2. Performance and design criteria if Contractor has delegated design responsibility.
  3. Operating standards.
  4. Operating procedures.
  5. Operating logs.
  6. Wiring diagrams.
  7. Control diagrams.
  8. Piped system diagrams.
  9. Precautions against improper use.
  10. License requirements including inspection and renewal dates.
- C. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
  2. Manufacturer's name.
  3. Equipment identification with serial number of each component.
  4. Equipment function.
  5. Operating characteristics.
  6. Limiting conditions.
  7. Performance curves.
  8. Engineering data and tests.
  9. Complete nomenclature and number of replacement parts.
- D. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
  2. Equipment or system break-in procedures.

3. Routine and normal operating instructions.
  4. Regulation and control procedures.
  5. Instructions on stopping.
  6. Normal shutdown instructions.
  7. Seasonal and weekend operating instructions.
  8. Required sequences for electric or electronic systems.
  9. Special operating instructions and procedures.
- E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

#### 1.10 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.
- C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
    - a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.



2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  3. Identification and nomenclature of parts and components.
  4. List of items recommended to be stocked as spare parts.
- E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
  2. Troubleshooting guide.
  3. Precautions against improper maintenance.
  4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  5. Aligning, adjusting, and checking instructions.
  6. Demonstration and training video recording, if available.
- F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.
- J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
1. Do not use original project record documents as part of maintenance manuals.

#### 1.11 PRODUCT MAINTENANCE MANUALS

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Product Information: Include the following, as applicable:
  - 1. Product name and model number.
  - 2. Manufacturer's name.
  - 3. Color, pattern, and texture.
  - 4. Material and chemical composition.
  - 5. Reordering information for specially manufactured products.
- E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
  - 1. Inspection procedures.
  - 2. Types of cleaning agents to be used and methods of cleaning.
  - 3. List of cleaning agents and methods of cleaning detrimental to product.
  - 4. Schedule for routine cleaning and maintenance.
  - 5. Repair instructions.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017823

## SECTION 017839 - PROJECT RECORD DOCUMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
  - 1. Record Drawings.
  - 2. Record Product Data.
  - 3. Miscellaneous record submittals.

#### 1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit copies of record Drawings as follows:
    - a. Initial Submittal:
      - 1) Submit PDF electronic files of scanned record prints and one of file prints.
      - 2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
      - 3) All documents will be provided to the Owner in BHFx digital format with two hard copies.
      - 4) All documents shall be submitted prior to Substantial Completion and final payment.
    - b. Final Submittal:
      - 1) Submit PDF electronic files of scanned record prints and three set(s) of prints.
      - 2) Print each drawing, whether or not changes and additional information were recorded.
- B. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
  - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- C. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

## 1.4 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an acceptable drawing technique.
    - c. Record data as soon as possible after obtaining it.
    - d. Record and check the markup before enclosing concealed installations.
    - e. Cross-reference record prints to corresponding photographic documentation.
  2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Duct size and routing.
    - i. Locations of concealed internal utilities.
    - j. Changes made by Change Order or Construction Change Directive.
    - k. Changes made following Architect's written orders.
    - l. Details not on the original Contract Drawings.
    - m. Field records for variable and concealed conditions.
    - n. Record information on the Work that is shown only schematically.
  3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
  4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  5. Mark important additional information that was either shown schematically or omitted from original Drawings.
  6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  2. Format: Annotated PDF electronic file with comment function enabled.
  3. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."

- d. Name of Architect and Construction Manager.
- e. Name of Contractor.
4. Contractor may submit Record Drawings to A/E digitally. No additional services shall be provided to the A/E for converting hand drawn record documents to CAD.
5. Record Drawings shall be in Vector format (AutoCAD 2011 or version as directed by PM).
6. One digital and two hard copies of the following Closeout Documents from Contractor. Other Record Documents required shall include but not be limited to the following:
  - a. Inspection Procedures
  - b. Operation and Maintenance Manuals
  - c. Warranties
  - d. Instruction of Owner's Personnel
  - e. Keying Schedules
  - f. Record Drawings. Record drawings shall indicate all addenda, modifications based on field sketches and changes in the work during construction.
  - g. Test and Balancing Reports
  - h. Certificates of Inspection (e.g. Sprinkler Testing)
  - i. Consents of Surety
  - j. Product Data for products used in Project
  - k. Record Project Manual
  - l. Inspection Tickets
7. Project Manual shall require Contractor to complete punch list no later than 30 calendar days from receipt of punch list.
8. Contractor shall obtain certificate of occupancy with assistance as required from the A/E and Owner.
9. For projects permitted by the Village of Glen Ellyn or DuPage County
  - a. No less than 30 days prior to Final (Occupancy) Inspection, the A/E shall require a Final Grading Survey be completed by Contractor.
  - b. Final Grading (Occupancy) Survey shall be on 24" x 36" sheet size maximum and shall include the following information:
    - 1) Benchmark reference, North arrow, scale, legend, permanent parcel number, DuPage Countywide Stormwater Management Permit Number and date of preparation of survey and any revisions.
    - 2) "As Constructed Conditions": Elevations for proposed corners, the high or low points, or major break points on all lot lines and swales, to include spot elevations on lot lines extended. Contour lines at one foot contour intervals. Flat grading may require intermediate contour lines to define swales. Minimum allowable slope for all pervious areas is one percent. Minimum allowable slope for all impervious areas is one percent (1%).
    - 3) Existing conditions on the adjacent lots within 100' of the subject parcel including existing or proposed top of foundation elevation where said foundation is or will be within 100' of the subject parcel.
    - 4) Locations and rim elevations of all utility structures located within 100' of the subject parcel. All utility structures on the subject parcel must be raised to grade.
    - 5) Locations and orientations of downspouts and sump pump discharges. All underground drainage systems must be shown.
    - 6) The location of B-Box. The B-Box must be encased in a metal or PVC sleeve if ~~it is~~ located in a sidewalk or driveway approach.
    - 7) All building setback lines including minimum dimensions from building to all lot lines. Include the distance from all impervious areas, including driveways and walkways to all lot lines.
    - 8) Flood Plain limits within 100' of the subject parcel.
    - 9) For any parcel in or located within 250' of a flood plain area established by FEMA, an Elevation Certificate form on FEMA Form #81-31 shall

accompany the occupancy survey. The 100 year design high water elevation of the storage facility is to be used as the 100 year flood elevation.

- 10) Any major deviations from the approved Site Development (Grading) Plan must be ~~approved discussed~~ by the A/E.
- 11) Statement thereon by the A/E certifying that the final grading has been completed and complies with the approved final development/engineering plans. The statement must be signed and sealed by the civil engineer.
- 12) Six copies of the survey with at least one originally signed and sealed by a professional engineer. ~~to the Glen Ellyn Building Division.~~
- 13) Layout and dimensions of vehicle parking spaces, width of aisles, bays and angle of parking together with the location and dimensions of vehicular entrances, exits and driveways, and the layout and dimensions of vehicle loading and unloading spaces, areas and docks. These may be on a separate drawing for clarity.
- 14) Location and orientation of all signs other than signs flat on building facades.
- 15) Location, height, and orientation of all lights
- 16) Location, dimensions and grading of all stormwater storage (detention) facilities, showing critical grades and slopes of all side slopes, berms, and bottom, if dry, or depth of permanent pool, if wet. Rim and invert elevations of all inlet and outlet structures, including sizing of all piping downstream to the existing storm sewer system. The size, type and critical elevations of all control structures, including restrictors and overflow weirs and structures, shall be provided.
- 17) Location and grading of overhead drainage swales, both inlet and outlet to the detention facility.
- 18) As constructed calculations showing that the volume and release rate requirements of the DuPage Countywide Stormwater and Flood Plain Ordinance and Village Code have been met.

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- 1.5 Location, dimensions and grading of all stormwater storage (detention) facilities, showing critical grades and slopes of all side slopes, berms, and bottom, if dry, or depth of permanent pool, if wet. Rim and invert elevations of all inlet and outlet structures, including sizing of all piping downstream to the existing storm sewer system. The size, type and critical elevations of all control structures, including restrictors and overflow weirs and structures, shall be provided.
- 1.6 Location and grading of overhead drainage swales, both inlet and outlet to the detention facility.
- 1.7 As constructed calculations showing that the volume and release rate requirements of the DuPage Countywide Stormwater and Flood Plain Ordinance and Village Code have been met.
- 1.8 RECORD PRODUCT DATA
- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- B. Format: Submit record Product Data as annotated PDF electronic file.
1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.
- 1.9 MISCELLANEOUS RECORD SUBMITTALS
- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as PDF electronic file.
1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.
- 1.10 MAINTENANCE OF RECORD DOCUMENTS
- A. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for

construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's and Construction Manager's reference during normal working hours.

- B. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017839



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## SECTION 017900 - DEMONSTRATION AND TRAINING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
  - 1. Instruction in operation and maintenance of systems, subsystems, and equipment.
  - 2. Demonstration and training video recordings.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
  - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Attendance Record: For each training module, submit list of participants and length of instruction time.

#### 1.4 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

## PART 2 - PRODUCTS

### 2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
1. Provide a combination of classroom, field and factory training classes which includes as a minimum the following curricula requirements:
    - a. Buildings and Structures: one 4-hour class
      - 1) Concrete
      - 2) Unit Masonry
      - 3) Metals
      - 4) Woods and Plastics
      - 5) Thermal and Moisture Protection
      - 6) Doors and Windows
      - 7) Finishes
      - 8) Specialties
    - b. Fire Protection: one 2-hour class
      - 1) Basic materials and methods
      - 2) Standpipe and hose systems
      - 3) Sprinkler systems
    - c. Electrical: one 8-hour class
      - 1) Basic materials and methods
      - 2) Service and distribution
      - 3) Service entrance
      - 4) Switchboards
      - 5) Disconnects
      - 6) Grounding
      - 7) Transformers
      - 8) Panelboards
      - 9) Overcurrent Protection devices
      - 10) Contactors
      - 11) Voltage surge suppression
      - 12) Testing
      - 13) Lighting
      - 14) Interior and Exterior lighting, lamps, and accessories
      - 15) Emergency Lighting
      - 16) Heat tracing
    - d. Sound System: one 1-hour class
    - e. Communication: one 2-hour class
      - 1) Voice and data
      - 2) Television distribution system
      - 3) Security and Intercom system
    - f. Fire Alarm System: one 4-hour class
      - 1) Zoning and Operations
      - 2) Devices
      - 3) Carbon Monoxide monitoring
      - 4) Supervisory and Control Interface
        - a) Sprinkler systems

- b) Elevators
- c) HVAC
- d) Telephone
- 5) Annunciators
- 6) Signage

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
  - a. System, subsystem, and equipment descriptions.
  - b. Performance and design criteria if Contractor is delegated design responsibility.
  - c. Operating standards.
  - d. Regulatory requirements.
  - e. Equipment function.
  - f. Operating characteristics.
  - g. Limiting conditions.
  - h. Performance curves.
2. Documentation: Review the following items in detail:
  - a. Emergency manuals.
  - b. Operations manuals.
  - c. Maintenance manuals.
  - d. Project record documents.
  - e. Identification systems.
  - f. Warranties and bonds.
  - g. Maintenance service agreements and similar continuing commitments.
3. Emergencies: Include the following, as applicable:
  - a. Instructions on meaning of warnings, trouble indications, and error messages.
  - b. Instructions on stopping.
  - c. Shutdown instructions for each type of emergency.
  - d. Operating instructions for conditions outside of normal operating limits.
  - e. Sequences for electric or electronic systems.
  - f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
  - a. Startup procedures.
  - b. Equipment or system break-in procedures.
  - c. Routine and normal operating instructions.
  - d. Regulation and control procedures.
  - e. Control sequences.
  - f. Safety procedures.
  - g. Instructions on stopping.
  - h. Normal shutdown instructions.
  - i. Operating procedures for emergencies.
  - j. Operating procedures for system, subsystem, or equipment failure.
  - k. Seasonal and weekend operating instructions.
  - l. Required sequences for electric or electronic systems.
  - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
  - a. Alignments.
  - b. Checking adjustments.

- c. Noise and vibration adjustments.
- d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
  - a. Diagnostic instructions.
  - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
  - a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
- 8. Repairs: Include the following:
  - a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.
  - e. Review of spare parts needed for operation and maintenance.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

### 3.2 INSTRUCTION

- A. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  - 1. Schedule training with Owner, through Construction Manager, with at least seven days' advance notice.
- B. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

END OF SECTION 017900

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## SECTION 054000 - COLD-FORMED METAL FRAMING

### 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. Load-bearing wall framing.
2. Exterior non-load-bearing wall framing.
3. Interior non-load-bearing wall framing exceeding height limitations of standard, nonstructural metal framing.
4. Soffit framing.

- B. Related Requirements:

1. Section 055000 "Metal Fabrications" for miscellaneous steel shapes, masonry shelf angles, and connections used with cold-formed metal framing.
2. Section 092116.23 "Gypsum Board Shaft Wall Assemblies" for interior non-load-bearing, metal-stud-framed, shaft-wall assemblies, with height limitations.
3. Section 092216 "Non-Structural Metal Framing" for standard, interior non-load-bearing, metal-stud framing, with height limitations and ceiling-suspension assemblies.

#### 1.3 ACTION SUBMITTALS

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

- B. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

- C. Delegated-Design Submittal: For non-load bearing cold-formed steel framing.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Welding certificates.
- C. Product Certificates: For each type of code-compliance certification for studs and tracks.
- D. Product Test Reports: For each listed product, for tests performed by a qualified testing agency.
  - 1. Steel sheet.
  - 2. Expansion anchors.
  - 3. Power-actuated anchors.
  - 4. Mechanical fasteners.
  - 5. Vertical deflection clips.
  - 6. Horizontal drift deflection clips
  - 7. Miscellaneous structural clips and accessories.
- E. Evaluation Reports: For nonstandard cold-formed steel framing post-installed anchors and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

#### 1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- B. Product Tests: Mill certificates or data from a qualified independent testing agency, or in-house testing with calibrated test equipment, indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.
- C. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association the Steel Framing Industry Association or the Steel Stud Manufacturers Association.
- D. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
  - 2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
- E. Comply with AISI S230 "Standard for Cold-Formed Steel Framing - Prescriptive Method for One and Two Family Dwellings."

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. AllSteel & Gypsum Products, Inc.
  2. ClarkDietrich Building Systems.
  3. Craco Manufacturing, Inc.
  4. Nuconsteel, A Nucor Company.
  5. Super Stud Building Products Inc.
  6. United Metal Products, Inc.
  7. United Steel Deck, Inc.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a licensed structural engineer in the state of Illinois to design the non-load bearing cold-formed steel framing.
- B. Structural Performance: Provide non-load bearing cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
1. Design Loads: As indicated on Drawings.
  2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
    - a. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/600 of the wall height.
    - b. Interior Non-Load-Bearing Framing: Horizontal deflection of 1/360 of the wall height under a horizontal load of 5 lbf/sq. ft..
  3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.
  4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure
  5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
- C. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing shall comply with AISI S100, AISI S200, and the following:
1. Floor and Roof Systems: AISI S210.
  2. Wall Studs: AISI S211.
  3. Headers: AISI S212.
  4. Lateral Design: AISI S213.

- D. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency acceptable to authorities having jurisdiction.

## 2.3 COLD-FORMED STEEL FRAMING MATERIALS

- A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:
  - 1. Grade: ST50H As required by structural performance.
  - 2. Coating: G60,
- B. Steel Sheet for Vertical Deflection Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
  - 1. Grade: 50, Class 1 As required by structural performance.
  - 2. Coating: G60.

## 2.4 LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: 0.0428 inch.
  - 2. Flange Width: 1-5/8 inches.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: 0.0428 inch.
  - 2. Flange Width: 1-1/4 inches.
- C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: 0.0428 inch.
  - 2. Flange Width: 1-5/8 inches.
- D. Steel Single- or Double-L Headers: Manufacturer's standard L-shapes used to form header beams, of web depths indicated, and as follows:
  - 1. Minimum Base-Metal Thickness: 0.0428 inch.
  - 2. Top Flange Width: 1-5/8 inches.



## 2.5 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: 0.0428 inch.
  - 2. Flange Width: 1-5/8 inches.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: 0.0428 inch.
  - 2. Flange Width: 1-1/4 inches.
- C. Vertical Deflection Clips: Manufacturer's standard head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
  - 1. Minimum Base-Metal Thickness: 0.0428 inch.
  - 2. Flange Width: 1 inch plus the design gap for
- E. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
  - 1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
    - a. Minimum Base-Metal Thickness: 0.0428 inch.
    - b. Flange Width: 1 inch plus the design gap.
  - 2. Inner Track: Of web depth indicated, and as follows:
    - a. Minimum Base-Metal Thickness: 0.0428 inch.
    - b. Flange Width: Dimension equal to sum of outer deflection track flange width plus 1 inch.
- F. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

## 2.6 INTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch.
  2. Flange Width: 1-5/8 inches.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0428 inch.
  2. Flange Width: 1-1/4 inches.
- C. Vertical Deflection Clips: Manufacturer's standard bypass or head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- 1.
- D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
1. Minimum Base-Metal Thickness: 0.0428 inch.
  2. Flange Width: 1 inch plus the design gap.
- E. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
    - a. Minimum Base-Metal Thickness: 0.0428 inch.
    - b. Flange Width: 1 inch plus the design gap
  2. Inner Track: Of web depth indicated, and as follows:
    - a. Minimum Base-Metal Thickness: 0.0428 inch.
    - b. Flange Width: Insert dimension equal to sum of outer deflection track flange width plus 1 inch.
- F. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

## 2.7 SOFFIT FRAMING

- A. Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0428 inch.
  2. Flange Width: 1-5/8 inches, minimum.

## 2.8 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
  - 1. Supplementary framing.
  - 2. Bracing, bridging, and solid blocking.
  - 3. Web stiffeners.
  - 4. Anchor clips.
  - 5. End clips.
  - 6. Foundation clips.
  - 7. Gusset plates.
  - 8. Stud kickers and knee braces.
  - 9. Joist hangers and end closures.
  - 10. Hole-reinforcing plates.
  - 11. Backer plates.

## 2.9 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
- B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts, carbon-steel nuts, and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.
- C. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 or ICC-ES AC308 as appropriate for the substrate.
  - 1. Uses: Securing cold-formed steel framing to structure.
  - 2. Type: Torque-controlled expansion anchor.
  - 3. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
  - 4. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.
- D. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
  - 1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.

- F. Welding Electrodes: Comply with AWS standards.

## 2.10 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A 780/A 780M MIL-P-21035B or SSPC-Paint 20.
- B. Cement Grout: Portland cement, ASTM C 150/C 150M, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Nonshrink Grout: Factory-packaged, nonmetallic, noncorrosive, nonstaining grout, complying with ASTM C 1107/C 1107M, and with a fluid consistency and 30-minute working time.
- D. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.
- E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.

## 2.11 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
  - 1. Fabricate framing assemblies using jigs or templates.
  - 2. Cut framing members by sawing or shearing; do not torch cut.
  - 3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
    - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    - b. Locate mechanical fasteners and install according to Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.
  - 4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.
- C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8 inch in 10 feet and as follows:
  - 1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.
- B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that required to obtain fire-resistance ratings indicated. Protect remaining fire-resistive materials from damage.
- C. Install load-bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch to ensure a uniform bearing surface on supporting concrete or masonry construction.
- D. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

### 3.3 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
  1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.
- D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
  1. Cut framing members by sawing or shearing; do not torch cut.

2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
  - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
  - b. Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- H. Install insulation, specified in Section 072100 "Thermal Insulation," in framing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

#### 3.4 LOAD-BEARING WALL INSTALLATION

- A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:
  1. Anchor Spacing: 16 inches on center or as indicated on the structural drawings.
- B. Squarely seat studs against top and bottom tracks, with gap not exceeding 1/8 inch between the end of wall-framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:
  1. Stud Spacing: 16 inches or as indicated on the structural drawings.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.
- D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.
- E. Align floor and roof framing over studs according to AISI S200, Section C1. Where framing cannot be aligned, continuously reinforce track to transfer loads.
- F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure.

- G. Install headers over wall openings wider than stud spacing. Locate headers above openings. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.
  - 1. Frame wall openings with not less than a double stud at each jamb of frame. Fasten jamb members together to uniformly distribute loads.
  - 2. Install tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.
- H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.
  - 1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.
- I. Install horizontal bridging in stud system, spaced vertically as indicated on Drawings. Fasten at each stud intersection.
  - 1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of two screws into each flange of the clip angle for framing members up to 6 inches deep.
  - 2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges, and secure solid blocking to stud webs or flanges.
  - 3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- J. Install steel sheet diagonal bracing straps to both stud flanges; terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.
- K. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

### 3.5 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
- B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
  - 1. Stud Spacing: 16 inches.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
  - 1. Install single deep-leg deflection tracks and anchor to building structure.
  - 2. Install double deep-leg deflection tracks and anchor outer track to building structure.
  - 3. Connect vertical deflection clips to bypassing or infill studs and anchor to building structure.
  - 4. Connect drift clips to cold-formed steel framing and anchor to building structure.
- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.
  - 1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
  - 2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
  - 3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- F. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
  - 1. Install solid blocking at centers indicated on Shop Drawings.
- G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

### 3.6 INTERIOR NON-LOAD-BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
- B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
  - 1. Stud Spacing: 16 inches or as indicated on the shop drawings.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
  - 1. Install single deep-leg deflection tracks and anchor to building structure.
  - 2. Install double deep-leg deflection tracks and anchor outer track to building structure.
  - 3. Connect vertical deflection clips to studs and anchor to building structure.
  - 4. Connect drift clips to cold-formed steel metal framing and anchor to building structure.



- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.
  - 1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
  - 2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
  - 3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- F. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
  - 1. Install solid blocking at centers indicated on Shop Drawings.
- G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

### 3.7 ERECTION TOLERANCES

- A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
  - 1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

### 3.8 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

### 3.9 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.

- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

DECEMBER 18, 2017

## SECTION 055000 - METAL FABRICATIONS

### 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. Steel framing and supports for mechanical and electrical equipment.
  - 2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
  - 3. Shelf angles.
  - 4. Metal ladders.
  - 5. Miscellaneous steel trim including steel angle corner guards.
  - 6. Support steel for equipment
- B. Products furnished, but not installed, under this Section include the following:
  - 1. Loose steel lintels.
  - 2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
  - 3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

#### 1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
  - 1. Paint products.

2. Attachments

- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
  - 1. Steel framing and supports for mechanical and electrical equipment.
  - 2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
  - 3. Shelf angles.
  - 4. Miscellaneous steel trim including steel angle corner guards.
  - 5. Support Steel for equipment
  - 6. Loose steel lintels.
- C. Delegated-Design Submittal: For ladders and alternating tread devices, including analysis data signed and sealed by the qualified professional engineer, licensed in the State of Illinois, responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design ladders and alternating tread devices.

- B. Structural Performance of Alternating Tread Devices: Alternating tread devices shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
1. Uniform Load: 100 lbf/sq. ft..
  2. Concentrated Load: 300 lbf applied on an area of 4 sq. in..
  3. Uniform and concentrated loads need not be assumed to act concurrently.
  4. Alternating Tread Device Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

## 2.2 METALS

- A. Where dissimilar metals used next to each other, require separation or coating to prevent electrolytic action from damaging either material.
- B. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- C. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- D. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- E. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 304.
- F. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.
- G. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.
- H. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.
- I. Zinc-Coated Steel Wire Rope: ASTM A 741.
1. Wire-Rope Fittings: Hot-dip galvanized-steel connectors with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.
- J. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
1. Size of Channels: 1-5/8 by 1-5/8 inches.
  2. Material: Cold-rolled steel, ASTM A 1008/A 1008M, structural steel, Grade 33; 0.0677-inch minimum thickness; coated with rust-inhibitive, baked-on, acrylic enamel.

- K. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.
- L. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.
- M. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.
- N. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.
- O. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.
- P. Nickel Silver Extrusions: ASTM B 151/B 151M, Alloy UNS No. C74500.
- Q. Nickel Silver Castings: ASTM B 584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

## 2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
  - 1. Provide stainless-steel fasteners for fastening aluminum.
  - 2. Provide stainless-steel fasteners for fastening stainless steel.
  - 3. Provide stainless-steel fasteners for fastening nickel silver.
  - 4. Provide bronze fasteners for fastening bronze.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593; with hex nuts, ASTM F 594; and, where indicated, flat washers; Alloy Group 1 (A1).
- D. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
  - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- E. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- F. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
  - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.

2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

- G. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches (41 by 22 mm) by length indicated with anchor straps or studs not less than 3 inches (75 mm) long at not more than 8 inches (200 mm) o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

## 2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 099113 "Exterior Painting," Section 099123 Interior Painting," and Section 099600 "High-Performance Coatings."
- B. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- E. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- F. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa).

## 2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
  1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.
  3. Remove welding flux immediately.
  4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

## 2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
1. Fabricate units from slotted channel framing where indicated.
  2. Furnish inserts for units installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports where indicated.
- D. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

## 2.7 SHELF ANGLES

- A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch (19-mm) bolts, spaced not more than 6 inches (150 mm) from ends and 24 inches (600 mm) o.c., unless otherwise indicated.
1. Provide mitered and welded units at corners.
  2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches (50 mm) larger than expansion or control joint.



- B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.
- C. Galvanize shelf angles located in exterior walls.
- D. Prime shelf angles located in exterior walls with zinc-rich primer.
- E. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

## 2.8 METAL LADDERS

### A. General:

- 1. Comply with ANSI A14.3.
- 2. For elevator pit ladders, comply with ASME A17.1/CSA B44.

### B. Steel Ladders:

- 1. Space siderails 18 inches (457 mm) apart unless otherwise indicated.
- 2. Siderails: Continuous, 1/2-by-2-1/2-inch (12.7-by-64-mm) steel flat bars, with eased edges.
- 3. Rungs: 3/4-inch- (19-mm-) diameter steel bars.
- 4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
- 5. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
- 6. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to rung.
  - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - 1) Harsco Industrial IKG, a division of Harsco Corporation.
    - 2) SlipNOT Metal Safety Flooring; W.S. Molnar Company.
- 7. Support each ladder at top and bottom and not more than 60 inches (1500 mm) o.c. with welded or bolted steel brackets.
- 8. Primeladders, including brackets and fasteners, with primer specified in Section 099600 "High-Performance Coatings."

## 2.9 ALTERNATING TREAD DEVICES

### A. Alternating Tread Devices: Fabricate alternating tread devices of open-type construction with channel or plate stringers and pipe and tube railings unless otherwise indicated. Provide brackets and fittings for installation.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Lapeyre Stair Inc.

b. Schmidt Structural Products, Inc.

2. Tread depth shall be not less than 5 inches (127 mm) exclusive of nosing or less than 8-1/2 inches (216 mm) including the nosing, tread width shall be not less than 7 inches (178 mm), and riser height shall be not more than 9-1/2 inches (241 mm).
3. Fabricate from steel and assemble by welding or with stainless-steel fasteners.
4. Comply with applicable railing requirements in Section 055213 "Pipe and Tube Railings."

- B. Finish: Manufacturer's standard powder coat finish selected by the Architect from the manufacturer's full range of colors.

#### 2.10 ELEVATOR PIT SUMP COVERS

- A. Fabricate from 1/8-inch (3.2-mm) abrasive-surface floor plate with four 1-inch- (25-mm-) diameter holes for water drainage and for lifting.
- B. Fabricate from welded or pressure-locked steel bar grating Limit openings in gratings to no more than 1/2 inch (12 mm) in least dimension.
- C. Provide steel angle supports as indicated.

#### 2.11 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
  1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- C. Galvanize and prime exterior miscellaneous steel trim.
- D. Prime exterior miscellaneous steel trim with primer specified in Section 099600 "High-Performance Coatings."

#### 2.12 METAL BOLLARDS

- A. Fabricate metal bollards from Schedule 40 steel pipe.
- B. Fabricate bollards with 3/8-inch- (9.5-mm-) thick steel baseplates for bolting to concrete slab. Drill baseplates at all four corners for 3/4-inch (19-mm) anchor bolts.
  1. Where bollards are to be anchored to sloping concrete slabs, angle baseplates for plumb alignment of bollards.

- C. Prime bollards with primer specified in Section 099600 "High-Performance Coatings."

#### 2.13 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8 inches (200 mm) unless otherwise indicated.
- C. Galvanize loose steel lintels located in exterior walls.
- D. Prime loose steel lintels located in exterior walls with primer specified in Section 099600 "High-Performance Coatings."

#### 2.14 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

#### 2.15 FINISHES, GENERAL

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

#### 2.16 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
  - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
  - 1. Shop prime with primers specified in Section 099123 "Interior Painting" unless primers specified in Section 099600 "High-Performance Coatings" are indicated.
- D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:

1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  3. Items Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  4. Other Items: SSPC-SP 3, "Power Tool Cleaning."
- E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  2. Obtain fusion without undercut or overlap.
  3. Remove welding flux immediately.
  4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

### 3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

- B. Anchor supports for ceiling hung toilet partitions and overhead doors securely to, and rigidly brace from, building structure.
- C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
  - 1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.
- D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.
  - 1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

### 3.3 INSTALLING METAL BOLLARDS

- A. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches (75 mm) above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- B. Fill bollards solidly with concrete, mounding top surface to shed water.

### 3.4 INSTALLING NOSINGS, TREADS, AND THRESHOLDS

- A. Center nosings on tread widths unless otherwise indicated.
- B. For nosings embedded in concrete steps or curbs, align nosings flush with riser faces and level with tread surfaces.
- C. Seal thresholds exposed to exterior with elastomeric sealant complying with Section 079200 "Joint Sealants" to provide a watertight installation.

### 3.5 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

### 3.6 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
  - 1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099123 "Interior Painting."
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 055000

DECEMBER 18, 2017

## SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

### 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. Wood blocking, cants, and nailers.
  2. Wood furring and grounds.
  3. Utility shelving.
  4. Plywood backing panels.

#### 1.3 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.
- B. Dimension Lumber: Lumber of 2 inches nominal or greater size but less than 5 inches nominal size in least dimension.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
  2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
  3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
  4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

## 1.5 INFORMATIONAL SUBMITTALS

### A. Evaluation Reports: For the following, from ICC-ES:

1. Preservative-treated wood.
2. Fire-retardant-treated wood.
3. Power-driven fasteners.
4. Post-installed anchors.
5. Metal framing anchors.

## 1.6 QUALITY ASSURANCE

- ### A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- ### A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

## PART 2 - PRODUCTS

### 2.1 WOOD PRODUCTS, GENERAL

- ### A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.

- ### B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness unless otherwise indicated.

### 2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- ### A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

- ### B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.



- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat all miscellaneous carpentry unless otherwise indicated. items indicated on Drawings, and the following:
  - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
  - 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
  - 4. Wood floor plates that are installed over concrete slabs-on-grade.

### 2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
  - 1. Treatment shall not promote corrosion of metal fasteners.
  - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
  - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
  - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
- E. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not bleed through, contain colorants, or otherwise adversely affect finishes.
- F. Application: Treat items indicated on Drawings, and the following:
  - 1. Framing for raised platforms.

2. Concealed blocking.
3. Roof framing and blocking.
4. Wood cants, nailers, curbs, equipment support bases, blocking, and similar members in connection with roofing.
5. Plywood backing panels.

## 2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
1. Blocking.
  2. Nailers.
  3. Rooftop equipment bases and support curbs.
  4. Cants.
  5. Furring.
  6. Grounds.
  7. Utility shelving.
- B. Dimension Lumber Items: Construction or No. 2 grade lumber of any of the following species:
1. Hem-fir (north); NLGA.
  2. Mixed southern pine or southern pine; SPIB.
  3. Spruce-pine-fir; NLGA.
  4. Hem-fir; WCLIB or WWPA.
  5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
  6. Western woods; WCLIB or WWPA.
  7. Northern species; NLGA.
  8. Eastern softwoods; NeLMA.
- C. Concealed Boards: 15 percent maximum moisture content of any of the following the following species and grades:
1. Mixed southern pine or southern pine, No. 2 grade; SPIB.
  2. Hem-fir or hem-fir (north), Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
  3. Spruce-pine-fir (south) or spruce-pine-fir, Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
- D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

## 2.5 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1,, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

## 2.6 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Screws for Fastening to Metal Framing: ASTM C 1002, length as recommended by screw manufacturer for material being fastened.
- D. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- E. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 as appropriate for the substrate.
  - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
  - 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

## 2.7 METAL FRAMING ANCHORS

- A. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.
  - 1. Use for interior locations unless otherwise indicated.
- B. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.
  - 1. Use for wood-preservative-treated lumber and where indicated.
- C. Stainless-Steel Sheet: ASTM A 666, Type 304.
  - 1. Use for exterior locations and where indicated.

## 2.8 MISCELLANEOUS MATERIALS

- A. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
  - 1. Adhesives shall have a VOC content of 70 g/L or less.
- B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Compliance with recommendations of American Wood Preservers Institute when handling and installing pressure-treated wood.
- C. Where composite wood products are used, specify products with no added urea-formaldehyde resins.
- D. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- E. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- F. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- G. Do not splice structural members between supports unless otherwise indicated.
- H. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
  - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- I. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
  - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.

2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal thickness.
  3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
  4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.
- J. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- K. Comply with AWPAC M4 for applying field treatment to cut surfaces of preservative-treated lumber.
1. Use inorganic boron for items that are continuously protected from liquid water.
  2. Use copper naphthenate for items not continuously protected from liquid water.
- L. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- M. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
  2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
  3. ICC-ES evaluation report for fastener.
- N. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

### 3.2 WOOD BLOCKING AND NAILER INSTALLATION

- A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
- C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

### 3.3 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
- B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal-size furring horizontally and vertically at 24 inches o.c.
- C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal-size furring vertically at 16 inches

### 3.4 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061053

DECEMBER 18, 2017

## SECTION 061600 - SHEATHING

### 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. Wall sheathing.
  - 2. Parapet sheathing.
  - 3. Sheathing joint and penetration treatment.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

#### 1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As tested according to ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
  - 2. Exterior signage: 5/8" Pressure treated plywood , Wolmanized basis for design.

### 2.2 WALL SHEATHING

- A. Glass-Mat Gypsum Sheathing: ASTM C 1177/1177M.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
    - a. CertainTeed Corporation.
    - b. Georgia-Pacific Building Products.
    - c. National Gypsum Company.
    - d. United States Gypsum Company.
  - 2. Type and Thickness: Type X, 5/8 inch thick.
  - 3. Size: 48 by 96 inches for vertical installation.

### 2.3 PARAPET SHEATHING

- A. Glass-Mat Gypsum Sheathing: ASTM C 1177/1177M.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
    - a. CertainTeed Corporation.
    - b. Georgia-Pacific Building Products.
    - c. National Gypsum Company.
    - d. United States Gypsum Company.
  - 2. Type and Thickness: Type X, 5/8 inch thick.
  - 3. Size: 48 by 96 inches for vertical installation.

### 2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.



1. For parapet and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.
  1. For steel framing less than 0.0329 inch thick, use screws that comply with ASTM C 1002.
  2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C 954.

## 2.5 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

- A. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.
  1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches wide, 10 by 10 or 10 by 20 threads/inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
  1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
  2. ICC-ES evaluation report for fastener.
- D. Coordinate wall parapet sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

### 3.2 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
  - 1. Fasten gypsum sheathing to wood framing with screws.
  - 2. Fasten gypsum sheathing to cold-formed metal framing with screws.
  - 3. Install panels with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
  - 4. Install panels with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.
  - 1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.
  - 2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.
- D. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.
  - 1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.
  - 2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.
- E. Seal sheathing joints according to sheathing manufacturer's written instructions.
  - 1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
  - 2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

END OF SECTION 061600

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## SECTION 092900 - GYPSUM BOARD

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

##### A. Section Includes:

1. Interior gypsum board.
2. Exterior gypsum board for ceilings and soffits.
3. Tile backing panels.
4. Texture finishes.

##### B. Related Requirements:

1. Section 061600 "Sheathing" for gypsum sheathing for exterior walls.
2. Section 092116.23 "Gypsum Board Shaft Wall Assemblies" for metal shaft-wall framing, gypsum shaft liners, and other components of shaft-wall assemblies.
3. Section 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.
4. Section 092613 "Gypsum Veneer Plastering" for gypsum base for veneer plaster and for other components of gypsum-veneer-plaster finishes.
5. Section 093013 "Ceramic Tiling" for cementitious backer units installed as substrates for ceramic tile.

#### 1.3 ACTION SUBMITTALS

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

##### B. Sustainable Design Submittals:

1. [<Double click to insert sustainable design text for recycled content.>](#)
2. [<Double click to insert sustainable design text for regional materials.>](#)
3. [<Double click to insert sustainable design text for adhesives and sealants.>](#)
4. [<Double click to insert sustainable design text for low-emitting ceilings and walls.>](#)

##### C. Samples: For the following products:

1. Trim Accessories: Full-size Sample in **12-inch-** (300-mm-) long length for each trim accessory indicated.

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2. Textured Finishes: [**Manufacturer's standard size**] <Insert size> for each textured finish indicated and on same backing indicated for Work.
- D. Samples for Initial Selection: For each type of [**trim accessory**] [**and**] [**textured finish**] indicated.
- E. Samples for Verification: For the following products:
  1. Trim Accessories: Full-size Sample in **12-inch- (300-mm-)** long length for each trim accessory indicated.
  2. Textured Finishes: [**Manufacturer's standard size**] <Insert size> for each textured finish indicated and on same backing indicated for Work.

#### 1.4 QUALITY ASSURANCE

- A. Mockups: Build mockups of at least **100 sq. ft. (9 sq. m)** in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.
  1. Build mockups for the following:
    - a. Each level of gypsum board finish indicated for use in exposed locations.
    - b. Each texture finish indicated.
  2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
  3. Simulate finished lighting conditions for review of mockups.
  4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.5 DELIVERY, STORAGE AND HANDLING

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

#### 1.6 FIELD CONDITIONS

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

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2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. [<Double click to insert sustainable design text for low-emitting ceilings and walls.>](#)

### 2.2 GYPSUM BOARD, GENERAL

- A. [<Double click to insert sustainable design text for recycled content.>](#)
- B. [<Double click to insert sustainable design text for regional materials.>](#)
- C. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

### 2.3 INTERIOR GYPSUM BOARD

- A. Gypsum Wallboard: ASTM C 1396/C 1396M.
  1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  2. Thickness: **1/2 inch (12.7 mm)**.
  3. Long Edges: [**Tapered**] [**Tapered and featured (rounded or beveled) for prefilling**].
- B. Gypsum Board, Type X: ASTM C 1396/C 1396M.
  1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  2. Thickness: **5/8 inch (15.9 mm)**.
  3. Long Edges: [**Tapered**] [**Tapered and featured (rounded or beveled) for prefilling**].
- C. Flexible Gypsum Board: ASTM C 1396/C 1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.
  1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  2. Thickness: **1/4 inch (6.4 mm)**.
  3. Long Edges: Tapered.

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- D. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  2. Thickness: **1/2 inch (12.7 mm)**.
  3. Long Edges: Tapered.
- E. Foil-Backed Gypsum Board: ASTM C 1396/C 1396M.
1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  2. Core: [As indicated on Drawings] [**3/8 inch (9.5 mm), regular type**] [**1/2 inch (12.7 mm), regular type**] [**5/8 inch (15.9 mm), Type X**] [Type C as required by fire-resistance-rated assembly indicated on Drawings].
  3. Long Edges: [Tapered] [Tapered and featured (rounded or beveled) for prefilling].
- F. Abuse-Resistant Gypsum Board: ASTM C 1396/C 1396M gypsum board, tested according to ASTM C 1629/C 1629M.
1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  2. Core: [As indicated on Drawings] [**1/2 inch (12.7 mm), regular type**] [**5/8 inch (15.9 mm), Type X**].
  3. Surface Abrasion: ASTM C 1629/C 1629M, meets or exceeds [Level 1] [Level 2] [Level 3] requirements.
  4. Indentation: ASTM C 1629/C 1629M, meets or exceeds [Level 1] [Level 2] [Level 3] requirements.
  5. Soft-Body Impact: ASTM C 1629/C 1629M, meets or exceeds [Level 1] [Level 2] [Level 3] requirements.
  6. Long Edges: Tapered.
  7. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- G. Impact-Resistant Gypsum Board: ASTM C 1396/C 1396M gypsum board, tested according to ASTM C 1629/C 1629M.
1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  2. Core: [As indicated on Drawings] [**1/2 inch (12.7 mm), regular type**] [**5/8 inch (15.9 mm), Type X**].
  3. Surface Abrasion: ASTM C 1629/C 1629M, meets or exceeds [Level 1] [Level 2] [Level 3] requirements.
  4. Indentation: ASTM C 1629/C 1629M, meets or exceeds [Level 1] [Level 2] [Level 3] requirements.
  5. Soft-Body Impact: ASTM C 1629/C 1629M, meets or exceeds [Level 1] [Level 2] [Level 3] requirements.
  6. Hard-Body Impact: ASTM C 1629/C 1629M, meets or exceeds [Level 1] [Level 2] [Level 3] requirements according to test in Annex A1.
  7. Long Edges: Tapered.
  8. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- H. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)

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2. Core: [As indicated] [**1/2 inch (12.7 mm), regular type**] [**5/8 inch (15.9 mm), Type X**].
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

#### 2.4 SPECIALTY GYPSUM BOARD

- A. Gypsum Board, Type C: ASTM C 1396/C 1396M. Manufactured to have increased fire-resistive capability.
  1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  2. Thickness: As required by fire-resistance-rated assembly indicated on Drawings.
  3. Long Edges: Tapered.
- B. Glass-Mat Interior Gypsum Board: ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.
  1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  2. Core: [As indicated] [**1/2 inch (12.7 mm), regular type**] [**1/2 inch (12.7 mm), Type C**] [**5/8 inch (15.9 mm), Type X**] [**5/8 inch (15.9 mm), abuse resistant**].
  3. Long Edges: Tapered.
  4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- C. Acoustically Enhanced Gypsum Board: ASTM C 1396/C 1396M. Multilayer products constructed of two layers of gypsum boards sandwiching a viscoelastic sound-absorbing polymer core.
  1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  2. Core: [As indicated] [**1/2 inch (12.7 mm), regular type**] [**1/2 inch (12.7 mm), Type X**] [**5/8 inch (15.9 mm), regular type**] [**5/8 inch (15.9 mm), Type X**] [**1-3/8 inch (35 mm), regular type**].
  3. Long Edges: Tapered.
- D. Skim-Coated Gypsum Board: ASTM C 1396/C 1396M. Manufactured with a factory-applied skim coat.
  1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  2. Core: [As indicated] [**1/2 inch (12.7 mm), regular type**] [**5/8 inch (15.9 mm), Type X**].
  3. Long Edges: Tapered.

#### 2.5 EXTERIOR GYPSUM BOARD FOR CEILINGS AND SOFFITS

- A. Exterior Gypsum Soffit Board: ASTM C 1396/C 1396M, with manufacturer's standard edges.
  1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  2. Core: [As indicated] [**1/2 inch (12.7 mm), regular type**] [**5/8 inch (15.9 mm), Type X**].
- B. Glass-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M, with fiberglass mat laminated to both sides and with manufacturer's standard edges.



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1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
2. Core: [As indicated] [**1/2 inch (12.7 mm), regular type**] [**5/8 inch (15.9 mm), Type X**].

## 2.6 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.
  1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  2. Core: [As indicated on Drawings] [**1/2 inch (12.7 mm), regular type**] [**5/8 inch (15.9 mm), Type X**].
  3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- B. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.
  1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  2. Thickness: [**1/4 inch (6.4 mm)**] [**1/2 inch (12.7 mm)**] [**5/8 inch (15.9 mm)**] [**As indicated**].
  3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- C. Water-Resistant Gypsum Backing Board: ASTM C 1396/C 1396M, with manufacturer's standard edges.
  1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  2. Core: [As indicated on Drawings] [**1/2 inch (12.7 mm), regular type**] [**5/8 inch (15.9 mm), Type X**] [**Type C as required by fire-resistance-rated assembly indicated on Drawings**].

## 2.7 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
  1. Material: [**Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet**] [**Galvanized or aluminum-coated steel sheet or rolled zinc**] [**Plastic**] [**Paper-faced galvanized-steel sheet**].
  2. Shapes:
    - a. Cornerbead.
    - b. Bullnose bead.
    - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
    - d. L-Bead: L-shaped; exposed long flange receives joint compound.
    - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
    - f. Expansion (control) joint.
    - g. Curved-Edge Cornerbead: With notched or flexible flanges.
- B. Exterior Trim: ASTM C 1047.

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1. Material: [**Hot-dip galvanized-steel sheet, plastic, or rolled zinc**] <Insert material>.
2. Shapes:
  - a. Cornerbead.
  - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
  - c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

C. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
2. Aluminum: Alloy and temper with not less than the strength and durability properties of **ASTM B 221 (ASTM B 221M)**, Alloy 6063-T5.
3. Finish: [**Corrosion-resistant primer compatible with joint compound and finish materials specified**] <Insert requirements for Class II anodic finishes and factory-painted, baked-enamel finishes>.

## 2.8 JOINT TREATMENT MATERIALS

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

B. Joint Tape:

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

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

1. Prefilling: At open joints[, **rounded or beveled panel edges,**] and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use [**setting-type taping**] [**drying-type, all-purpose**] compound.
  - a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use [**setting-type, sandable topping**] [**drying-type, all-purpose**] compound.
4. Finish Coat: For third coat, use [**setting-type, sandable topping**] [**drying-type, all-purpose**] compound.
5. Skim Coat: For final coat of Level 5 finish, use [**setting-type, sandable topping compound**] [**drying-type, all-purpose compound**] [**high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish**].

D. Joint Compound for Exterior Applications:

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1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.
2. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.

E. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
2. Cementitious Backer Units: As recommended by backer unit manufacturer.
3. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.9 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

1. [<Double click to insert sustainable design text for VOC content of adhesive.>](#)
2. [<Double click to insert sustainable design text for adhesives.>](#)

C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from **0.033 to 0.112 inch** (0.84 to 2.84 mm) thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
2. [<Double click to insert sustainable design text for recycled content.>](#)

E. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
2. [<Double click to insert sustainable design text for sealants.>](#)
3. [<Double click to insert sustainable design text for sealants.>](#)

F. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."

G. Vapor Retarder: As specified in Section 072600 "Vapor Retarders."

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## 2.10 TEXTURE FINISHES

- A. Primer: As recommended by textured finish manufacturer.
- B. Polystyrene Aggregate Ceiling Finish: Water-based, job-mixed, polystyrene aggregate finish with flame-spread and smoke-developed indexes of not more than 25 when tested according to ASTM E 84.
  - 1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  - 2. Texture: [**Fine**] [**Medium**] [**Coarse**].
- C. Aggregate Finish: Water-based, job-mixed, aggregated, drying-type texture finish for spray application.
  - 1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  - 2. Texture: [**Light spatter**] [**Spatter knock-down**] **<Insert texture>**.
- D. Non-Aggregate Finish: Premixed, vinyl texture finish for spray application.
  - 1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  - 2. Texture: [**Orange peel**] [**Spatter**] [**Spatter knock-down**] **<Insert texture>**.
- E. Acoustical Finish: Water-based, chemical-setting or drying-type, job-mixed texture finish for spray application.
  - 1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  - 2. Application Thickness: [**1/2 inch (12.7 mm)**] **<Insert dimension>**.
  - 3. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - a. Flame-Spread Index: [**25**] **<Insert value>** or less.
    - b. Smoke-Developed Index: [**50**] [**450**] **<Insert value>** or less.
  - 4. NRC: [**0.55**] **<Insert NRC>** according to ASTM C 423.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

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### 3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than **1/16 inch (1.5 mm)** of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than **8 sq. ft. (0.7 sq. m)** in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow **1/4- to 3/8-inch- (6.4- to 9.5-mm-)** wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide **1/4- to 1/2-inch- (6.4- to 12.7-mm-)** wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.
- J. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- K. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

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### 3.3 APPLYING INTERIOR GYPSUM BOARD

#### A. Install interior gypsum board in the following locations:

1. Wallboard Type: [**As indicated on Drawings**] [**Vertical surfaces unless otherwise indicated**].
2. Type X: [**As indicated on Drawings**] [**Where required for fire-resistance-rated assembly**] [**Vertical surfaces unless otherwise indicated**] <Insert requirements>.
3. Flexible Type: [**As indicated on Drawings**] [**Apply in double layer at curved assemblies**].
4. Ceiling Type: [**As indicated on Drawings**] [**Ceiling surfaces**].
5. Foil-Backed Type: [**As indicated on Drawings**] <Insert requirements>.
6. Abuse-Resistant Type: [**As indicated on Drawings**] <Insert requirements>.
7. Impact-Resistant Type: [**As indicated on Drawings**] <Insert requirements>.
8. Mold-Resistant Type: [**As indicated on Drawings**] <Insert requirements>.
9. Type C: [**As indicated on Drawings**] [**Where required for specific fire-resistance-rated assembly indicated**].
10. Glass-Mat Interior Type: [**As indicated on Drawings**] <Insert requirements>.
11. Acoustically Enhanced Type: [**As indicated on Drawings**] <Insert requirements>.
12. Skim-Coated Type: [**As indicated on Drawings**] <Insert requirements>.

#### B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels [**vertically (parallel to framing)**] [**horizontally (perpendicular to framing)**] unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
  - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
  - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

#### C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, **16 inches (400 mm)** minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

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3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
  4. Fastening Methods: Fasten base layers [**and face layers separately to supports with screws**] [**with screws; fasten face layers with adhesive and supplementary fasteners**].
- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.
- E. Curved Surfaces:
1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus **12-inch- (300-mm-)** long straight sections at ends of curves and tangent to them.
  2. For double-layer construction, fasten base layer to studs with screws **16 inches (400 mm)** o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced **12 inches (300 mm)** o.c.

### 3.4 APPLYING EXTERIOR GYPSUM PANELS FOR CEILINGS AND SOFFITS

- A. Apply panels perpendicular to supports, with end joints staggered and located over supports.
1. Install with **1/4-inch (6.4-mm)** open space where panels abut other construction or structural penetrations.
  2. Fasten with corrosion-resistant screws.

### 3.5 APPLYING TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at [**showers, tubs, and where indicated**] [**locations indicated to receive tile**]. Install with **1/4-inch (6.4-mm)** gap where panels abut other construction or penetrations.
- B. Cementitious Backer Units: ANSI A108.11, at [**showers, tubs, and where indicated**] [**locations indicated to receive tile**].
- C. Water-Resistant Backing Board: Install where indicated with **1/4-inch (6.4-mm)** gap where panels abut other construction or penetrations.
- D. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

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### 3.6 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints **[at locations indicated on Drawings]** **[according to ASTM C 840 and in specific locations approved by Architect for visual effect]**.
- C. Interior Trim: Install in the following locations:
  - 1. Cornerbead: Use at outside corners **[unless otherwise indicated]**.
  - 2. Bullnose Bead: Use **[at outside corners]** **[where indicated]** **<Insert requirements>**.
  - 3. LC-Bead: Use **[at exposed panel edges]** **<Insert requirements>**.
  - 4. L-Bead: Use **[where indicated]** **<Insert requirements>**.
  - 5. U-Bead: Use **[at exposed panel edges]** **[where indicated]** **<Insert requirements>**.
  - 6. Curved-Edge Cornerbead: Use at curved openings.
- D. Exterior Trim: Install in the following locations:
  - 1. Cornerbead: Use at outside corners.
  - 2. LC-Bead: Use **[at exposed panel edges]** **<Insert requirements>**.
- E. Aluminum Trim: Install in locations **[indicated on Drawings]** **<Insert requirements>**.

### 3.7 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints **[, rounded or beveled edges,]** and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
  - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
  - 2. Level 2: **[Panels that are substrate for tile]** **[Panels that are substrate for acoustical tile]** **[Where indicated on Drawings]** **<Insert locations>**.
  - 3. Level 3: **[Where indicated on Drawings]** **<Insert locations>**.
  - 4. Level 4: **[At panel surfaces that will be exposed to view unless otherwise indicated]** **<Insert locations>**.
    - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."



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5. Level 5: [**Where indicated on Drawings**] <Insert locations>.

- a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
- E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.
- F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.
- G. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.8 APPLYING TEXTURE FINISHES

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture[ **matching approved mockup and**] free of starved spots or other evidence of thin application or of application patterns.
- C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written instructions.

3.9 PROTECTION

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

END OF SECTION 092900

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## SECTION 095113 - ACOUSTICAL PANEL CEILINGS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings.
- B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
  - 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
  - 2. Laboratory Test Reports: For ceiling products, indicating compliance with requirements for low-emitting materials.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Ceiling suspension-system members.
  - 2. Structural members to which suspension systems will be attached.
  - 3. Method of attaching hangers to building structure.
    - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
  - 4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
  - 5. Size and location of initial access modules for acoustical panels.
  - 6. Items penetrating finished ceiling and ceiling-mounted items including the following:
    - a. Lighting fixtures.
    - b. Diffusers.
    - c. Grilles.
    - d. Speakers.
    - e. Sprinklers.
    - f. Access panels.



## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.
- B. See Room Finish schedule: for products and basis for design.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Ceiling products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design seismic restraints for ceiling systems.
- C. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- D. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: Class A according to ASTM E 1264.
  - 2. Smoke-Developed Index: 50 or less.
- E. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Indicate design designations from UL or from the listings of another qualified testing agency.

### 2.3 ACOUSTICAL PANELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Armstrong World Industries, Inc.
  - 2. CertainTeed Corporation.
  - 3. United States Gypsum Company
  - 4. ICI.
- B. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than **70** percent at food service areas and 80 percent in all other locations.
- C. Products: Refer to Interior Material Finish Schedule.

- D. Classification: Provide fire-resistance-rated panels as follows:
  - 1. Type and Form: Type IV, mineral base with membrane-faced overlay; Form 2, water felted; with fiberglass-fabric overlay on face.
- E. Color: as indicated on room finish drawings
- F. Light Reflectance (LR): Not less than 0.85.
- G. Ceiling Attenuation Class (CAC): Not less than 35.
- H. Noise Reduction Coefficient (NRC): Not less than 0.70.
- I. Edge/Joint Detail: Square.
- J. Thickness: 3/4 inch.
- K. Modular Size: As indicated on drawings.
- L. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273, ASTM D 3274, or ASTM G 21 and evaluated according to ASTM D 3274 or ASTM G 21.

#### 2.4 METAL SUSPENSION SYSTEM

- A. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.
  - 1. High-Humidity Finish: Where indicated, provide coating tested and classified for "severe environment performance" according to ASTM C 635/C 635M.
    - a. Location: Kitchen and Food prep areas
- B. **Recycled Content**: Postconsumer recycled content plus one-half of preconsumer recycled content not less than **90** percent.
- C. Wide-Face, Aluminum-Capped, Double-Web, Fire-Rated, Hot-Dip Galvanized, G60, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; hot-dip galvanized, G60 coating designation; with prefinished, 15/16-inch-wide aluminum caps on flanges.
  - 1. Structural Classification: Intermediate-duty system.
  - 2. Face Design: Flat, flush.
  - 3. Cap Finish: Painted to match color of acoustical unit.

#### 2.5 ACCESSORIES

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

1. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
  2. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304, nonmagnetic.
  3. Nickel-Copper-Alloy Wire: ASTM B 164, nickel-copper-alloy UNS No. N04400.
  4. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch-diameter wire.
- C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- E. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.

## 2.6 METAL EDGE MOLDINGS AND TRIM

- A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
  2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
- B. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements.
1. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.
  2. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 1.5 mils. Comply with ASTM C 635/C 635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

### 3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

### 3.3 INSTALLATION

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

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

6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
  7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
  8. Do not attach hangers to steel deck tabs.
  9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
  11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
  2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
  3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
  2. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

### 3.4 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.
- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.



### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform the following tests and inspections of completed installations of acoustical panel ceiling hangers and anchors and fasteners in successive stages and when installation of ceiling suspension systems on each floor has reached 20 percent completion, but no panels have been installed. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations of acoustical panel ceiling hangers show compliance with requirements.
  - 1. Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf of tension; it will also select one of every two postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf of tension.
  - 2. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.
- C. Acoustical panel ceiling hangers, anchors, and fasteners will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

### 3.6 CLEANING

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

END OF SECTION 095113

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## SECTION 096816 - SHEET CARPETING

### 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. Tufted carpet.
- 2. Woven carpet.
- 3. Carpet cushion.

- B. Related Requirements:

- 1. Section 024119 "Selective Demolition" for removing existing floor coverings.
- 2. **Section 096513 "Resilient Base and Accessories"** for resilient wall base and accessories installed with carpet.
- 3. Section 096813 "Tile Carpeting" for modular carpet tiles.

#### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

- 1. Review methods and procedures related to carpet installation including, but not limited to, the following:
  - a. Review delivery, storage, and handling procedures.
  - b. Review ambient conditions and ventilation procedures.
  - c. Review subfloor preparation procedures.

#### 1.4 ACTION SUBMITTALS

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

- 1. Include manufacturer's written data on physical characteristics and durability.
- 2. Include manufacturer's written installation recommendations for each type of substrate.

- B. Sustainable Design Submittals:

- 1. Product Data: For adhesives, indicating VOC content.

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2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
  3. Laboratory Test Reports: For flooring products, indicating compliance with requirements for testing and product requirements of CRI's "Green Label Plus" testing program.
  4. Laboratory Test Reports: For flooring products, indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings: For carpet installation, showing the following:
1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
  2. Carpet type, color, and dye lot.
  3. Locations where dye lot changes occur.
  4. Seam locations, types, and methods.
  5. Type of subfloor.
  6. Type of installation.
  7. Pattern type, repeat size, location, direction, and starting point.
  8. Pile direction.
  9. Types, colors, and locations of insets and borders.
  10. Types, colors, and locations of edge, transition, and other accessory strips.
  11. Transition details to other flooring materials.
  12. Type of carpet cushion.
- D. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
1. Carpet: **12-inch- (300-mm-)** square Sample.
  2. Exposed Edge, Transition, and Other Accessory Stripping: **12-inch- (300-mm-)** long Samples.
  3. Carpet Cushion: **6-inch- (150-mm-)** square Sample.
  4. Carpet Seam: **6-inch (150-mm)** Sample.
  5. Mitered Carpet-Border Seam: **12-inch- (300-mm-)** square Sample. Show carpet pattern alignment.
- E. Samples for Initial Selection: For each type of product.
1. Include Samples of exposed edge, transition, and other accessory stripping involving color or finish selection.
- F. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
1. Carpet: **12-inch- (300-mm-)** square Sample.
  2. Exposed Edge, Transition, and Other Accessory Stripping: **12-inch- (300-mm-)** long Samples.
  3. Carpet Cushion: **6-inch- (150-mm-)** square Sample.
  4. Carpet Seam: **6-inch (150-mm)** Sample.

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5. Mitered Carpet-Border Seam: **12-inch- (300-mm-)** square Sample. Show carpet pattern alignment.

G. Product Schedule: For carpet[ **and carpet cushion**]. Use same designations indicated on Drawings.

H. Sustainable Product Certification: Provide ANSI/NSF 140 certification for carpet products.

#### 1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For carpet[ **and carpet cushion**], for tests performed by a qualified testing agency.

C. Sample Warranties: For special warranties.

#### 1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet[ **and carpet cushion**].

#### 1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet: Full-width rolls equal to [5] **<Insert number>** percent of amount installed for each type indicated, but not less than **10 sq. yd. (8.3 sq. m)**.

#### 1.8 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the [**Commercial II**] [**Master II**] **<Insert description>** certification level.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

1. Build mockups at locations and in sizes shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

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1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI's "CRI Carpet Installation Standard."
- B. Deliver carpet in original mill protective covering with mill register numbers and tags attached.

1.10 FIELD CONDITIONS

- A. Comply with CRI's "CRI Carpet Installation Standard" for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet[ **and carpet cushion**] until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C. Do not install carpet[ **and carpet cushion**] over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet, install carpet before installing these items.

1.11 WARRANTY

- A. Special Warranty for Carpet: Manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.
  - 1. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.
  - 2. Failures include, but are not limited to, the following:
    - a. More than 10 percent loss of face fiber, edge raveling, snags, and runs.
    - b. Loss of tuft bind strength.
    - c. Excess static discharge.
    - d. Delamination.
    - e. **<Insert failure characteristic>**.
  - 3. Warranty Period: [10] **<Insert number>** years from date of Substantial Completion.
- B. Special Warranty for Carpet Cushion: Manufacturer agrees to repair or replace components of carpet cushion installation that fail in materials or workmanship within specified warranty period.
  - 1. Warranty includes removal and replacement of carpet and accessories required by replacement of carpet cushion.
  - 2. Warranty does not include deterioration or failure of carpet cushion due to unusual traffic, failure of substrate, vandalism, or abuse.

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3. Failure includes, but is not limited to, permanent indentation or compression.
4. Warranty Period: [10] <Insert number> years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 TUFTED CARPET <Insert designation>

- A. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
- B. Color: [As indicated by manufacturer's designations] [Match Architect's samples] [As selected by Architect from manufacturer's full range] <Insert color>.
- C. Pattern: [Match Architect's samples] <Insert pattern>.
- D. Fiber Content: [100 percent nylon 6, 6] [100 percent nylon 6] [100 percent polypropylene] <Insert fiber and content by percentage>.
- E. Fiber Type: <Insert proprietary fiber type>.
- F. Pile Characteristic: [Level-loop] [Cut] [Cut-and-loop] [Multilevel-loop] [Level tip shear] [Random shear] [Frieze] [Sculptured] <Insert characteristic> pile.
- G. Yarn Twist: <Insert twist in TPI (TPCM)>.
- H. Yarn Count: <Insert yarn count>.
- I. Density: <Insert oz./cu. yd. (g/cu. cm)>.
- J. Pile Thickness: <Insert inches (mm)> for finished carpet [ according to ASTM D 6859].
- K. Stitches: <Insert stitches per inch (mm)>.
- L. Gage: <Insert gage in ends per inch (mm)>.
- M. Face Weight: <Insert oz./sq. yd. (g/sq. m)>.
- N. Total Weight: <Insert oz./sq. yd. (g/sq. m)> for finished carpet.
- O. Primary Backing: [Manufacturer's standard material] [Woven polypropylene] [Nonwoven, polypropylene or polyester] <Insert specific primary backing material>.
- P. Secondary Backing: [Manufacturer's standard material] [Woven polypropylene] [Nonwoven, polypropylene or polyester] [Woven jute] [Fiberglass] <Insert specific secondary backing material>.
- Q. Backcoating: [Manufacturer's standard material] [SBR latex] [PVC] [Thermoplastic copolymer] <Insert backcoating; consult manufacturers>.
- R. Backing System: <Insert proprietary name>.

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S. Roll Width: [**12 feet (3.7 m)**] [**6 feet (1.8 m)**] [**13.5 feet (4.1 m)**] [**15 feet (4.6 m)**] <Insert dimension>.

T. Applied Treatments:

1. Applied Soil-Resistance Treatment: [**Manufacturer's standard material**] <Insert treatment>.
2. Antimicrobial Treatment: [**Manufacturer's standard material**] <Insert treatment>.

a. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.

U. Sustainable Design Requirements:

1. Sustainable Product Certification: [**Silver**] [**Gold**] [**Platinum**] level certification according to ANSI/NSF 140.
2. Carpet and cushion shall comply with testing and product requirements of CRI's "Green Label Plus" testing program.
3. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

V. Performance Characteristics:

1. Appearance Retention Rating: [**Moderate traffic, 2.5**] [**Heavy traffic, 3.0**] [**Severe traffic, 3.5**] <Insert number> minimum according to ASTM D 7330.
2. Critical Radiant Flux Classification: Not less than [**0.45 W/sq. cm**] [**0.22 W/sq. cm**] according to NFPA 253.
3. Dry Breaking Strength: Not less than **100 lbf (445 N)** according to ASTM D 2646.
4. Tuft Bind: Not less than [**3 lbf (13 N)**] [**5 lbf (22 N)**] [**6.2 lbf (28 N)**] [**8 lbf (36 N)**] [**10 lbf (45 N)**] <Insert value> according to ASTM D 1335.
5. Delamination: Not less than [**2.5 lbf/in. (0.4 N/mm)**] [**3.5 lbf/in. (0.6 N/mm)**] [**4 lbf/in. (0.07 N/mm)**] <Insert value> according to ASTM D 3936.
6. Noise Reduction Coefficient (NRC): <Insert NRC> according to ASTM C 423.
7. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.
8. Colorfastness to Light: Not less than 4 after [**40**] [**60**] <Insert number> AFU (AATCC fading units) according to AATCC 16, Option E.
9. Electrostatic Propensity: Less than [**3.5**] [**2**] <Insert number> kV according to AATCC 134.

2.2 WOVEN CARPET <Insert designation>

A. <Double click here to find, evaluate, and insert list of manufacturers and products.>

B. Color: [**As indicated by manufacturer's designations**] [**Match Architect's samples**] [**As selected by Architect from manufacturer's full range**] <Insert color>.

C. Pattern: [**Match Architect's samples**] <Insert pattern>.

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- D. Fiber Content: [100 percent wool] [80 percent wool; 20 percent nylon 6, 6] [80 percent wool; 20 percent nylon 6] <Insert fiber and content by percentage>.
- E. Face Construction: [Axminster] [Wilton] [Velvet] <Insert construction>.
- F. Pile Characteristic: [Level-loop] [Cut] [Cut-and-loop] pile.
- G. Yarn Twist: <Insert twist in TPI (TPCM)>.
- H. Yarn Count: <Insert yarn count>.
- I. Density: <Insert oz./cu. yd. (g/cu. cm)>.
- J. Pile Thickness: <Insert inches (mm)> for finished carpet[ according to ASTM D 6859].
- K. Rows: <Insert number of lengthwise tufts per inch (mm)>.
- L. Pitch: <Insert number of rows in 27 inches (686 mm)>.
- M. Face Weight: <Insert oz./sq. yd. (g/sq. m)>.
- N. Total Weight: <Insert oz./sq. yd. (g/sq. m)> for finished carpet.
- O. Backing: [Manufacturer's standard.] [As follows:]
1. Chain Warp: <Insert material>.
  2. Stuffer Warp: <Insert material>.
  3. Shot or Fill Weft: <Insert material>.
  4. Backcoating: <Insert backcoating>.
- P. Applied Treatments:
1. Applied Soil-Resistance Treatment: [Manufacturer's standard material] <Insert treatment>.
  2. Antimicrobial Treatment: [Manufacturer's standard material] <Insert treatment>.
    - a. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.
- Q. Sustainable Design Requirements:
1. Sustainable Product Certification: [Silver] [Gold] [Platinum] level certification according to ANSI/NSF 140.
  2. Carpet and cushion shall comply with testing and product requirements of CRI's "Green Label Plus" testing program.
  3. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."



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R. Performance Characteristics:

1. Appearance Retention Rating: [**Moderate traffic, 2.5**] [**Heavy traffic, 3.0**] [**Severe traffic, 3.5**] <Insert number> minimum according to ASTM D 7330.
2. Critical Radiant Flux Classification: Not less than [**0.45 W/sq. cm**] [**0.22 W/sq. cm**] according to NFPA 253.
3. Dry Breaking Strength: Not less than **100 lbf (445 N)** according to ASTM D 2646.
4. Noise Reduction Coefficient (NRC): <Insert NRC> according to ASTM C 423.
5. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.
6. Colorfastness to Light: Not less than 4 after [**40**] [**60**] <Insert number> AFU (AATCC fading units) according to AATCC 16, Option E.
7. Electrostatic Propensity: Less than [**3.5**] [**2**] <Insert number> kV according to AATCC 134.

2.3 CARPET CUSHION <Insert designation>

A. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)

B. Traffic Classification: CCC [**Class I, moderate**] [**Class II, heavy**] [**Class III, extra-heavy**] traffic.

C. Fiber Cushion: [**Rubberized hair, mothproofed and sterilized**] [**Rubberized jute, mothproofed and sterilized**] [**Synthetic**] [**Resinated, recycled textile**].

1. Weight: <Insert **oz./sq. yd. (g/sq. m)**>.
2. Thickness: <Insert **inches (mm)**> plus 5 percent maximum.
3. Density: <Insert **lb/cu. ft. (kg/cu. m)**>.

D. Rubber Cushion: [**Flat**] [**Rippled waffle**] [**Textured flat**] [**Reinforced**].

1. Weight: <Insert **oz./sq. yd. (g/sq. m)**>.
2. Thickness: <Insert **inches (mm)**> plus 5 percent maximum.
3. Compression Resistance: <Insert **lb/sq. in. (kg/sq. mm)**> at [**25**] [**65**] percent according to ASTM D 3676.
4. Density: <Insert **lb/cu. ft. (kg/cu. m)**>.

E. Polyurethane-Foam Cushion: [**Grafted prime**] [**Densified**] [**Bonded**] [**Mechanically frothed**].

1. Compression Force Deflection at 65 Percent: <Insert **lb/sq. in. (kg/sq. mm)** of polymer density> according to ASTM D 3574.
2. Thickness: <Insert **inches (mm)**>.
3. Density: <Insert **lb/cu. ft. (kg/cu. m)**>.

F. Performance Characteristics:

1. Critical Radiant Flux Classification: Not less than [**0.45 W/sq. cm**] [**0.22 W/sq. cm**] according to NFPA 253.
2. Noise Reduction Coefficient (NRC): <Insert NRC> according to ASTM C 423.

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3. Carpet and cushion shall comply with testing and product requirements of CRI's "Green Label Plus" testing program.
4. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

## 2.4 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by [**carpet**] [**carpet cushion**] manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by [**carpet manufacturer**] [**carpet and carpet cushion manufacturers**].
  1. Adhesives shall have a VOC content of [**50**] <Insert value> g/L or less.
  2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Tackless Carpet Stripping: Water-resistant plywood, in strips as required to match cushion thickness and that comply with CRI's "CRI Carpet Installation Standard."
- D. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.
- E. Metal Edge/Transition Strips: Extruded aluminum with [**mill**] <Insert finish> finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance.
- B. Examine carpet for type, color, pattern, and potential defects.
- C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.

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1. Moisture Testing: Perform tests so that each test area does not exceed [**200 sq. ft. (18.6 sq. m)**] [**1000 sq. ft. (304.8 sq. m)**] <Insert area>, and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
  - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of [**3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m)**] <Insert emission> in 24 hours.
  - b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum [**75**] <Insert number> percent relative humidity level measurement.
  - c. Perform additional moisture tests recommended in writing by [**adhesive and carpet**] [**adhesive, carpet cushion, and carpet**] manufacturers. Proceed with installation only after substrates pass testing.

D. Wood Subfloors: Verify the following:

1. Underlayment over subfloor complies with requirements specified in Section 061600 "Sheathing."
2. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard" and with carpet manufacturer's written installation instructions for preparing substrates.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions **1/8 inch (3 mm)** wide or wider, and protrusions more than **1/32 inch (0.8 mm)**, unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by [**adhesive and carpet**] [**adhesive, carpet, and carpet cushion**] manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

### 3.3 CARPET INSTALLATION

- A. Comply with CRI's "CRI Carpet Installation Standard" and [**carpet manufacturer's**] [**carpet and carpet cushion manufacturers**] written installation instructions for the following:
  1. Direct-glue-down installation.
  2. Double-glue-down installation.
  3. Carpet with attached-cushion installation.

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4. Preapplied adhesive installation.
  5. Hook-and-loop installation.
  6. Stretch-in installation.
  7. Stair installation.
- B. Comply with carpet manufacturer's written instructions and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
1. Stretch-in Carpet Installation: Install carpet cushion seams at 90-degree angle with carpet seams.
- C. Install **[pattern parallel to walls and borders]** **[as indicated on Drawings]** **<Insert requirements>**.
- D. Install borders with mitered corner seams.
- E. Do not bridge building expansion joints with carpet.
- F. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
- G. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- H. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet as marked on subfloor. Use nonpermanent, nonstaining marking device.

### 3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet:
1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
  2. Remove yarns that protrude from carpet surface.
  3. Vacuum carpet using commercial machine with face-beater element.
- B. Protect installed carpet to comply with CRI's "CRI Carpet Installation Standard."
- C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods recommended in writing by carpet manufacturer **[and carpet cushion manufacturer]** **[and carpet adhesive manufacturer]** **[and carpet cushion and adhesive manufacturers]**.

END OF SECTION 096816

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## SECTION 097200 - WALL COVERINGS

### 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. Vinyl wall covering.
- B. Owner-Furnished Materials: Wall covering to be furnished by Owner.

#### 1.3 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.
- B. Lighting: Do not install wall covering until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive wall covering.
- C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - a. Flame-Spread Index: 25 or less.

- b. Smoke-Developed Index: 200 or less.
- 2. Fire-Growth Contribution: No flashover and heat and smoke release according to NFPA 286.

## 2.2 VINYL WALL COVERING

- A. Material – refer to drawings for type.

## 2.3 ACCESSORIES

- A. Adhesive: Mildew-resistant, nonstaining, strippable adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by wall-covering manufacturer.
- B. Seam Tape: As recommended in writing by wall-covering manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
  - 1. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
- D. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finish with fine sandpaper.
- E. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- F. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

### 3.3 WALL-COVERING INSTALLATION

- A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated.
- B. Cut wall-covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.
- C. Install strips in same order as cut from roll.
  - 1. For solid-color, even-texture, or random-match wall coverings, reverse every other strip.
- D. Install wall covering without lifted or curling edges and without visible shrinkage.
- E. Match pattern **72 inches (1830 mm)** above the finish floor.
- F. Install seams vertical and plumb at least **6 inches (150 mm)** from outside corners and **6 inches (150 mm)** from inside corners unless a change of pattern or color exists at corner. Horizontal seams are not permitted.
- G. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.
- H. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

### 3.4 CLEANING

- A. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.
- B. Use cleaning methods recommended in writing by wall-covering manufacturer.
- C. Replace strips that cannot be cleaned.
- D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 097200

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SECTION 098433 - SOUND-ABSORBING WALL AND CEILING UNITS

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 shop-fabricated panel units tested for acoustical performance, including:
  - 1. Sound-absorbing wall panels.
  - 2. Sound-diffusing wall panels.
  - 3. Sound-diffusing ceiling panels.
- B. Related Sections: The following Sections include requirements that relate to this Section.
  - 1. Section 012300 – Alternates.
  - 2. Section 097713 – Stretched-Fabric Wall System.
  - 3. Section 099900 - Finish/Color Schedule.

1.3 DEFINITIONS

- A. NRC: Noise Reduction Coefficient.
- B. SAA: Sound Absorption Average.

1.4 SUBMITTALS

- A. Product Data: For each type of panel edge, core material, and mounting indicated.
- B. Shop Drawings: For sound-absorbing wall units. Include mounting devices and details; details at panel head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Indicate panel edge and core materials.
  - 1. Include elevations showing panel sizes and direction of fabric weave and pattern matching.
- C. Samples for Initial Selection: For each type of fabric facing from sound-absorbing wall unit manufacturer's full range.
- D. Samples for Verification: For the following products, prepared on Samples of size indicated below:
  - 1. Fabric: Full-width by approximately 36-inch- (900-mm-) long Sample, but not smaller than required to show complete pattern repeat, from dye lot to be used for the Work, and with specified treatments applied. Mark top and face of fabric.
  - 2. Panel Edge: 12-inch- (300-mm-) long Sample(s) showing each edge profile, corner, and finish.
  - 3. Core Material: 12-inch- (300-mm-) square Sample at corner.
  - 4. Mounting Devices: Full-size Samples.



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- E. Product Certificates: For each type of sound-absorbing wall unit, from manufacturer.
- F. Warranty: Sample of special warranty.
- G. Maintenance Data: For sound-absorbing wall units to include in maintenance manuals. Include fabric manufacturers' written cleaning and stain-removal recommendations.

#### 1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain sound-absorbing wall units from single source from single manufacturer.
- B. Fire-Test-Response Characteristics: Provide sound-absorbing wall units meeting the following as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
  - 1. Surface-Burning Characteristics: As determined by testing per ASTM E 84.
    - a. Flame-Spread Index: 25 or less.
    - b. Smoke-Developed Index: 450 or less.
- C. Preinstallation Conference: Conduct conference at Project site.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with fabric and sound-absorbing wall unit manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
- B. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

#### 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install sound-absorbing wall units until wet work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Lighting: Do not install sound-absorbing wall units until a permanent level of lighting is provided on surfaces to receive the units.
- C. Field Measurements: Verify locations of sound-absorbing wall units and actual dimensions of openings and penetrations by field measurements before fabrication.

#### 1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of sound-absorbing wall units that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to the following:
    - a. Acoustical performance.
    - b. Fabric sagging, distorting, or releasing from panel edge.

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- c. Warping of core.
2. Warranty Period: Two years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 WALL UNITS

- A. Basis-of-Design Products: Refer to Section 099900 – Finish/Color Schedule for the following wall panels:
  1. Diffusion Wall Panels: Drawing Key Note 15 – Base Bid.
  2. Diffusion Wall Panels: Drawing Key Note 15 – Alternate No. 5.
  3. Broadband Absorption Panels: Drawing Key Note 16 – Alternate No. 4.
  4. Diffusion Absorption Panels: Drawing Key Note 17 – Base Bid.
  5. Diffusion Absorption Panels: Drawing Key Note 17 – Alternate No. 7.
  6. Absorption Panels: Drawing Key Note 19 – Base Bid.
  7. Absorption Panels: Drawing Key Note 19 – Alternate No. 3.
- B. Other Manufacturers: Subject to compliance with requirements for the Project, acoustic window assemblies by other manufacturers must meet performance and characteristics specified as acceptable to Architect. Architect shall be the sole judge of acceptable manufacturers.
- C. Acoustical Performance: Sound absorption NRC of not less than 0.80 according to ASTM C 423 for Type A mounting according to ASTM E 795.

### 2.2 FABRICATION

- A. General: Use manufacturer's standard construction except as otherwise indicated; with facing material applied to face, edges, and back border of dimensionally stable core; and with rigid edges to reinforce panel perimeter against warpage and damage.
- B. Core-Face Layer: Evenly stretched over core face and edges and securely attached to core; free from puckers, ripples, wrinkles, or sags.
- C. Facing Material: Apply fabric facing fully covering visible surfaces of unit; with material stretched straight, on the grain, tight, square, and free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other visible distortions or foreign matter.
  1. Square Corners: Tailor corners.
  2. Fabrics with Directional or Repeating Patterns or Directional Weave: Mark fabric top and attach fabric in same direction so pattern or weave matches in adjacent units.
- D. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch (1.6 mm) for the following:
  1. Thickness.
  2. Edge straightness.
  3. Overall length and width.
  4. Squareness from corner to corner.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fabric, fabricated units, substrates, areas, and conditions, for compliance with requirements, installation tolerances, and other conditions affecting performance of sound-absorbing wall units.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install sound-absorbing wall units in locations indicated with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.
- B. Comply with sound-absorbing wall unit manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.
- C. Align and level fabric pattern and grain among adjacent units.

3.3 INSTALLATION TOLERANCES

- A. Variation from Plumb and Level: Plus or minus 1/16 inch (1.6 mm).
- B. Variation of Panel Joints from Hairline: Not more than 1/32 inch (0.79 mm) wide.

3.4 CLEANING

- A. Clip loose threads; remove pills and extraneous materials.
- B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION

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## SECTION 099123 - INTERIOR PAINTING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on interior substrates.

#### 1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
  - 1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
  - 2. Indicate VOC content.
- B. Sustainable Design Submittals:
  - 1. Product Data: For paints and coatings, indicating VOC content.
  - 2. Laboratory Test Reports: For paints and coatings, indicating compliance with requirements for low-emitting materials.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

#### 1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

#### 1.6 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

### PART 2 - PRODUCTS

#### 2.1 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

- C. **VOC Content:** For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
  - 1. Flat Paints and Coatings: 50 g/L.
  - 2. Nonflat Paints and Coatings: 150 g/L.
  - 3. Dry-Fog Coatings: 400 g/L.
  - 4. Primers, Sealers, and Undercoaters: 200 g/L.
  - 5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
  - 6. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
  - 7. Pretreatment Wash Primers: 420 g/L.
  - 8. Shellacs, Clear: 730 g/L.
  - 9. Shellacs, Pigmented: 550 g/L.
- D. **Low-Emitting Materials:** Interior paints and coatings shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- E. **Colors:** As indicated on Interior Material Schedule..

## 2.2 SOURCE QUALITY CONTROL

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

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. **Examine substrates and conditions,** with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. **Maximum Moisture Content of Substrates:** When measured with an electronic moisture meter as follows:
  - 1. Concrete: 12 percent.

2. Fiber-Cement Board: 12 percent.
  3. Masonry (Clay and CMUs): 12 percent.
  4. Wood: 15 percent.
  5. Gypsum Board: 12 percent.
  6. Plaster: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
  - D. Plaster Substrates: Verify that plaster is fully cured.
  - E. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.
  - F. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
  - G. Proceed with coating application only after unsatisfactory conditions have been corrected.
    1. Application of coating indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Aluminum Substrates: Remove loose surface oxidation.
- J. Wood Substrates:
  - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
  - 2. Sand surfaces that will be exposed to view, and dust off.
  - 3. Prime edges, ends, faces, undersides, and backsides of wood.
  - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- K. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

### 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
  - 1. Paint the following work where exposed in occupied spaces:
    - a. Equipment, including panelboards.



- b. Uninsulated metal piping.
  - c. Uninsulated plastic piping.
  - d. Pipe hangers and supports.
  - e. Metal conduit.
  - f. Plastic conduit.
  - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
  - h. Other items as directed by Architect.
2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

### 3.4 FIELD QUALITY CONTROL

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

### 3.5 CLEANING AND PROTECTION

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

### 3.6 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Nontraffic Surfaces:
  1. Latex System MPI INT 3.1A:
    - a. Prime Coat: Primer, alkali resistant, water based, MPI #3.
    - b. Prime Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Latex, interior (MPI Gloss Level 3), MPI #52.

d. Low-Odor/VOC

B. Concrete Substrates, Traffic Surfaces:

1. Concrete Stain System MPI INT 3.2E:

- a. First Coat: Stain, interior, for concrete floors, matching topcoat.
- b. Topcoat: Stain, interior, for concrete floors, MPI #58.

2. Water-Based Concrete Floor Sealer System MPI INT 3.2G:

- a. First Coat: Sealer, water based, for concrete floors, matching topcoat.
- b. Topcoat: Sealer, water based, for concrete floors, MPI #99.

3. Solvent-Based Concrete Floor Sealer System MPI INT 3.2F:

- a. First Coat: Sealer, solvent based, for concrete floors, matching topcoat.
- b. Topcoat: Sealer, solvent based, for concrete floors, MPI #104.

4. ***Latex Floor Enamel System MPI INT 3.2A:***

- a. ***Prime Coat: Floor paint, latex, matching topcoat.***
- b. ***Intermediate Coat: Floor paint, latex, matching topcoat.***
- c. ***Topcoat: Floor paint, latex, low gloss (maximum MPI Gloss Level 3), MPI #60.***

***1) PPG 3-510 Series Urethane Modified 100% Acrylic Latex Floor Paint Satin Finish.***

C. CMU Substrates:

1. Institutional Low-Odor/VOC Latex System MPI INT 4.2E:

- a. Block Filler: Block filler, latex, interior/exterior, MPI #4.
- b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
- c. Topcoat: Latex, interior, institutional low odor/VOC (MPI Gloss Level 3), MPI #145.

D. Steel Substrates:

1. Institutional Low-Odor/VOC Latex System MPI INT 5.1S:

- a. Prime Coat: Primer, rust inhibitive, water based MPI #107.
- b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
- c. Topcoat: Latex, interior, institutional low odor/VOC (MPI Gloss Level 4), MPI #146.

E. Galvanized-Metal Substrates:

1. Institutional Low-Odor/VOC Latex System MPI INT 5.3N:
  - a. Prime Coat: Primer, galvanized, water based, MPI #134.
  - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
  - c. Topcoat: Latex, interior, institutional low odor/VOC (MPI Gloss Level 4), MPI #146.
  
- F. Aluminum (Not Anodized or Otherwise Coated) Substrates:
  1. Institutional Low-Odor/VOC Latex System MPI INT 5.4G:
    - a. Prime Coat: Primer, quick dry, for aluminum, MPI #95.
    - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    - c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (MPI Gloss Level 5), MPI #147.
  
- G. Stainless-Steel Substrates:
  1. Water-Based Light Industrial Coating See interior design drawings and room finish schedule
    - a. Prime Coat: Primer, bonding, solvent based, MPI #69.
    - b. Prime Coat: Primer, quick dry, for aluminum, MPI #95.
    - c. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
    - d. Topcoat: Light industrial coating, interior, water based, semi-gloss (MPI Gloss Level 5), MPI #153.
  
- H. Wood Substrates: Wood trim.
  1. Institutional Low-Odor/VOC Latex System MPI INT 6.3V:
    - a. Prime Coat: Primer, latex, for interior wood, MPI #39.
    - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    - c. Topcoat: Latex, interior, institutional low odor/VOC (MPI Gloss Level 3), MPI #145.
  
- I. Spray-Textured Ceiling Substrates:
  1. Latex, Flat System MPI INT 9.1A: Spray applied.
    - a. Prime Coat: Latex, interior, flat, matching topcoat.
    - b. Topcoat: Latex, interior, flat (MPI Gloss Level 1), MPI #53.

J. Gypsum Board Substrates:

1. Institutional Low-Odor/VOC Latex System MPI INT 9.2M:
  - a. Prime Coat: Primer sealer, interior, institutional low odor/VOC, MPI #149.
  - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
  - c. Topcoat: Latex, interior, institutional low odor/VOC (MPI Gloss Level 3), MPI #145.
2. High-Performance Architectural Latex System MPI INT 9.2B:
  - a. Prime Coat: Primer sealer, latex, interior, MPI #50.
  - b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
  - c. Topcoat: Latex, interior, high performance architectural (MPI Gloss Level 3), MPI #139.

END OF SECTION 099123

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## SECTION 099600 - HIGH-PERFORMANCE COATINGS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes surface preparation and the application of high-performance coating systems[.][ **on the following substrates:**]

- 1. Exterior Substrates:

- a. Concrete, [**vertical**] [**and**] [**horizontal**] surfaces.
- b. Fiber-cement board.
- c. Clay masonry.
- d. Concrete masonry units (CMUs).
- e. Steel.
- f. Galvanized metal.
- g. Aluminum (not anodized or otherwise coated).
- h. Copper.
- i. Stainless steel.
- j. Wood.
- k. Fiberglass.
- l. Portland cement plaster (stucco).

- 2. Interior Substrates:

- a. Concrete, [**vertical**] [**and**] [**horizontal**] surfaces.
- b. Cement board.
- c. Clay masonry.
- d. Concrete masonry units (CMUs).
- e. Steel.
- f. Galvanized metal.
- g. Aluminum (not anodized or otherwise coated).
- h. Wood.
- i. Fiberglass.
- j. Gypsum board.
- k. Plaster.

- B. Related Requirements:

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1. [Section 051200 "Structural Steel Framing"] [Section 051213 "Architecturally Exposed Structural Steel Framing"] for shop priming of structural steel with primers specified in this Section.
2. Section 055213 "Pipe and Tube Railings" for shop [priming] [painting] pipe and tube railings with coatings specified in this Section.
3. Section 099113 "Exterior Painting" for general field painting.
4. Section 099123 "Interior Painting" for general field painting.

### 1.3 DEFINITIONS

- A. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- B. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- C. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
  1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
  2. Indicate VOC content.
- B. Sustainable Design Submittals:
  1. Product Data: For paints and coatings, indicating VOC content.
  2. Laboratory Test Reports: For paints and coatings, indicating compliance with requirements for low-emitting materials.
- C. Samples for Initial Selection: For each type of topcoat product indicated.
- D. Samples for Verification: For each type of coating system and each color and gloss of topcoat indicated.
  1. Submit Samples on rigid backing, 8 inches (200 mm) square.
  2. Apply coats on Samples in steps to show each coat required for system.
  3. Label each coat of each Sample.
  4. Label each Sample for location and application area.
- E. Product List: Cross-reference to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

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#### 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials[, **from the same product run,**] that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Coatings: [**5**] percent, but not less than [**1 gal. (3.8 L)**] **<Insert number>** of each material and color applied.

#### 1.6 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each coating system indicated to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Architect will select one surface to represent surfaces and conditions for application of each coating system.
    - a. Wall and Ceiling Surfaces: Provide samples of at least **100 sq. ft. (9 sq. m)**.
    - b. Other Items: Architect will designate items or areas required.
  - 2. Final approval of color selections will be based on mockups.
    - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
  - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than **45 deg F (7 deg C)**.
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Remove rags and waste from storage areas daily.

#### 1.8 FIELD CONDITIONS

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

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## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
1. Benjamin Moore & Co.
  2. Dulux (formerly ICI Paints); a brand of AkzoNobel.
  3. PPG Paints.
  4. Rust-Oleum Corporation; a subsidiary of RPM International, Inc.
  5. Sherwin-Williams Company (The).
  6. Tnemec Inc.
- B. Products: Subject to compliance with requirements, [**provide product**] [**provide one of the products**] [**available products that may be incorporated into the Work include, but are not limited to products**] listed in the Exterior High-Performance Coating Schedule or Interior High-Performance Coating Schedule for the coating category indicated.

### 2.2 HIGH-PERFORMANCE COATINGS, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
  3. Products shall be of same manufacturer for each coat in a coating system.
- C. **VOC Content:** For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
1. Flat Paints and Coatings: 50 g/L.
  2. Nonflat Paints and Coatings: 150 g/L.
  3. Primers, Sealers, and Undercoaters: 200 g/L.
  4. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
  5. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
  6. Pretreatment Wash Primers: 420 g/L.
  7. Floor Coatings: 100 g/L.
  8. Shellacs, Clear: 730 g/L.
  9. Shellacs, Pigmented: 550 g/L.



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- D. Low-Emitting Materials: Interior paints and coatings shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- E. Colors: **[As selected by Architect from manufacturer's full range] [Match Architect's samples] [As indicated in color schedule] <Insert requirements>.**

## 2.3 SOURCE QUALITY CONTROL

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

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Concrete: 12 percent.
  - 2. Fiber-Cement Board: 12 percent.
  - 3. Masonry (Clay and CMUs): 12 percent.
  - 4. Wood: 15 percent.
  - 5. Gypsum Board: 12 percent.
  - 6. Plaster: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Plaster Substrates: Verify that plaster is fully cured.
- E. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

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- F. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and coating systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
  - 1. Clean surfaces with pressurized water. Use pressure range of [**1500 to 4000 psi (10 350 to 27 580 kPa)**] [**4000 to 10,000 psi (27 580 to 68 950 kPa)**] at **6 to 12 inches (150 to 300 mm)**.
  - 2. Abrasive blast clean surfaces to comply with SSPC-SP 7/NACE No. 4.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or alkalinity of mortar joints exceeds that permitted in manufacturer's written instructions.
  - 1. Clean surfaces with pressurized water. Use pressure range of [**100 to 600 psi (690 to 4140 kPa)**] [**1500 to 4000 psi (10 350 to 27 580 kPa)**] at **6 to 12 inches (150 to 300 mm)**.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer[.][ **but not less than the following:**]
  - 1. SSPC-SP 7/NACE No. 4.
  - 2. SSPC-SP 11.
  - 3. SSPC-SP 6/NACE No. 3.
  - 4. SSPC-SP 10/NACE No. 2.
  - 5. SSPC-SP 5/NACE No. 1.

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- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings.
- I. Aluminum Substrates: Remove loose surface oxidation.
- J. Wood Substrates:
  - 1. Scrape and clean knots. Before applying primer, apply coat of knot sealer that is recommended in writing by topcoat manufacturer for coating system indicated.
  - 2. Sand surfaces that will be exposed to view and dust off.
  - 3. Prime edges, ends, faces, undersides, and backsides of wood.
  - 4. After priming, fill holes and imperfections in the finish surfaces with filler that is recommended in writing by topcoat manufacturer for coating system indicated. Sand smooth when dried.

### 3.3 APPLICATION

- A. Apply high-performance coatings according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
  - 1. Use applicators and techniques suited for coating and substrate indicated.
  - 2. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
  - 3. Coat backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  - 4. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.
- D. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

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### 3.4 FIELD QUALITY CONTROL

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

### 3.5 CLEANING AND PROTECTION

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

This Section is intended to be edited using ARCOM's SpecBuilder and the MPI Architectural Painting Decision Tree, located at [www.ARCOMone.com/MPI](http://www.ARCOMone.com/MPI). [<Double click here to connect.>](#)

### 3.6 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

- A. Concrete Substrates, Vertical Surfaces:
  - 1. Epoxy System [**MPI EXT 3.1D**]:
    - a. Prime Coat: Epoxy, matching topcoat.
    - b. Intermediate Coat: Epoxy, matching topcoat.
    - c. Topcoat: Epoxy, gloss[, **MPI #77**].
      - 1) **<Insert manufacturer's name; product name or designation>**.
  - 2. Epoxy-Modified Latex System [**MPI EXT 3.1E**]:
    - a. Prime Coat: Epoxy-modified latex, matching topcoat.
    - b. Intermediate Coat: Epoxy-modified latex, matching topcoat.
    - c. Topcoat: Epoxy-modified latex, semi-gloss (MPI Gloss Level 5)[, **MPI #215**].
      - 1) **<Insert manufacturer's name; product name or designation>**.

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- d. Topcoat: Epoxy-modified latex, gloss (MPI Gloss Level 6)[, **MPI #115**].
  - 1) <Insert manufacturer's name; product name or designation>.
3. Pigmented Polyurethane over Epoxy System [**MPI EXT 3.1M**]:
  - a. Prime Coat: Epoxy, matching intermediate coat.
  - b. Intermediate Coat: Epoxy, gloss[, **MPI #77**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
    - 1) <Insert manufacturer's name; product name or designation>.
- B. Concrete Substrates, Horizontal Surfaces:
  1. Epoxy Non-Slip Deck Coating System [**MPI EXT 3.2C**]:
    - a. Prime Coat: As recommended in writing by topcoat manufacturer.
    - b. Intermediate Coat: As recommended in writing by topcoat manufacturer.
    - c. Topcoat: Epoxy deck coating (slip resistant)[, **MPI #82**].
      - 1) <Insert manufacturer's name; product name or designation>.
- C. Cement Board Substrates:
  1. Epoxy System [**MPI EXT 3.3E**]:
    - a. Prime Coat: Epoxy, matching topcoat.
    - b. Intermediate Coat: Epoxy, matching topcoat.
    - c. Topcoat: Epoxy, gloss[, **MPI #77**].
      - 1) <Insert manufacturer's name; product name or designation>.
  2. Epoxy-Modified Latex System [**MPI EXT 3.3D**]:
    - a. Prime Coat: Epoxy-modified latex, matching topcoat.
    - b. Intermediate Coat: Epoxy-modified latex, matching topcoat.
    - c. Topcoat: Epoxy-modified latex, semi-gloss (MPI Gloss Level 5)[, **MPI #215**].
      - 1) <Insert manufacturer's name; product name or designation>.
    - d. Topcoat: Epoxy-modified latex, gloss (MPI Gloss Level 6)[, **MPI #115**].
      - 1) <Insert manufacturer's name; product name or designation>.
  3. Pigmented Polyurethane over Epoxy System [**MPI EXT 3.3F**]:
    - a. Prime Coat: Epoxy, gloss[, **MPI #77**].

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1) <Insert manufacturer's name; product name or designation>.

- b. Intermediate Coat: Epoxy, matching prime coat.
- c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, MPI #72].

1) <Insert manufacturer's name; product name or designation>.

D. Clay Masonry Substrates:

1. Epoxy System [MPI EXT 4.1D]:

- a. Prime Coat: Epoxy, matching topcoat.
- b. Intermediate Coat: Epoxy, matching topcoat.
- c. Topcoat: Epoxy, gloss[, MPI #77].

1) <Insert manufacturer's name; product name or designation>.

2. Pigmented Polyurethane over Epoxy System [MPI EXT 4.1J]:

- a. Prime Coat: Epoxy, matching intermediate coat.
- b. Intermediate Coat: Epoxy, gloss[, MPI #77].

1) <Insert manufacturer's name; product name or designation>.

- c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, MPI #72].

1) <Insert manufacturer's name; product name or designation>.

E. CMU Substrates:

1. Epoxy System [MPI EXT 4.2E]:

- a. Block Filler: Block filler, epoxy[, MPI #116].

1) <Insert manufacturer's name; product name or designation>.

- b. Intermediate Coat: Epoxy, matching topcoat.
- c. Topcoat: Epoxy, gloss[, MPI #77].

1) <Insert manufacturer's name; product name or designation>.

2. Pigmented Polyurethane over High-Build Epoxy System [MPI EXT 4.2G]:

- a. Block Filler: Block filler, epoxy[, MPI #116].

1) <Insert manufacturer's name; product name or designation>.

- b. Intermediate Coat: Epoxy, high build, low gloss[, MPI #108].

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- 1) <Insert manufacturer's name; product name or designation>.
  - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, MPI #72].
    - 1) <Insert manufacturer's name; product name or designation>.
- F. Steel Substrates:
1. Epoxy System [MPI EXT 5.1F]:
    - a. Prime Coat: Primer, epoxy, anti-corrosive, for metal[, MPI #101].
      - 1) <Insert manufacturer's name; product name or designation>.
    - b. Intermediate Coat: Epoxy, high build, low gloss[, MPI #108].
      - 1) <Insert manufacturer's name; product name or designation>.
    - c. Topcoat: Epoxy, gloss[, MPI #77].
      - 1) <Insert manufacturer's name; product name or designation>.
  2. Epoxy over Self-Priming Epoxy System [MPI EXT 5.1S]:
    - a. Prime Coat: Epoxy, high build, self-priming [, MPI #120].
      - 1) <Insert manufacturer's name; product name or designation>.
    - b. Intermediate Coat: Epoxy, matching topcoat.
    - c. Topcoat: Epoxy, gloss[, MPI #77].
      - 1) <Insert manufacturer's name; product name or designation>.
  3. Epoxy Deck Coating over Epoxy Primer and High-Build Epoxy System [MPI EXT 5.1V]:
    - a. Prime Coat: Primer, epoxy, anti-corrosive, for metal[, MPI #101].
      - 1) <Insert manufacturer's name; product name or designation>.
    - b. Intermediate Coat: Epoxy, high build, low gloss[, MPI #108].
      - 1) <Insert manufacturer's name; product name or designation>.
    - c. Topcoat: Epoxy deck coating[, MPI #82].
      - 1) <Insert manufacturer's name; product name or designation>.
  4. Epoxy Deck Coating over Self-Priming Epoxy System [MPI EXT 5.1X]:

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- a. Prime Coat: Epoxy, high build, self-priming [, **MPI #120**].
    - 1) **<Insert manufacturer's name; product name or designation>**.
  - b. Topcoat: Epoxy deck coating[, **MPI #82**].
    - 1) **<Insert manufacturer's name; product name or designation>**.
5. Pigmented Polyurethane over Epoxy System [**MPI EXT 5.1H**]:
- a. Prime Coat: Primer, epoxy, anti-corrosive, for metal[, **MPI #101**].
    - 1) **<Insert manufacturer's name; product name or designation>**.
  - b. Intermediate Coat: Epoxy, gloss[, **MPI #77**].
    - 1) **<Insert manufacturer's name; product name or designation>**.
  - c. [**First and Second**] Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
    - 1) **<Insert manufacturer's name; product name or designation>**.
6. Pigmented Polyurethane over High-Build Epoxy System [**MPI EXT 5.1J**]:
- a. Prime Coat: Primer, epoxy, anti-corrosive, for metal[, **MPI #101**].
    - 1) **<Insert manufacturer's name; product name or designation>**.
  - b. Intermediate Coat: Epoxy, high build, low gloss[, **MPI #108**].
    - 1) **<Insert manufacturer's name; product name or designation>**.
  - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
    - 1) **<Insert manufacturer's name; product name or designation>**.
7. Pigmented Polyurethane over Self-Priming Epoxy System [**MPI EXT 5.1T**]:
- a. Prime Coat: Epoxy, high build, self-priming [, **MPI #120**].
    - 1) **<Insert manufacturer's name; product name or designation>**.
  - b. Intermediate Coat: Polyurethane, two component, pigmented, matching topcoat.
  - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
    - 1) **<Insert manufacturer's name; product name or designation>**.
8. Pigmented Polyurethane over Epoxy Zinc-Rich Primer System [**MPI EXT 5.1P**]:



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- a. Prime Coat: Primer, zinc rich, epoxy[, **MPI #20**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Epoxy, gloss[, **MPI #77**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
    - 1) <Insert manufacturer's name; product name or designation>.
9. Pigmented Polyurethane over Epoxy Zinc-Rich Primer and High-Build Epoxy System [**MPI EXT 5.1G**]:
- a. Prime Coat: Primer, zinc rich, epoxy[, **MPI #20**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Epoxy, high build, low gloss[, **MPI #108**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - c. [**First and Second**] Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
    - 1) <Insert manufacturer's name; product name or designation>.
10. Pigmented Polyurethane over Inorganic Zinc-Rich Primer and High-Build Epoxy System [**MPI EXT 5.1L**]:
- a. Prime Coat: Primer, zinc rich, inorganic[, **MPI #19**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Epoxy, high build, low gloss[, **MPI #108**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
    - 1) <Insert manufacturer's name; product name or designation>.
- G. Galvanized-Metal Substrates:
1. Epoxy System [**MPI EXT 5.3C**]:
    - a. Prime Coat: Primer, epoxy, anti-corrosive, for metal[, **MPI #101**].

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- 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Epoxy, matching topcoat.
  - c. Topcoat: Epoxy, gloss[, MPI #77].
    - 1) <Insert manufacturer's name; product name or designation>.
2. Pigmented Polyurethane over Epoxy Primer System [MPI EXT 5.3L]:
    - a. Prime Coat: Primer, epoxy, anti-corrosive, for metal[, MPI #101].
      - 1) <Insert manufacturer's name; product name or designation>.
    - b. Intermediate Coat: Polyurethane, two component, pigmented, gloss matching topcoat.
    - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, MPI #72].
      - 1) <Insert manufacturer's name; product name or designation>.
  3. Pigmented Polyurethane over Vinyl Wash Primer and Epoxy Primer System [MPI EXT 5.3D]:
    - a. Prime Coat: Primer, vinyl wash[, MPI #80].
      - 1) <Insert manufacturer's name; product name or designation>.
    - b. Intermediate Coat: Primer, epoxy, anti-corrosive, for metal[, MPI #101].
      - 1) <Insert manufacturer's name; product name or designation>.
    - c. [First and Second ]Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, MPI #72].
      - 1) <Insert manufacturer's name; product name or designation>.
- H. Aluminum (Not Anodized or Otherwise Coated) Substrates:
1. Epoxy System [MPI EXT 5.4E]:
    - a. Prime Coat: Primer, vinyl wash[, MPI #80].
      - 1) <Insert manufacturer's name; product name or designation>.
    - b. Intermediate Coat: Epoxy, matching topcoat.
    - c. Topcoat: Epoxy, gloss[, MPI #77].
      - 1) <Insert manufacturer's name; product name or designation>.
  2. Pigmented Polyurethane over Epoxy System [MPI EXT 5.4B]:

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- a. Prime Coat: Primer, vinyl wash[, **MPI #80**].
  - 1) <Insert manufacturer's name; product name or designation>.
- b. Intermediate Coat: Primer, epoxy, anti-corrosive, for metal[, **MPI #101**].
- c. [**First and Second**] Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
  - 1) <Insert manufacturer's name; product name or designation>.

I. Copper Substrates:

1. Epoxy System [**MPI EXT 5.5E**]:
  - a. Prime Coat: Primer, vinyl wash[, **MPI #80**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Epoxy, matching topcoat.
  - c. Topcoat: Epoxy, gloss[, **MPI #77**].
    - 1) <Insert manufacturer's name; product name or designation>.
2. Pigmented Polyurethane over Epoxy System [**MPI EXT 5.5B**]:
  - a. Prime Coat: Primer, vinyl wash[, **MPI #80**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Primer, epoxy, anti-corrosive, for metal[, **MPI #101**].
  - c. [**First and Second**] Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
    - 1) <Insert manufacturer's name; product name or designation>.

J. Stainless-Steel Substrates:

1. Epoxy System [**MPI EXT 5.6D**]:
  - a. Prime Coat: Primer, epoxy, anti-corrosive, for metal[, **MPI #101**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Epoxy, matching topcoat.
  - c. Topcoat: Epoxy, gloss[, **MPI #77**].
    - 1) <Insert manufacturer's name; product name or designation>.
2. Pigmented Polyurethane System [**MPI EXT 5.6B**]:
  - a. Prime Coat: Primer, vinyl wash[, **MPI #80**].

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- 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Primer, epoxy, anti-corrosive, for metal[, **MPI #101**].
  - c. [**First and Second**] Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
  - 1) <Insert manufacturer's name; product name or designation>.
- K. Wood Substrates: Glued-laminated construction.
1. Pigmented Polyurethane System [**MPI EXT 6.1J**]:
    - a. Prime Coat: Polyurethane, two component, pigmented, gloss, matching topcoat.
    - b. Intermediate Coat: Polyurethane, two component, pigmented, gloss, matching topcoat.
    - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
    - 1) <Insert manufacturer's name; product name or designation>.
- L. Wood Substrates: Exposed framing.
1. Pigmented Polyurethane System [**MPI EXT 6.2J**]:
    - a. Prime Coat: Polyurethane, two component, pigmented, gloss, matching topcoat.
    - b. Intermediate Coat: Polyurethane, two component, pigmented, gloss, matching topcoat.
    - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
    - 1) <Insert manufacturer's name; product name or designation>.
- M. Wood Substrates: [**Wood trim**] [**Architectural woodwork**] [**Doors**] [**Windows**] [**Wood board siding**] [**and**] [**wood fences**]
1. Pigmented Polyurethane System [**MPI EXT 6.3H**]:
    - a. Prime Coat: Polyurethane, two component, pigmented, gloss, matching topcoat.
    - b. Intermediate Coat: Polyurethane, two component, pigmented, gloss, matching topcoat.
    - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
    - 1) <Insert manufacturer's name; product name or designation>.
- N. Fiberglass Substrates:
1. Epoxy System [**MPI EXT 6.7F**]:
    - a. Prime Coat: Epoxy, matching topcoat.

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- b. Intermediate Coat: Epoxy, matching topcoat.
  - c. Topcoat: Epoxy, gloss[, **MPI #77**].
    - 1) **<Insert manufacturer's name; product name or designation>**.
2. Epoxy-Modified Latex System [**MPI EXT 6.7E**]
- a. Prime Coat: Epoxy-modified latex, matching topcoat.
  - b. Intermediate Coat: Epoxy-modified latex, matching topcoat.
  - c. Topcoat: Epoxy-modified latex, semi-gloss (MPI Gloss Level 5)[, **MPI #215**].
    - 1) **<Insert manufacturer's name; product name or designation>**.
  - d. Topcoat: Epoxy-modified latex, gloss (MPI Gloss Level 6)[, **MPI #115**].
    - 1) **<Insert manufacturer's name; product name or designation>**.
3. Pigmented Polyurethane over Epoxy System [**MPI EXT 6.7D**]:
- a. Prime Coat: Epoxy, matching intermediate coat.
  - b. Intermediate Coat: Epoxy, gloss[, **MPI #77**].
    - 1) **<Insert manufacturer's name; product name or designation>**.
  - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
    - 1) **<Insert manufacturer's name; product name or designation>**.
- O. Portland Cement Plaster Substrates:
- 1. Epoxy System [**MPI EXT 9.1D**]:
    - a. Prime Coat: Epoxy, matching topcoat.
    - b. Intermediate Coat: Epoxy, matching topcoat.
    - c. Topcoat: Epoxy, gloss[, **MPI #77**].
      - 1) **<Insert manufacturer's name; product name or designation>**.

This Section is intended to be edited using ARCOM's SpecBuilder and the MPI Architectural Painting Decision Tree, located at [www.ARCOMone.com/MPI](http://www.ARCOMone.com/MPI). **<Double click here to connect.>**

### 3.7 INTERIOR HIGH-PERFORMANCE COATING SCHEDULE

#### A. Concrete Substrates, Vertical Surfaces:

- 1. Epoxy System [**MPI INT 3.1F**]:
  - a. Prime Coat: Epoxy, matching topcoat.

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- b. Intermediate Coat: Epoxy, matching topcoat.
  - c. Topcoat: Epoxy, gloss[, **MPI #77**].
    - 1) **<Insert manufacturer's name; product name or designation>**.
  - 2. Epoxy, High-Build System [**MPI INT 3.1P**]:
    - a. Prime Coat: High-build epoxy, matching topcoat (reduced).
    - b. Intermediate Coat: High-build epoxy, matching topcoat.
    - c. Topcoat: High-build epoxy, low gloss[, **MPI #108**].
      - 1) **<Insert manufacturer's name; product name or designation>**.
    - d. Topcoat: High-build epoxy, gloss[, **MPI #98**].
      - 1) **<Insert manufacturer's name; product name or designation>**.
  - 3. Epoxy-Modified Latex System [**MPI INT 3.1G**]:
    - a. Prime Coat: Epoxy-modified latex, matching topcoat.
    - b. Intermediate Coat: Epoxy-modified latex, matching topcoat.
    - c. Topcoat: Epoxy-modified latex, semi-gloss (MPI Gloss Level 5)[, **MPI #215**].
      - 1) **<Insert manufacturer's name; product name or designation>**.
    - d. Topcoat: Epoxy-modified latex, gloss (MPI Gloss Level 6)[, **MPI #115**].
      - 1) **<Insert manufacturer's name; product name or designation>**.
- B. Concrete Substrates, Horizontal Surfaces.
- 1. Epoxy System [**MPI INT 3.2C**]:
    - a. Prime Coat: Epoxy, matching topcoat.
    - b. Intermediate Coat: Epoxy, matching topcoat.
    - c. Topcoat: Epoxy, gloss[, **MPI #77**].
      - 1) **<Insert manufacturer's name; product name or designation>**.
  - 2. Epoxy, High-Build System [**MPI INT 3.2L**]:
    - a. Prime Coat: High-build epoxy, matching topcoat (reduced).
    - b. Intermediate Coat: High-build epoxy, matching topcoat.
    - c. Topcoat: High-build epoxy, low gloss[, **MPI #108**].
      - 1) **<Insert manufacturer's name; product name or designation>**.
    - d. Topcoat: High-build epoxy, gloss[, **MPI #98**].
      - 1) **<Insert manufacturer's name; product name or designation>**.

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3. Pigmented Polyurethane System [**MPI INT 3.2D**]:
  - a. Prime Coat: Epoxy, gloss[, **MPI #77**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Polyurethane, two component, pigmented, gloss, matching topcoat.
  - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
    - 1) <Insert manufacturer's name; product name or designation>.
4. Clear (Two-Component) Polyurethane System [**MPI INT 3.2K**]:
  - a. Prime Coat: Two-component polyurethane matching topcoat.
  - b. Intermediate Coat: Two-component polyurethane, matching topcoat.
  - c. Topcoat: Varnish, aliphatic polyurethane, two component (MPI Gloss Level 6 or MPI Gloss Level 7)[, **MPI #78**].
    - 1) <Insert manufacturer's name; product name or designation>.

C. Cement Board Substrates:

1. Epoxy System [**MPI INT 3.3E**]:
  - a. Prime Coat: Epoxy, matching topcoat.
  - b. Intermediate Coat: Epoxy, matching topcoat.
  - c. Topcoat: Epoxy, gloss[, **MPI #77**].
    - 1) <Insert manufacturer's name; product name or designation>.
2. Epoxy-Modified Latex System [**MPI INT 3.3D**]:
  - a. Prime Coat: Epoxy-modified latex, matching topcoat.
  - b. Intermediate Coat: Epoxy-modified latex, matching topcoat.
  - c. Topcoat: Epoxy-modified latex, semi-gloss (MPI Gloss Level 5)[, **MPI #215**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - d. Topcoat: Epoxy-modified latex, gloss (MPI Gloss Level 6)[, **MPI #115**].
    - 1) <Insert manufacturer's name; product name or designation>.

D. Clay Masonry Substrates:

1. Epoxy System [**MPI INT 4.1F**]:
  - a. Prime Coat: Epoxy, matching topcoat.
  - b. Intermediate Coat: Epoxy, matching topcoat.
  - c. Topcoat: Epoxy, gloss[, **MPI #77**].

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- 1) <Insert manufacturer's name; product name or designation>.
  2. Epoxy-Modified Latex System [**MPI INT 4.1G**]:
    - a. Prime Coat: Epoxy-modified latex, matching topcoat.
    - b. Intermediate Coat: Epoxy-modified latex, matching topcoat.
    - c. Topcoat: Epoxy-modified latex, semi-gloss (MPI Gloss Level 5)[, **MPI #215**].
      - 1) <Insert manufacturer's name; product name or designation>.
    - d. Topcoat: Epoxy-modified latex, gloss (MPI Gloss Level 6)[, **MPI #115**].
      - 1) <Insert manufacturer's name; product name or designation>.
  3. Clear (Two-Component) Polyurethane System [**MPI INT 4.1K**]:
    - a. Prime Coat: Two-component polyurethane, matching topcoat.
    - b. Intermediate Coat: Two-component polyurethane, matching topcoat.
    - c. Topcoat: Varnish, aliphatic polyurethane, two component (MPI Gloss Level 6 or MPI Gloss Level 7)[, **MPI #78**].
      - 1) <Insert manufacturer's name; product name or designation>.
- E. CMU Substrates:
1. Epoxy System [**MPI INT 4.2F**] [**MPI INT 4.2G**]:
    - a. Block Filler: Block filler, latex, interior/exterior[, **MPI #4**].
      - 1) <Insert manufacturer's name; product name or designation>.
    - b. Block Filler: Block filler, epoxy[, **MPI #116**].
      - 1) <Insert manufacturer's name; product name or designation>.
    - c. Intermediate Coat: Epoxy, matching topcoat.
    - d. Topcoat: Epoxy, gloss[, **MPI #77**].
      - 1) <Insert manufacturer's name; product name or designation>.
  2. Epoxy, High-Build System [**MPI INT 4.2R**]:
    - a. Prime Coat: Epoxy block filler[, **MPI #116**].
    - b. Intermediate Coat: High-build epoxy, matching topcoat.
    - c. Topcoat: High-build epoxy, low gloss[, **MPI #108**].
      - 1) <Insert manufacturer's name; product name or designation>.
    - d. Topcoat: High-build epoxy, gloss[, **MPI #98**].
      - 1) <Insert manufacturer's name; product name or designation>.



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3. Epoxy-Modified Latex System [**MPI INT 4.2J**]:
  - a. Block Filler: Block filler, latex, interior/exterior[, **MPI #4**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Epoxy-modified latex, interior, matching topcoat.
  - c. Topcoat: Epoxy-modified latex, semi-gloss (MPI Gloss Level 5)[, **MPI #215**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - d. Topcoat: Epoxy-modified latex, gloss (MPI Gloss Level 6)[, **MPI #115**].
    - 1) <Insert manufacturer's name; product name or designation>.
4. Clear (Two-Component) Polyurethane System [**MPI INT 4.2Q**]:
  - a. Prime Coat: Two-component polyurethane, matching topcoat.
  - b. Intermediate Coat: Two-component polyurethane, matching topcoat.
  - c. Topcoat: Varnish, aliphatic polyurethane, two component (MPI Gloss Level 6 or MPI Gloss Level 7)[, **MPI #78**].
    - 1) <Insert manufacturer's name; product name or designation>.

F. Steel Substrates:

1. Epoxy System [**MPI INT 5.1L**]:
  - a. Prime Coat: Primer, epoxy, anti-corrosive, for metal[, **MPI #101**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Epoxy, matching topcoat.
  - c. Topcoat: Epoxy, gloss[, **MPI #77**].
    - 1) <Insert manufacturer's name; product name or designation>.
2. High-Build Epoxy over Epoxy Zinc-Rich Primer System [**MPI INT 5.1P**]:
  - a. Prime Coat: Primer, zinc-rich, epoxy[, **MPI #20**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Epoxy, high build, low gloss[, **MPI #108**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - c. Topcoat: Epoxy, gloss[, **MPI #77**].
    - 1) <Insert manufacturer's name; product name or designation>.

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- d. Topcoat: Epoxy, high-build, low gloss[, **MPI #108**].
  - 1) <Insert manufacturer's name; product name or designation>.
3. Epoxy over Self-Priming Epoxy System [**MPI INT 5.1V**]:
  - a. Prime Coat: Epoxy, high build, self-priming [, **MPI #120**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Epoxy, matching topcoat.
  - c. Topcoat: Epoxy, gloss[, **MPI #77**].
    - 1) <Insert manufacturer's name; product name or designation>.
4. Epoxy, High-Build System [**MPI INT 5.1Y**]:
  - a. Prime Coat: Primer, epoxy, anti-corrosive, for metal[, **MPI #101**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: High-build epoxy, matching topcoat.
  - c. Topcoat: High-build epoxy, low gloss[, **MPI #108**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - d. Topcoat: High-build epoxy, gloss[, **MPI #98**].
    - 1) <Insert manufacturer's name; product name or designation>.
5. Epoxy Deck Coating System [**MPI INT 5.1LL**]:
  - a. Prime Coat: Primer, epoxy, anti-corrosive, for metal[, **MPI #101**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Epoxy, gloss[, **MPI #77**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - c. Topcoat: Epoxy deck coating (slip resistant)[, **MPI #82**].
    - 1) <Insert manufacturer's name; product name or designation>.
6. Epoxy-Modified Latex System [**MPI INT 5.1K**]:
  - a. Prime Coat: Primer, rust inhibitive, water based[, **MPI #107**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Epoxy-modified latex, interior, matching topcoat.

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- c. Topcoat: Epoxy-modified latex, semi-gloss (MPI Gloss Level 5)[, **MPI #215**].
  - 1) <Insert manufacturer's name; product name or designation>.
- d. Topcoat: Epoxy-modified latex, gloss (MPI Gloss Level 6)[, **MPI #115**].
  - 1) <Insert manufacturer's name; product name or designation>.
- 7. Pigmented Polyurethane over Epoxy Primer System [**MPI INT 5.1F**]:
  - a. Prime Coat: Primer, epoxy, anti-corrosive, for metal[, **MPI #101**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Polyurethane, two component, pigmented, matching topcoat.
  - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
    - 1) <Insert manufacturer's name; product name or designation>.
- 8. Pigmented Polyurethane over High-Build Epoxy System [**MPI INT 5.1G**]:
  - a. Prime Coat: Primer, epoxy, anti-corrosive, for metal[, **MPI #101**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Epoxy, high build[, **MPI #108**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
    - 1) <Insert manufacturer's name; product name or designation>.
- 9. Pigmented Polyurethane over Self-Priming Epoxy System [**MPI INT 5.1U**]:
  - a. Prime Coat: Epoxy, high build, self-priming [, **MPI #120**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Polyurethane, two component, pigmented, matching topcoat.
  - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
    - 1) <Insert manufacturer's name; product name or designation>.
- 10. Pigmented Polyurethane over Inorganic Zinc and Epoxy System [**MPI INT 5.1H**]:
  - a. Prime Coat: Primer, zinc rich, inorganic[, **MPI #19**].

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- 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Epoxy, gloss[, **MPI #77**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
    - 1) <Insert manufacturer's name; product name or designation>.
11. Pigmented Polyurethane over Epoxy Zinc-Rich and Epoxy System [**MPI INT 5.1J**]:
- a. Prime Coat: Primer, zinc rich, epoxy[, **MPI #20**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Epoxy, gloss[, **MPI #77**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, **MPI #72**].
    - 1) <Insert manufacturer's name; product name or designation>.
- G. Galvanized-Metal Substrates:
1. Epoxy over Epoxy Primer System [**MPI INT 5.3D**]:
    - a. Prime Coat: Primer, epoxy, anti-corrosive, for metal[, **MPI #101**].
      - 1) <Insert manufacturer's name; product name or designation>.
    - b. Intermediate Coat: Epoxy, matching topcoat.
    - c. Topcoat: Epoxy, gloss[, **MPI #77**].
      - 1) <Insert manufacturer's name; product name or designation>.
  2. Epoxy over Vinyl Wash Primer and Epoxy Primer System [**MPI INT 5.3E**]:
    - a. Prime Coat: Primer, vinyl wash[, **MPI #80**].
      - 1) <Insert manufacturer's name; product name or designation>.
    - b. Intermediate Coat: Primer, epoxy, anti-corrosive, for metal[, **MPI #101**].
      - 1) <Insert manufacturer's name; product name or designation>.
    - c. Topcoat: Epoxy, gloss[, **MPI #77**].

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1) <Insert manufacturer's name; product name or designation>.

H. Aluminum (Not Anodized or Otherwise Coated) Substrates:

1. Epoxy System [MPI INT 5.4B]:

a. Prime Coat: Primer, vinyl wash[, MPI #80].

1) <Insert manufacturer's name; product name or designation>.

b. Intermediate Coat: Epoxy, matching topcoat.

c. Topcoat: Epoxy, gloss[, MPI #77].

1) <Insert manufacturer's name; product name or designation>.

2. Pigmented Polyurethane System [MPI INT 5.4C]:

a. Prime Coat: Primer, vinyl wash[, MPI #80].

1) <Insert manufacturer's name; product name or designation>.

b. Intermediate Coat: Epoxy, gloss[, MPI #77].

1) <Insert manufacturer's name; product name or designation>.

c. Topcoat: Polyurethane, two-component, pigmented, gloss (MPI Gloss Level 6)[, MPI #72].

1) <Insert manufacturer's name; product name or designation>.

I. Copper Substrates:

1. Epoxy System [MPI INT 5.5B]:

a. Prime Coat: Primer, vinyl wash[, MPI #80].

1) <Insert manufacturer's name; product name or designation>.

b. Intermediate Coat: Epoxy, matching topcoat.

c. Topcoat: Epoxy, gloss[, MPI #77].

1) <Insert manufacturer's name; product name or designation>.

2. Pigmented Polyurethane System [MPI INT 5.5C]:

a. Prime Coat: Primer, vinyl wash[, MPI #80].

1) <Insert manufacturer's name; product name or designation>.

b. Intermediate Coat: Epoxy, gloss[, MPI #77].

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- 1) <Insert manufacturer's name; product name or designation>.
  - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, MPI #72].
    - 1) <Insert manufacturer's name; product name or designation>.
- J. Stainless-Steel Substrates:
1. Epoxy System [MPI INT 5.6C]:
    - a. Prime Coat: Primer, vinyl wash[, MPI #80].
      - 1) <Insert manufacturer's name; product name or designation>.
    - b. Intermediate Coat: Epoxy, matching topcoat.
    - c. Topcoat: Epoxy, gloss[, MPI #77].
      - 1) <Insert manufacturer's name; product name or designation>.
  2. Pigmented Polyurethane System [MPI INT 5.6D]:
    - a. Prime Coat: Primer, vinyl wash[, MPI #80].
      - 1) <Insert manufacturer's name; product name or designation>.
    - b. Intermediate Coat: Epoxy, gloss[, MPI #77].
      - 1) <Insert manufacturer's name; product name or designation>.
    - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, MPI #72].
      - 1) <Insert manufacturer's name; product name or designation>.
- K. Wood Substrates: Glued-laminated construction.
1. Epoxy System [MPI INT 6.1L]:
    - a. Prime Coat: Epoxy, matching topcoat.
    - b. Intermediate Coat: Epoxy, matching topcoat.
    - c. Topcoat: Epoxy, gloss[, MPI #77].
      - 1) <Insert manufacturer's name; product name or designation>.
  2. Pigmented Polyurethane System [MPI INT 6.1E]:
    - a. Prime Coat: Polyurethane, two component, pigmented, matching topcoat.
    - b. Intermediate Coat: Polyurethane, two component, pigmented, matching topcoat.
    - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, MPI #72].

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- 1) <Insert manufacturer's name; product name or designation>.
- L. Wood Substrates: [Wood trim] [Architectural woodwork] [Doors] [Windows] [and] [wood board paneling].
1. Epoxy System [MPI INT 6.3L]:
    - a. Prime Coat: Epoxy, matching topcoat.
    - b. Intermediate Coat: Epoxy, matching topcoat.
    - c. Topcoat: Epoxy, gloss[, MPI #77].
    - 1) <Insert manufacturer's name; product name or designation>.
- M. Fiberglass Substrates:
1. Epoxy System [MPI INT 6.7D]:
    - a. Prime Coat: Epoxy, matching topcoat.
    - b. Intermediate Coat: Epoxy, matching topcoat.
    - c. Topcoat: Epoxy, gloss[, MPI #77].
    - 1) <Insert manufacturer's name; product name or designation>.
  2. Pigmented Polyurethane System [MPI INT 6.7E]:
    - a. Prime Coat: Epoxy, gloss[, MPI #77].
    - 1) <Insert manufacturer's name; product name or designation>.
    - b. Intermediate Coat: Epoxy, matching prime coat.
    - c. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6)[, MPI #72].
    - 1) <Insert manufacturer's name; product name or designation>.
  3. Epoxy-Modified Latex System [MPI INT 6.7F]:
    - a. Block Filler: Block filler, latex, interior/exterior[, MPI #4].
    - 1) <Insert manufacturer's name; product name or designation>.
    - b. Intermediate Coat: Epoxy-modified latex, interior, matching topcoat.
    - c. Topcoat: Epoxy-modified latex, semi-gloss (MPI Gloss Level 5)[, MPI #215].
    - 1) <Insert manufacturer's name; product name or designation>.
    - d. Topcoat: Epoxy-modified latex, gloss (MPI Gloss Level 6)[, MPI #115].
    - 1) <Insert manufacturer's name; product name or designation>.
- N. [Gypsum Board] [Plaster] Substrates:

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1. Epoxy System [**MPI INT 9.2E**]:
  - a. Prime Coat: Primer sealer, latex, interior[, **MPI #50**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Epoxy, matching topcoat.
  - c. Topcoat: Epoxy, gloss[, **MPI #77**].
    - 1) <Insert manufacturer's name; product name or designation>.
2. Epoxy, High-Build System [**MPI INT 9.2N**]:
  - a. Prime Coat: Primer sealer, latex, interior[, **MPI #50**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: High-build epoxy, matching topcoat.
  - c. Topcoat: High-build epoxy, low gloss[, **MPI #108**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - d. Topcoat: High-build epoxy, gloss[, **MPI #98**].
    - 1) <Insert manufacturer's name; product name or designation>.
3. Epoxy-Modified Latex System [**MPI INT 9.2F**]:
  - a. Prime Coat: Primer sealer, latex, interior[, **MPI #50**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - b. Intermediate Coat: Epoxy-modified latex, matching topcoat.
  - c. Topcoat: Epoxy-modified latex, semi-gloss (MPI Gloss Level 5)[, **MPI #215**].
    - 1) <Insert manufacturer's name; product name or designation>.
  - d. Topcoat: Epoxy-modified latex, gloss (MPI Gloss Level 6)[, **MPI #115**].
    - 1) <Insert manufacturer's name; product name or designation>.

END OF SECTION 099600



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## SECTION 104413 - FIRE PROTECTION CABINETS

### 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. Fire-protection cabinets for the following:
    - a. Portable fire extinguishers.
- B. Related Requirements:
  - 1. Section 104416 "Fire Extinguishers."

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semirecessed-, or surface-mounting method and relationships of box and trim to surrounding construction.
- B. Shop Drawings: For fire-protection cabinets. Include plans, elevations, sections, details, and attachments to other work.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

#### 1.5 COORDINATION

- A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

## 1.6 SEQUENCING

- A. Apply decals and vinyl lettering on field-painted fire-protection cabinets after painting is complete.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

### 2.2 FIRE-PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
  1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
    - a. **JL Industries, Inc.; a division of the Activar Construction Products Group or similar, "Ambassador" with glass front. Nominal inside dimensions 27" H x 12" W x 8"D..**
- B. Cabinet Construction:
  1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from **0.043-inch- (1.09-mm-)** thick cold-rolled steel sheet lined with minimum **5/8-inch- (16-mm-)** thick fire-barrier material. Provide factory-drilled mounting holes.
- C. Cabinet Material: Cold-rolled steel sheet.
  1. Shelf: Same metal and finish as cabinet.
- D. Recessed Cabinet:
  1. Exposed Flat Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
- E. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
  1. Square-Edge Trim: **1-1/4- to 1-1/2-inch (32- to 38-mm)** backbend depth.
- F. Cabinet Trim Material: Same material and finish as door.
- G. Door Material: Steel sheet.
- H. Door Style: Center glass panel with frame.

- I. Door Glazing: Tempered float glass (clear).
- J. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
  - 1. Provide projecting door pull and friction latch.
  - 2. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.
- K. Accessories:
  - 1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
  - 2. Lettered Door Handle: One-piece, cast-iron door handle with the word "FIRE" embossed into face.
  - 3. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.
    - a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
      - 1) Location: Applied to cabinet door.
      - 2) Application Process: Pressure-sensitive vinyl letters.
      - 3) Lettering Color: Red.
      - 4) Orientation: Vertical.
- L. Materials:
  - 1. Cold-Rolled Steel: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
    - a. Finish: Baked enamel or powder coat.
    - b. Color: As selected by Architect from full range of industry colors and color densities.
  - 2. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, **[Class 1 (clear)] [Class 2 (tinted, heat absorbing, and light reducing), bronze tint]**.

### 2.3 SECURITY FIRE-PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
  - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
    - a. **JL Industries, Inc.; a division of the Activar Construction Products Group.**
    - b. **Larsens Manufacturing Company.**
    - c. **Potter Roemer LLC.**
- B. Cabinet Construction: .

1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls lined with minimum **5/8-inch- (16-mm-)** thick fire-barrier material.
- C. Cabinet Material: **0.097-inch- (2.45-mm-)** thick steel sheet.
1. Shelf: Same metal and finish as cabinet.
- D. Recessed Cabinet:
1. Exposed Flat Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
- E. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
1. Square-Edge Trim: **1-1/4- to 1-1/2-inch (32- to 38-mm)** backbend depth.
- F. Cabinet Trim Material: Same material and finish as door.
- G. Door Material: **0.097-inch- (2.45-mm-)** thick steel sheet.
- H. Door Style: Solid opaque panel with frame.
- I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated, and as follows:
1. Recessed door pull.
  2. Continuous Hinge: Same material and finish as trim, permitting door to open 180 degrees.
  3. Mechanical Deadlock: Lockbolt retracted and extended by five-tumbler paracentric mogul cylinder; keyed one side.
    - a. Lockbolt: **1-1/2 inches high by 3/4 inch (38 mm high by 19 mm)** thick; **5/8-inch (16-mm)** throw.
- J. Accessories:
1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to security fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
  2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.
    - a. Identify fire extinguisher in security fire-protection cabinet with the words "FIRE EXTINGUISHER."
      - 1) Location: Applied to cabinet door.
      - 2) Application Process: Pressure-sensitive vinyl letters.
      - 3) Lettering Color: Red.
      - 4) Orientation: Vertical.

3. Keys: Three per door lock.

K. Materials:

1. Cold-Rolled Steel: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
  - a. Finish: Baked enamel or powder coat.
  - b. Color: As selected by Architect from full range of industry colors.

2.4 FABRICATION

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
  1. Weld joints and grind smooth.
  2. Provide factory-drilled mounting holes.
  3. Prepare doors and frames to receive locks.
  4. Install door locks at factory.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
  1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum **1/2 inch (13 mm)** thick.
  2. Fabricate door frames of one-piece construction with edges flanged.
  3. Miter and weld perimeter door frames.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire-protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where recessed and semirecessed cabinets will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare recesses for recessed and semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

### 3.3 INSTALLATION

- A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
  - 1. Fire-Protection Cabinets: **54 inches (1372 mm)** above finished floor to top of cabinet.
- B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.
  - 1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semirecessed fire-protection cabinets.
  - 2. Provide inside latch and lock for break-glass panels.
  - 3. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.
- C. Identification: Apply decals and vinyl lettering at locations indicated.

### 3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.
- E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

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## SECTION 104416 - FIRE EXTINGUISHERS

### 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 portable, fire extinguishers and mounting brackets for fire extinguishers.
- B. Related Requirements:

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
- B. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function. Use same designations indicated on Drawings.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

#### 1.6 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.



## 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure of hydrostatic test according to NFPA 10.
    - b. Faulty operation of valves or release levers.
  - 2. Warranty Period: Six years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

### 2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
  - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
    - a. **JL Industries, Inc.; a division of the Activar Construction Products Group** or similar
    - b. "Ambassador" with glass front.
  - 2. Valves: Manufacturer's standard.
  - 3. Handles and Levers: Manufacturer's standard.
  - 4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.
- B. Wet-Chemical Type: UL-rated 2-A:1-B:C:K, 2.5-gal. nominal capacity, with potassium acetate-based chemical in stainless-steel container; with pressure-indicating gage.
- C. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

## 2.3 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or black baked-enamel finish.
  - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
    - a. **JL Industries, Inc.; a division of the Activar Construction Products Group** or similar.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
  - 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
    - a. Orientation: Vertical.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
  - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
  - 1. Mounting Brackets: 54 inches above finished floor to top of fire extinguisher.
- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

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## SECTION 116143 – STAGE DRAPERY

### PART 1 GENERAL

#### 1.1 WORK INCLUDED

- A. This section includes all labor, materials, equipment, and services necessary to manufacture and deliver to job site and install the stage drapery as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Sound and light lock panels on curved walk-along track.
  - 2. G area background panel on straight walk-along track.
- B. It shall be the responsibility of the Stage Drapery Manufacturer to furnish equipment complete in all respects and to provide any additional equipment required to fulfill the intent of these drawings and specifications regardless of whether or not such items are herein specified or indicated.

#### 1.2 GENERAL

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Related work in other Sections
  - 1. Division 11: Theatrical Rigging Systems.
- C. Site Conditions: Contractor shall be responsible for verifying that the job conditions are ready to receive work in this section. Contractor must bring forth any existing conditions that may adversely affect execution of work, so that resolution may be reached before commencement of installation.

#### 1.3 SUBMITTALS

- A. Submittals shall be according to the Conditions of the Contract and Division Specification Sections.
- B. Prior to fabrication, Stage Drapery Manufacturer shall submit for review a 1/2 yard x full width minimum size sample of each color of each fabric type.
  - 1. Each sample shall be provided with labels listing Manufacturer and Manufacturer's identification numbers.
  - 2. Work shall not commence on fabrication until review of samples has been transmitted to the Stage Drapery Manufacturer.
  - 3. Submit Manufacturer's color line samples to the Specifier to verify color selections.
    - a. Dye lot to be guaranteed by Manufacturer.
  - 4. For custom color drapery, submit Manufacturer's lab dip sample matching control sample furnished by Architect.
    - a. Lab dip dye lot to be guaranteed and maintained by Manufacturer after approval.
- C. Prior to providing shop drawings and fabrication, dimensions shall be verified by field measurements.
  - 1. After field measurements are taken, Stage Drapery Manufacturer shall provide information as to exact dimensions of drapery items and areas affecting drapery sizes.
  - 2. This information will be used to coordinate work with other trades and to verify that all drapery items have been accounted for.
  - 3. No extras will be allowed due to the Stage Drapery Manufacturer's misunderstanding as to the amount of work involved or lack of knowledge of any field conditions based on neglect or failure to make field measurements or thorough investigation of the job site.

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- D. Shop Drawings shall be submitted for review before fabrication can begin. Such review does not relieve the Stage Drapery Manufacturer of the responsibility of providing equipment in accordance with this Specification.
  - 1. Shop Drawings shall show each type of curtain track plus the method and equipment to be used in hanging the curtain track.
  - 2. Where items must fit and coordinate with finished surfaces and/or constructed spaces, take measurements at site and not from drawings.
  - 3. Where welded connections or concrete or masonry inserts are required to receive work, shop drawings shall show exact locations required and all such drawings shall be furnished to the trades responsible for installing the connectors or inserts.
  - 4. Catalog work sheets showing illustrated cuts of items may be submitted for standard manufactured items.
- E. Furnish Operations and Maintenance manuals containing "record" shop drawings, operation instructions and recommended maintenance procedures for all equipment, in quantity outlined in Division 01.

#### 1.4 WARRANTY

- A. Manufacturer agrees to make all repairs, including replacement of materials, made necessary due to defects in workmanship and materials without additional cost to the Owner for a period of two (2) years from the date of acceptance.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Division 01 – Work-Related Requirements for transporting, handling, storing, and protecting products.
- B. Bid price shall include full freight and insurance charges for the delivery of all drapery items to the job site.
- C. If, through no fault of the Owner, the timely completion of the work of this section is imperiled, the Drapery Manufacturer shall prevent or minimize any delay by shipping the required products by airfreight, at no additional cost to the Owner.
  - 1. This requirement covers initial delivery of fabrics to the Drapery Manufacturer, and delivery of finished drapery to the job site.
- D. Each drapery item shall be carefully wrapped and sealed tight for shipment in rigid and waterproof wrapping material to insure against impact and water damage during shipment.

#### 1.6 MANUFACTURERS

- A. Manufacturers for work in this section shall include the following:
  - 1. Beck Studios, Inc – Milford, OH
  - 2. BellaTEX Stage Curtains – Jackson, TN
  - 3. iWeiss, Inc. – Fairview, NJ
  - 4. Rose Brand East – Secaucus, NJ
  - 5. Stage Decoration and Supplies – Greensboro, NC
  - 6. Texas Scenic Co. – San Antonio, TX

#### 1.7 INSTALLATION CONTRACTORS

- A. Approved Contractors include:
  - 1. Barbizon Capitol – Alexandria, VA
  - 2. Beck Studios – Milford, OH

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3. Chicago Fly House – Chicago, IL
4. Grand Stage – Chicago, IL
5. InterAmerica Stage, Inc. – Sanford, FL
6. iWeiss – Fairview, NJ
7. Janson Industries Stage Equipment – Canton, OH
8. Mainstage Theatrical Supply – Milwaukee, WI
9. Texas Scenic/Pook, Diemont & Ohl, Inc. – Bronx, NY
10. Tiffin Scenic Studios, Inc. – Tiffin, OH

- B. The drapery installation Contractor shall be the same Contractor that furnishes and installs the following related Division 11 theatrical systems specified on this project:
1. 11 61 33 – Theatrical Rigging Systems

## PART 2 - PRODUCTS

### 2.1 FABRICS

- A. All fabrics shall be inherently flame retardant and shall meet all requirements set forth in NFPA #701, Large and Small Scale.
1. All finished goods shall be furnished by the Stage Drapery Manufacturer to the Owner with proper affidavit of flame proofing in the form acceptable to local authorities.
- B. The following fabrics are approved for drapery use:
2. All drapery in this spec shall be TBD color from manufacturer swatches as chosen by the specifier, using following fabric:
    - a. *Encore*, 22 oz. Trevira CS, 54" wide, IFR, supplied by KM Fabrics, Greenville, SC.

### 2.2 GROMMETS, TIE LINE, AND WEBBING

- A. Grommets shall be #2 or #3 brass type.
- B. Tie lines shall be #4 braided masonry line, 36" long and black in color, unless otherwise noted.
- C. Webbing shall be 3" wide, polypropylene type.

### 2.3 DRAPERY

- A. General:
1. All velour shall be stitched with nylon thread and shall be without flaws, with each width of cloth continuous for the full height of the drapery with no horizontal seams or piercing.
- B. Velour Panels:
1. Each panel shall be sewn with vertical seams and fullness as noted on drapery schedule.
  2. Sew on to webbing 12" o.c. with snap hooks attached with nylon straps and two (2) rivets per hook.
  3. Bottom hem shall be chain pocket: Provide a 6" deep hem at bottom wrapping an internal nylon pocket lined with #8 jack chain. Whip-stitch chain to pocket at 12" intervals to prevent shifting.

### 2.4 DRAPERY SCHEDULES

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- A. Refer to QT series drawings for drapery panel schedule indicating quantity, width, height, and type.
- B. Drapery Manufacturer shall field verify all dimensions prior to fabrication. Any errors in finished size due to failure to properly verify field conditions will result in re-manufacture of any draperies not in compliance, at sole expense of the Manufacturer.
- C. Labeling of each drapery panel shall be by means of a cotton or synthetic duck tag sewn securely to the webbing at top right hand corner of each finished piece. Each tag shall contain the following, marked using indelible black ink:
  - 1. Panel Location (ex: Area C)
  - 2. Panel dimensions (ex: 8'-0"w x 24'-0"h)
  - 3. Material type and weight (ex: 22oz IFR Velour)

## 2.5 CURTAIN TRACKS

- B. Walk Along Curtain Tracks:
  - 1. Furnish and install all hardware required for walk along ADC #140 or H&H #301W curtain track system in lengths and locations as shown on the drawings.
  - 2. System shall be suspended from structure as indicated on drawings, in a manner that is permanent and requires little maintenance.
  - 3. Track shall be in continuous lengths, with minimum number of segments joined to complete the lengths indicated. Provide curves as shown on drawings.
  - 4. Support tracks from building structure at manufacturers recommend spacing as required. Additional supports required at each track bend and switch location.
    - a. Track to be hung with B7 or Grade 5 threaded rod to structural joists.
    - b. Additional steel required to span between structural members to be provided by the stage drapery manufacturer.
  - 5. System shall be furnished complete with all necessary accessories (CWANA), including factory curves (trim to adjust as required), hanging clamps, track splices, master carriers, single carriers, rubber bumpers, and end stops.
    - a. Furnish adequate carriers to serve number of drapery grommets indicated for drapery scheduled at each track system, plus 10% spare carriers.
- C. Verify all track lengths in the field before fabrication.

## PART 3 EXECUTION

### 3.1 GENERAL

- A. Examine all conditions under which all items in the section shall be installed and notify the Construction Manager in writing of any condition detrimental to the proper and timely completion of the installation.
- B. Responsibility for the satisfactory completion of the work in this section shall rest solely and exclusively with the Stage Drapery Manufacturer.
- C. Field verify condition of delivered goods, and repair or replace any components not in factory new condition. All materials shall remain covered or protected from debris, dust, paint, and other site hazards throughout the period between delivery to site and Owner training.
- D. Manufacturer shall be responsible for repairing any damage to jobsite surroundings during installation.
- E. Installation and training shall be supervised by the Stage Drapery Manufacturer's experienced supervisor, who shall have extensive installation experience with systems similar to those specified herein. This same

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supervisor shall remain in charge throughout the entire installation and training process, with exception only for circumstances completely beyond the control of the Manufacturer.

- F. All components shall be installed plumb, straight, and true, and shall function as designed. Anchors, connecting members, brackets, and associated fastening means and methods for properly supporting and bracing equipment shall be furnished and installed following best suitable practice for each condition.
- G. Prior to the completion of the installation, the Stage Drapery Manufacturer shall notify the Construction Manager to arrange on a date for inspection of the system.
  - 1. At the time of the inspection, the Stage Drapery Manufacturer shall furnish sufficient personnel to operate all equipment and to perform adjustments and tests as may be required by the Owner's representatives.
  - 2. Any equipment that fails to meet with the Specifications shall be repaired or replaced with new equipment, and the inspection shall be re-scheduled under the same conditions listed previously.
  - 3. Final review will be withheld until all systems have been thoroughly tested and found to be in first class operating condition in every circumstance.

### 3.2 OWNER TRAINING

- A. Manufacturer's installation Supervisor shall perform Owner training as outlined in Division 01 specifications to include the following:
  - 1. Operation of curtain tracks.
  - 2. Installation, dismantling, and storage of draperies.
  - 3. Care and maintenance.
  - 4. Warranty review.
- B. Documentation of Owner training shall be furnished as outlined in Division 01 specifications.

END OF SECTION 116143

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## SECTION 11 61 73 – THEATRICAL WIRING DEVICES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 WORK OF THIS SECTION

- A. This Section includes all labor, materials, equipment and services necessary to manufacture and deliver to job site, for installation by Electrical Contractor, theatrical wiring devices, including back boxes, as shown on the QT drawings and/or specified herein, including but not limited to the following:
  - 1. Recessed receptacle boxes
- B. It shall be the responsibility of the Theatrical Wiring Device Manufacturer to furnish equipment complete in all respects and to provide any additional equipment required to fulfill the intent of these drawings and specifications regardless of whether or not such items are herein specified or indicated.
- C. Theatrical Wiring Device Manufacturer shall furnish and deliver to job site all items in this Specification under a direct contract let by the Owner.
  - 1. Theatrical Wiring Device Manufacturer shall coordinate delivery with the Electrical Contractor.

#### 1.3 SUBMITTALS

- A. Theatrical Wiring Device Manufacturer shall prepare and submit complete shop drawings according to requirements set forth in the Contract Documents.
- B. Shop drawings shall show bussing for each outlet box and shall utilize the exact circuit numbering method detailed on the drawings.
- C. Furnish catalog cuts, drawings, and/or descriptive material of catalog items as requested by the Architect.
- D. Furnish all of the above for review by the Architect prior to commencing any work.
  - 1. Such review does not relieve the Wiring Device Manufacturer of the responsibility of providing equipment in accordance with this Specification.
- E. Any deviation from this Specification is to be "starred" and noted in letters a minimum 1/4" high.
  - 1. In order for a deviation to be considered it shall upgrade the quality of the equipment or respond to a field condition.
- F. It is the responsibility of the Wiring Device Manufacturer to submit shop drawings on a schedule that allows for adequate time for review. Proposals for contract time extensions due to delayed shop drawing submittals shall not be allowed.

#### 1.4 MANUFACTURING STANDARDS

- A. All work shall be manufactured in accordance with the latest editions of applicable publications and standards of the following organizations:
  - 1. National Electric Code (NEC) and all prevailing local and state regulations
  - 2. National Electrical Manufacturers Association (NEMA)



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3. Occupational Safety & Health Act (OSHA)

- B. All applicable products shall bear label of Underwriters Laboratories (UL).
- C. All equipment shall be thoroughly tested in Manufacturer's shop prior to shipment to insure mechanical and electrical integrity.

1.5 LABELING

- A. All theatrical wiring devices shall be permanently identified with means and methods as noted on the drawings and elsewhere in this specification.
- B. Each faceplate and back box shall be tagged with a removable label identifying the WD box number.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Delivery shall be as required in Construction Documents.
- B. The Theatrical Wiring Device Manufacturer shall coordinate delivery of all equipment with the Construction Manager and/or Electrical Contractor.
- C. Theatrical Wiring Device Manufacturer shall, if requested by the Construction Manager and/or Electrical Contractor, deliver theatrical wiring devices items in the following two (2) separate shipments:
  - 1. Shipment #1: Shipment shall include back boxes for all theatrical wiring device items so that the Electrical Contractor may terminate all conduit.
  - 2. Shipment #2: Shipment shall include faceplates for all theatrical wiring device items.
  - 3. Theatrical Wiring Device Manufacturer shall notify the Construction Manager and/or Electrical Contractor 24 hours prior to delivery of equipment.
- D. Deliver all material to the job site suitably crated, packed, and protected.
  - 1. Each crate or carton shall be clearly marked on the outside with the Manufacturer's identification label and the nomenclature of the product contained within.
- E. Bid price shall include full freight and insurance charges for all items to the job site.
- F. If, through no fault of the Owner, the timely completion of the work of this section is imperiled, the Wiring Device Manufacturer shall prevent or minimize any delay by shipping the required products to the job site by air freight at no additional cost to the Owner.

1.7 WARRANTY

- A. The Wiring Device Manufacturer shall assure that this equipment is provided free of defects in materials and workmanship and shall provide a warranty under this contract for a period of two (2) years from the date of final acceptance.
- B. During the warranty period, repair or replacement of defective materials and/or repair of faulty workmanship shall be provided, at no cost to the Owner, within ten (10) days written notice of the defect(s).

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1.8 THEATRICAL WIRING DEVICE MANUFACTURERS

A. Theatrical Wiring Device Manufacturers for work of this section shall include:

1. Altman Lighting  
57 Alexander St.  
Yonkers, NY 10701  
Contact: Nick Champion nchampion@altmanltg.com  
800-425-8626
2. Electronic Theatre Controls (ETC)  
3031 Pleasant View Road  
Middleton, WI 53562  
Contact: Randy Pybas randy.pybas@etconnect.com  
Joe DiNardo joe.dinardo@etconnect.com  
Heidi Bowers heidi.bowers@etconnect.com  
Rob Raff rob.raff@etconnect.com  
Sylvia Sinclair sylvia.sinclair@etconnect.com  
800-688-41163
3. Lex Products  
15 Progress Dr.  
Shelton, CT 06484  
Contact: Tom Siko tsiko@lexproducts.com  
800-643-4460
4. Performance Electric Inc.  
126A McDougall Ct.  
Greenville, SC 29607  
Contact: Larry Easterday save@performancedistro.com  
864-288-2021
5. SSRC  
170 Fortis Dr.  
Duncan, SC 29334  
Contact: Aaron Clark aclark@ssronline.com  
864-848-9770
6. Stagecraft Industries Inc.  
5051 N. Lagoon Ave.  
Portland, OR 97217  
Contact: Kevin Shetterly kevins@stagecraftindustries.com  
503-286-1600

PART 2 - PRODUCTS

2.1 RECESSED AND SURFACE MOUNT RECEPTACLE BOXES

- A. Provide recessed and surface mount receptacle boxes as listed herein and shown on the drawings.
- B. Steel face plates with receptacles shall be constructed of minimum 18-gauge steel, painted black.
  1. Provide mounting holes on faceplate.
  2. White circuit numbers, 1/4" in height, shall be engraved directly into a black lamicoïd or plastic laminate label plate attached with non-corroding screw fasteners or rivets.

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- C. Provide solid copper buss bars for each receptacle plate as follows:
  - 1. Adjacent neutral pairs for each circuit.
  - 2. Adjacent hot leg pairs for each circuit.
  - 3. Grounds for each receptacle plate.
- D. Boxes shall be prewired with 125° Celsius high temperature wire to molded barrier terminal blocks.
- E. Connectors shall be standard 20A standard Edison parallel blade U ground connectors flush type as shown on the drawings.
- F. Back boxes for surface and recessed mounted receptacle boxes shall be constructed of minimum 18-gauge steel, painted black.

END OF SECTION

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SECTION 11 61 83 – THEATRICAL INTEGRATED LIGHTING CONTROL SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section includes all labor, materials, equipment and services necessary to manufacturer and deliver to job site, for installation by Electrical Contractor, a complete electronic control and dimming system as shown on the drawings and/or specified herein, including but not limited to the following:
  - 1. Two (2) permanent relay panels, mains fed for stage and house lighting.
  - 2. Ethernet control system equipment rack, Ethernet taps, DMX splitters, and associated equipment.
  - 3. Computerized stage lighting control computer interface and associated software.
  - 4. Occupancy sensors.
- B. It shall be the responsibility of the Dimming System Manufacturer to furnish equipment complete in all respects and to provide any additional equipment required to fulfill the intent of these drawings and specifications regardless of whether or not such items are herein specified or indicated.

1.2 SUBMITTALS

- A. Dimming System Manufacturer shall prepare and submit complete shop drawings according to the requirements set forth in the Contract Documents.
- B. Shop drawings shall be reviewed by the Architect before fabrication shall begin.
  - 1. Such review does not relieve the Dimming System Manufacturer of the responsibility of providing equipment in accordance with this Specification.
- C. Shop drawings shall show optical or transformer isolation of all control data lines from dimmer rack to dimmer rack and dimmer rack to control equipment.
- D. Shop drawings shall show materials, finishes, metal gauges, overall and detail dimensions, sizes, electrical and mechanical connections, fasteners, welds, provisions for the work of others, and similar information.
- E. Shop drawings shall indicate complete details of equipment, including manufacturer's catalog numbers for components, and shall include complete wiring diagrams.
- F. Any deviation from this Specification shall be "starred" and noted in letters a minimum 1/4" high.
  - 1. In order for a deviation to be considered, it shall upgrade the quality of the equipment or respond to a field condition.
- G. The reviewed shop drawings shall be updated to show any changes made during manufacturing and assembly and shall be sent to the Architect before the equipment is delivered.
- H. Dimming System Manufacturer shall provide installation instructions for all equipment. These instructions shall include connection diagrams, termination designations, etc.
- I. After the installation is complete, the Dimming System Manufacturer shall provide the Owner with Operations and Maintenance Manuals not more than fourteen (14) days after the checkout is completed.
  - 1. One (1) O&M manual shall be a printed "hard" copy and O&M manual shall also be provided in electronic format on two (2) flash drives.
  - 2. Each O&M manual shall include, but not be limited to, the following:
    - a. Instruction manual for each control console type. Console instruction manuals may be requested by the Owner's Representative at a date prior to the system checkout

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- b. Copies of all "record" shop drawings.
  - c. Catalog cuts of dimmers and control console.
  - d. Recommendations for periodic maintenance.
  - e. Catalog numbers and manufacturer's names and addresses for perishable items such as pilot lamps and fuses.
  - f. Diagnostic procedures.
  - g. World Wide Web address for on-line access to manuals, product literature, and troubleshooting guides.
  - h. Emergency and normal repair telephone contact sheet for 7-day, 24-hour service.
3. Dimming System Manufacturer shall provide the Owner with three (3) instruction manuals for each control console type.
- a. Instruction manual shall be supplied to the Owner's Representative on the day of the dimming system checkout.
  - b. Instruction manuals may be requested by the Owner's Representative at a date prior to the system checkout.

### 1.3 LABELING

- A. All dimming system items shall be permanently identified with means and methods as noted on the drawings and elsewhere in this specification.
- B. Each faceplate and back box shall be tagged with a removable label identifying the device or box "number".

### 1.4 DELIVERY

- A. Delivery shall be as required in Construction Documents.
- B. The Dimming System Manufacturer shall coordinate delivery of all equipment with the Construction Manager and/or Electrical Contractor.
- C. If required by the Construction Manager/General/Electrical Contractor, Dimming System equipment shall be delivered in a minimum of three (3) separate shipments that shall include:
  1. Shipment #1: All items in which conduit is terminated which includes dimmer racks, control station back boxes, etc.
  2. Shipment #2: All items in which wiring is terminated including control station faceplates, etc.
  3. Shipment #3: All items that are not required until system activation by the Dimming Manufacturer's field service representative. This shall include dimmer modules, electronics modules, control console, gateways, monitors, cables, etc.
- D. Dimming System Manufacturer shall deliver all material to the job site suitably crated, packed, and protected, and bearing the manufacturer's identification label and the name of the product(s) found in each carton or crate.

### 1.5 JOB SUPERVISION

- A. When Contractor wiring is complete, the Dimming System Manufacturer shall send an engineering representative or a field service technician to the job site and prior to energizing the system to test and adjust the system.

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- B. Engineering representative or other manufacturer designated person shall instruct designated Owner's representatives in operation and maintenance of the dimming system, particularly the control console and light manager editing software.
  - 1. Instruction shall be two (2) days or a total of eight (8) hours in length.
  - 2. Dimming System Manufacturer shall schedule this instruction with the Construction Manager or Owner's designated representatives.
  - 3. Instruction shall not necessarily follow immediately after the system check-out and activation.
  - 4. Instruction shall be independent of the system check-out and activation. Length of engineering check-out and activation shall not affect the length of instruction time.

#### 1.6 WARRANTY

- A. Dimming System Manufacturer agrees to make all repairs, including replacement of components and parts, made necessary due to defects in design, workmanship, and materials without additional cost to the Owner for a period of two (2) years from the date of acceptance of the completed system.
- B. In the event of a system failure during the warranty period, manufacturer agrees to send to the job the necessary field service technician(s) within twenty-four (24) hours of notification.
  - 1. Technician(s) shall remain on the job until all necessary repairs have been made and the system is operational to the satisfaction of the Owner.

#### 1.7 OWNER TRAINING

- A. Manufacturer's authorized technician shall perform Owner training to include the following:
  - 1. Minimum of two (2) separate training sessions with Owner, as follows:
    - a. First session shall occur at conclusion of startup and system commissioning, and shall include four (4) hours training time with Owner representatives. This session shall include the following general subjects, but shall be tailored to Owner's preference at time of training:
      - 1) General system overview.
      - 2) Routine care and maintenance.
      - 3) Operation of basic panel functions, including presets, overrides, module types.
      - 4) Console introduction and basic programming.
      - 5) Configuration, programming and operation of the LED stage lighting fixtures. Fixtures provided by the owner.
    - b. Second session shall occur no less than two weeks following substantial completion, but within one month of initial training. This session shall include up to an additional four (4) hours training time with Owner representatives. This session shall include the following general subjects, but shall be tailored to Owner's preference at time of training:
      - 1) In-depth console operation and programming.
      - 2) Other review as requested by Owner.

#### 1.8 DIMMING SYSTEM MANUFACTURER

- A. The basis of design manufacturer for the work of this section shall be the following:
  - 1. Subject to compliance with Specifications, the basis of design manufacturer for the equipment in this section is:
    - a. Electronic Theatre Controls (ETC)  
3031 Pleasant View Rd.  
Middleton, WI 53562  
Contact: Heidi Bowers heidi.bowers@etconnect.com  
800-688-4116

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- B. Equal Manufacturers:
1. Subject to compliance with Specifications, the following Manufacturers are also approved to submit on this project:
    - a. Philips Strand Lighting  
Contact: Charlie Hulme [Charlie.hulme@philips.com](mailto:Charlie.hulme@philips.com)  
702-845-0830
  2. Subject to Division 01 Specifications, other manufacturers may submit for consideration must show conformance to project Specifications and system design requirements.
  3. Final determination of suitability shall be determined at the discretion of the Specifier.

## PART 2 PRODUCTS

### 2.1 LIGHTING CONTROL RELAY PANELS (LCP)

- A. General:
1. Each relay panel shall consist of 24 module spaces. System shall be UL listed and labeled.
- B. Physical:
1. Cabinets and Enclosures: NEMA 1 enclosure sized to accept required relays. Surface mounted cover as required with captive screws in a hinged, lockable configuration.
  2. Interior: Interiors shall be provided with installed and tested relays or dimming and interface modules.
  3. Panel shall be provided with expansion space for ease of installation of other system components (ex. time clock and/or photocell controller). Terminals shall be included in the interior to accept a communication line for the connection of communication line switches to the system, or to allow a communication line to be run between multiple panels for network communications.
  4. Furnish voltage barrier separation between line and control wiring.
- C. Electrical:
1. Power Supply: Transformer assembly include internal overcurrent protection with automatic reset and metal oxide varistor protection against power line spikes.
  2. Relays: Momentary-pulsed mechanically latching contactors with plug in connector. Relays shall have mechanically latching contacts with single moving part design for improved reliability. Relays will have the following characteristics:
    - a. Coil:
      - 1) Magnetically held, momentary coil activation (50 milliseconds)
      - 2) 2.2 VA max per relay to allow up to 20 relays to be controlled in parallel using class 2 wiring.
      - 3) Split coil - ½ for ON, ½ for OFF.
    - b. Power Contacts:
      - 1) 20-amp tungsten and NEMA electronic ballast rated.
      - 2) Rated for 50,000 ON/OFF cycles at full load.
      - 3) Support #10 - #14 AWG solid or stranded wire.
      - 4) 120 and 277 volt rated.
      - 5) 30 VAC Isolated contacts for status feedback and pilot light indication.
      - 6) FCC approved for commercial and residential use.
- D. Control Electronics:
1. Control electronics shall be integral to the panel, providing network and user interface to discrete relays in the panel.
  2. User interface shall be by means of an LCD display and keypad located on the face of the module. This interface shall permit rack configuration, preset control, status, error indications, and diagnostic functions. Status LEDs shall indicate presence of Power, Network connection, and DMX signal.

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3. Control and communication signals shall be accommodated by means of system network and DMX512 interfaces.
  - a. The system network interface shall serve as primary integrating means between the rack electronics and the lighting control network, and shall also support remote configuration, file storage, playback, and monitoring capabilities from other devices on the network.
  - b. There shall be at least one (1) optically isolated DMX512 input and one (1) optically isolated DMX512 output per panel.
4. Furnish ride-through power supply to permit electronics to remain energized during short duration loss of power.
5. Furnish a power monitoring device and tap kit to sense voltage on the three-phase input.
6. Furnish one (1) 24 circuit 0-10v control option card for control of house lighting.

## 2.2 LIGHTING CONTROL NETWORK AND INTERFACE:

### A. General:

1. Furnish and install a complete lighting control network system, capable of supporting the specified dimming and relay racks, stage lighting control console, architectural control stations, occupancy sensors, time and calendar schedules, and related network devices indicated on the drawings and in this Specification.
2. The network shall use category 5E, category 6 or Manufacturer approved STP control wiring distribution to communicate between control consoles, dimmer racks and DMX devices.
3. Manufacturer specified wiring and topology shall be used to communicate with control stations, sensor devices and relay panels.

### B. Network Components:

1. Control Processors:
  - a. Furnish an architectural processor as required to interface dimmer rack, lighting control relay panels, control stations, sensors, system I/O contacts, and any appurtenant devices or equipment required for system to function fully as intended. Processor shall provide necessary programming interface for setup and configuration of system and system components.
2. Ethernet switches:
  - a. All Ethernet signal cables terminating at the switch location shall be outfitted with RJ45 connectors as necessary to permit user patching where required. This includes signals to Ethernet Tap receptacles, dimmers, and relay panels.
3. DMX signal splitters:
  - a. ANSI/USITT E1.1-2008 compliant DMX512 opto-isolating splitters, in quantity and configuration of inputs and outputs as required for system.
  - b. All DMX signal cables terminating at the splitter location shall be outfitted with 5-pin XLR connectors as necessary to permit user patching where required. This includes signals to DMX node receptacles, dimmers, and relay panels.
4. Equipment Racks:
  - a. Wall mounted 19" equipment rack with mounting rails, hinged locking door, and sized to accommodate all required processing equipment including that indicated above. Furnish in quantities shown on drawings plus any additional required for complete system.
  - b. Each rack shall have minimum of one four-space contiguous blank section with cover plate for future equipment addition.
  - c. Each rack shall be furnished with a three-space pull out drawer for storage of manuals, patch cabling, and user notes.
  - d. Racks shall be Middle Atlantic EWR series or equal.
  - e. Coordinate electrical power connections for rack contents.
5. Ethernet cabling:



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- a. Ethernet cabling used in theatrical lighting control network shall have the following properties:
  - 1) Comply with NEMA WC-63.1 Category 5e, UL verified.
  - 2) Comply with TIA 568.C.2.
6. DMX Network Cabling:
  - a. Furnish and install 5-pin XLR M/F DMX jumper patch cables as necessary to fully patch between all DMX-512 splitter ports and DMX patch points, racks, or other DMX devices at equipment racks.
  - b. Furnish additional 5-pin XLR M/F DMX jumper cables to allow connection of DMX node devices to portable dimmer bars, luminaires, and other devices in the performance spaces. Refer to Theatrical Lighting Fixtures and Accessories Schedule on drawings for lengths and quantities to be furnished.
7. Input/Output devices for communication with other systems:
  - a. Furnish RS-232 communication interface for connection with audio-visual network.
  - b. Furnish minimum four (4) dry contact closures configurable as input or output signals, to connect with fire alarm system, effects controls, shading systems, and future interfaces.
8. Wireless Access Port
  - a. Furnish a wireless access port configured to allow remote control of the system from an owner-furnished portable device, such as an iPad or iPhone.
9. Occupancy/vacancy sensors
  - a. Furnish occupancy sensors to interface with architectural control processor.
  - b. Each sensor shall have adequate range to sense movement at 4' above the finished floor for the entire area (A-G) in which the sensor is located.

## 2.3 CONTROL INTERFACE

- A. Provide software and one (1) control interface from computer-based software to DMX system:
  1. Minimum 500 control channels and minimum 1024 DMX outputs.
  2. Provide one dongle for control software.
  3. Computer to be provided by owner.

## 2.4 CONTROL STATIONS

- A. General
  1. Control stations shall be touch screen and/or preset type with pushbuttons acting as ON/OFF controls.
    - a. Control station shall have an LED constantly illuminated when the system is powered.
    - b. When circuit is activated, LED shall be illuminated on every control station capable of controlling that circuit.
  2. Control station faceplates shall be in color shown on the drawings with engravings as noted.
  3. Control faceplate pushbutton labels shall be as scheduled on the drawings and verified in shop drawings.
  4. All control station back boxes and associated hardware shall be provided by the Dimming System Manufacturer and painted black.
  5. A label identifying the control station "number" shall be provided inside each control station back box and on the back of each control station faceplate.

END OF SECTION

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## SECTION 11 61 93 – STAGE RIGGING SYSTEM

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 WORK OF THIS SECTION

- A. This Section includes all labor, materials, equipment, and services necessary to furnish and install the Stage Rigging System as shown on the QT drawings and/or specified herein, including but not limited to the following:
  - 1. Eight (8) straight dead-hung lighting positions
  - 2. Miscellaneous equipment listed herein, for installation by others.
- B. It shall be the responsibility of the Rigging System Contractor to furnish equipment complete in all respects and to provide any additional equipment required to fulfill the intent of these drawings and specifications regardless of whether or not such items are herein specified or indicated.

#### 1.3 PROJECT CONDITIONS

- A. All dimensions shall be verified in the field prior to fabrication by the Stage Rigging Contractor, who shall make at least one (1) visit to the job site prior to preparation of shop drawings.
- B. No extras will be allowed due to the Stage Rigging Contractor's misunderstanding of the work involved or its lack of knowledge of any field conditions due to failure to make accurate field measurements or a thorough investigation of the job site.

#### 1.4 SUBMITTALS

- A. Stage Rigging Contractor shall prepare and submit complete shop drawings according to the requirements set forth in the Contract Documents.
- B. Shop Drawings shall be submitted for review by the Architect before fabrication can begin. Such review does not relieve the Stage Rigging Contractor of the responsibility of providing equipment in accordance with this Specification.
- C. Shop Drawings:
  - 1. Shop Drawings shall show dimensions, sizes, gauges, thicknesses, finishes, joining, attachments and relationship of work to adjoining construction.
  - 2. Shop Drawings shall clearly show power, wire, and conduit requirements for all work to be provided by the Stage Rigging Contractor.
  - 3. Where items must fit and coordinate with finished surfaces and/or constructed spaces, take measurements at site and not from drawings.
  - 4. Where other materials must be set to exact locations to receive rigging, furnish assistance and directions necessary to permit other trades to locate their work.
  - 5. Where welded connections, concrete or masonry inserts are required to receive work, shop drawings shall show exact locations required and all such drawings shall be furnished to the trades responsible for installing the connectors or inserts.

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6. Show locations of all lubrication points.
  7. Shop drawings for motorized equipment shall include engineering and load calculations as well as stamp and seal of a registered professional engineer.
  8. Catalog work sheets showing illustrated cuts of items may be submitted for standard manufactured items.
  9. Shop drawings shall include a copy of the installation superintendent's ETCP Certified Rigger - Theatre certification. A copy of the installation superintendent's ETCP certification shall be available on the job site for the length of the installation.
- D. Any deviation from this Specification shall be "starred" and noted in letters a minimum 1/4" high.
1. In order for a deviation to be considered, it must upgrade the quality of the equipment or respond to a field condition.
- E. The Stage Rigging Contractor shall, if requested by the Owner or Architect, furnish satisfactory evidence as to the kind and quality of materials he proposes to furnish by submission of exact samples of hardware to be used in this contract.
1. The samples shall be retained by the Owner until such time that this contract has been completed and accepted.
- F. Upon completion of installation, Stage Rigging Contractor shall provide Operation and Maintenance manuals that shall include "record" shop drawings, parts lists, operational instruction, service/maintenance recommendations, component working load limits, etc.
1. One (1) O&M manual shall be a printed "hard" copy.
  2. O&M manual shall also be provided in electronic format on two (2) flash drives.

#### 1.5 WARRANTY

- A. The Stage Rigging Contractor shall assure that the rigging is properly installed, free of defects in materials and workmanship and shall provide a warranty on all equipment and workmanship provided under this contract for a period of two (2) years from the date of the final acceptance.
- B. During the warranty period, repair or replacement of defective materials and faulty workmanship shall be provided, at no cost to the Owner, within ten (10) days of written notification of defects(s).
- C. Post Installation Safety Inspection:
1. One year after the date of final acceptance by the Owner, the Stage Rigging Contractor shall return to the job site to conduct a thorough inspection of the rigging installation.
    - a. All bolts shall be checked and tightened as required, cables and all cable connections inspected and all items given a thorough safety inspection.
    - b. All damage not caused by negligence on the part of the Owner shall be repaired and/or replaced.
  2. All materials, superintendent labor, transportation and living expenses for this work shall be furnished by the Stage Rigging Contractor at no additional cost to the Owner.
    - a. The inspection and repair work shall be conducted during normal working hours at a time mutually agreed upon by the Owner and the Stage Rigging Contractor.
  3. Within two (2) weeks of the completion of the inspection, the Stage Rigging Contractor shall provide the Owner and Architect with a written report stating the findings of the inspection.

#### 1.6 STAGE RIGGING MANUFACTURERS / STAGE RIGGING CONTRACTORS

- A. The Stage Rigging Contractor shall have been continuously engaged in the production of theatrical stage rigging equipment for at least fifteen (15) years.

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- B. The Stage Rigging Contractor shall have installed a total of not less than five (5) installations of equal or greater scope to system specified herein, which have been in service for a minimum of one (1) year and a maximum of ten (10) years.
1. Each of the listed stage rigging installations shall be in service in fully professional commercial theatres being operated by professional technicians.
- C. Stage Rigging Manufacturers for work of this section shall include:
1. H&H Specialties Inc.  
14850 Don Julian Road, Suite B  
City of Industry, CA 91746  
Contact: Reid Neslage      reid@hhspecialties.com  
800-221-9995
  2. I. Weiss  
815 Fairview Avenue, Unit 10  
Fairview, NJ 07022  
Contact: Jennifer Tankleff      JenniferT@iweiss.com  
888-325-7192
  3. J.R. Clancy, Inc.  
7041 Interstate Island Rd.  
Syracuse, NY 13209  
Contact: Mike Murphy      mikemurphy@jrclancy.com  
800-836-1885
  4. PROTECH Theatrical Services  
3431 North Bruce Street  
North Las Vegas, NV 89030  
Contact: Will Brants      wbrants@protechlv.com  
800-232-9336
  5. Stagecraft Industries Inc.  
5051 N. Lagoon Ave.  
Portland, OR 97217  
Contact: Kevin Shetterly      kevins@stagecraftindustries.com  
503-286-1600
  6. Texas Scenic Co.  
5423 Jackwood Dr.  
San Antonio, TX 78238  
Contact: Roy Harline      r.harline@texasscenic.com  
800-292-7490
  7. Thern Stage Equipment  
5712 Industrial Park Road  
Winona, MN 55987  
Contact: Sam Michael      smichael@thernstage.com  
800-553-2204
  8. Tiffin Scenic Studios  
P.O. Box 39  
Tiffin, OH 44883  
Contact: Steve Everhart      severhart@tiffinscenic.com  
800-445-1546

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D. Stage Rigging Contractors for work of this section shall include:

1. Chicago Flyhouse  
2925 W. Carroll Ave.  
Chicago, IL 60612  
Contact: Ed Leahy                   e Leahy@clearwing.com  
773-533-1590
2. Clearwing Productions  
11101 W. Mitchell St.  
Milwaukee, WI 53214  
Contact: Kerry Miller               k miller@clearwing.com  
414-258-6333
3. Grand Stage  
1319 W Grand Ave,  
Chicago, IL 60642  
Contact: Ted Jones                 t jones@grandstage.com  
312-332-1606
4. I. Weiss  
815 Fairview Avenue, Unit 10  
Fairview, NJ 07022  
Contact: Jennifer Tankleff       JenniferT@iweiss.com  
888-325-7192
5. J.R. Clancy, Inc.  
7041 Interstate Island Rd.  
Syracuse, NY 13209  
Contact: Mike Murphy             m ikemurphy@jrclancy.com  
800-836-1885

PART 2 PRODUCTS

2.1 MATERIALS

- A. Ferrous materials and accessories shall conform to the following ASTM and ANSI standard specifications:
1. Standard structural steel shapes and plates: ASTM A-36.
  2. Miscellaneous steel items: ASTM A-283, grade optional.
  3. Steel pipe: ASTM A-120
  4. Gray iron castings: ASTM A-48, Class 30 unless otherwise specified.
  5. Malleable iron castings: ASTM A-47
  6. Bolts and nuts: B18.2.1&2
  7. Welding electrodes shall be as permitted by AWS Code D1.0.
- B. Finishes for Items Without Factory Finish
1. Welds, burrs and rough surfaces on all interior ferrous metals shall be ground smooth and the completed assembly cleaned and all metal surfaces shall be given a minimum one coat of finish paint.
  2. No painted finish shall be required on aluminum finishes.
  3. All exposed fastenings shall match color and finish of adjacent material.

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## 2.2 SAFETY STANDARDS

- A. In order to establish minimum standards of safety, the following factors shall be used:
1. Cables and fittings: 8:1 Safety Factor
  2. Terminating hardware: 5:1, or not exceeding WLL, whichever is more restrictive.
  3. Purchase lines: Minimum tensile strength of 4,860# when new.
  4. Trim chain assembly: 5:1, or not exceeding WLL, whichever is more restrictive.
  5. Batten clamps: 5:1, or not exceeding WLL, whichever is more restrictive.
  6. Fiber rope lifting lines: 10:1, min. 5/8" diameter.
  7. Motors: 1.0 Service factor
  8. Gearboxes: 1.25 Mechanical Strength Service Factor
  9. Cable bending ratio: Sheave diameter is 30 times diameter of cable
  10. Tread pressures: 500# for cast iron, 900# for Nylatron, 1000# for steel
  11. Maximum fleet angle: 1-1/2 degrees
  12. Steel: 1/5 of yield
  13. Bearings: L10 life of 2000 hours at two times required load at full speed
  14. Bolts: Grade 5 or better, plated

## 2.3 STRAIGHT DEAD-HUNG LIGHTING POSITIONS

- A. Pipe shall be constructed of 1-1/2" NPS schedule 40 steel pipe as shown on the drawings. Pipe and all mounting hardware shall be painted black.
- B. All joints shall be sleeve spliced with 18" long sleeves with 9" extending into each pipe and held by two hex bolts and lock nuts on each side of the joint.
- C. The pipes shall be hung from building structure at locations shown on the drawings using grade 5 or B7 threaded rod to a rated pipe hanger.
1. At each point, the rod assembly shall attach to the overhead steel.
    - a. Where additional steel is required to span between existing structural members, the rigging manufacturer will provide and install this steel. Additional steel and connections shall be detailed in the shop drawings.
    - b. Verify all dimensions in field.
  2. Secure pipe to hanger such that pipe cannot spin in the hanger or slide out of the hanger.
  3. Provide circular plate to cover penetration in ceiling.
  4. Each pipe hanger shall have a minimum working load limit of minimum 700 pounds.
- D. Pipe and pipe hangers shall hang plumb and level in all directions.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Examine all conditions under which all presentation area rigging items shall be installed and notify the Construction Manager in writing of any condition detrimental to the proper and timely completion of the work.
- B. Responsibility for the satisfactory completion of this rigging system shall rest solely and exclusively with the Stage Rigging Contractor.
- C. The Stage Rigging Contractor shall be responsible for storage of all equipment and tools during the period of installation and shall be responsible for collecting and removing from the job site all packing materials, trash, scrap materials, etc.

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- D. The Stage Rigging Contractor shall be responsible for the protection of equipment and/or finished materials provided by other Contractors.
- E. Prior to the completion of the installation, the Stage Rigging Contractor shall notify the Construction Manager and Architect to schedule an inspection of the system.
  - 1. At the time of the inspection, the Stage Rigging Contractor shall furnish sufficient personnel to operate all equipment and to perform adjustments and tests as may be required by the Architect and/or the Owner's representatives.
  - 2. Any equipment that fails to meet with the Specifications shall be repaired or replaced with new equipment, and the inspection shall be re-scheduled under the same conditions listed previously.
  - 3. All temporary equipment shall be removed to permit full operation and access to all equipment.
  - 4. Final review will be withheld until all systems have been thoroughly tested and found to be in first class operating condition in every circumstance.

### 3.2 INSTALLATION SUPERVISION

- A. Installation of the rigging systems shall be supervised by the Rigging System Contractor's own experienced superintendent having extensive experience in installing work of this kind.
  - 1. Superintendent shall be an Entertainment Technician Certification Program (ETCP) Certified Rigger - Theatre.
    - a. Rigging System Contractor shall provide the Architect with a copy of the superintendent's ETCP certification and shall make a copy of this certification available on the job site for the length of the installation.
  - 2. An ETCP Certified Rigger - Theatre shall be present at all times during the rigging system installation.
- B. The same individual shall remain in charge of the work throughout the installation of the rigging system until work is completed excepting only the intervention of circumstances completely beyond the control of the Stage Rigging Contractor.
- C. The superintendent shall represent the Rigging System Contractor and all directions given to him shall be binding as if given to the Rigging System Contractor.
  - 1. The Rigging System Contractor may require the Owner to confirm such directions in writing.

### 3.3 FIELD QUALITY CONTROL

- A. Rigging System shall be installed in accordance with OSHA Safety and Health Standards and all local codes. All welding shall be in full compliance with the most recent edition of the Structural Welding Code (ANSI / AWS D1.1).
- B. All equipment shall be installed in locations shown on Construction Drawings and shall be installed plumb, straight and true and shall function as designed.
- C. The Stage Rigging Contractor shall perform all drilling and fitting required in the setting of materials and all cutting and fitting required in the fitting of materials to the adjoining work of other Contractors.

END OF SECTION

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## SECTION 260519 - 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. Section Includes:
  - 1. Building wires and cables rated 600 V and less.
  - 2. Connectors, splices, and terminations rated 600 V and less.

### PART 2 - PRODUCTS

#### 2.1 CONDUCTORS AND CABLES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. AFC Cable Systems
  - 2. Alpha Wire.
  - 3. Belden Inc.
  - 4. Encore Wire Corporation.
  - 5. General Cable Technologies Corporation.
  - 6. Southwire Incorporated.
- B. Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.
- C. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN-2-THWN-2 Type XHHW-2 and Type SO.
- D. Multiconductor Cable: Comply with NEMA WC 70/ICEA S-95-658 for metal-clad cable, Type MC Type SO with ground wire.

#### 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. Gardner Bender.



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3. Hubbell Power Systems, Inc.
4. Ideal Industries, Inc.
5. Ilsco; a branch of Bardes Corporation.
6. NSi Industries LLC.
7. O-Z/Gedney; a brand of the EGS Electrical Group.
8. 3M; Electrical Markets Division.
9. Tyco Electronics.

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

### 2.3 SYSTEM DESCRIPTION

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

## PART 3 - EXECUTION

### 3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders & Branch Circuits: Copper. Solid for No. 14AWG and smaller; stranded for No. 12 AWG and larger.
- B. Minimum wire size shall be No. 12AWG, except No. 14AWG shall be permitted as follows:
1. Signal and pilot control circuits.
  2. Fixture Whips.
- C. Mechanical Equipment: Feeders and branch circuits feeding mechanical equipment shall be copper.
- D. At contractor's option, provide Alcan Stabiloy Compact Stranded Aluminum conductor or approved equal for feeders larger than #3 AWG.

### 3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type XHHW-2, single conductors in raceway.
- B. Feeders: Type THHN-2-THWN-2, single conductors in raceway.
- C. Branch Circuits: Type THHN-2-THWN-2, single conductors in raceway.

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- D. Branch Circuits Other: Metal clad cable, Type MC (with insulated grounding conductor), shall only be allowed where specifically noted below:
  - 1. Fixture Whips: In lengths less than 10'
  - 2. Branch Circuits concealed in accessible ceilings, and gypsum board walls and partitions. Homeruns shall remain in conduit.
- E. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
- F. All wiring in exposed areas: run in raceway.

### 3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install all wiring methods parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."
- G. Use 10 AWG minimum conductor size in lieu of #12 AWG minimum for 20 ampere, 120 volt branch circuits where home runs are longer than 75 feet and for 20 ampere, 277 volt branch circuits where homeruns are longer than 175 feet. Increase in size as required for a minimum of 3 percent voltage drop from panel to load.
- H. Three phase wiring: Homeruns shall be limited to 3 phase conductors with corresponding neutral(s) and ground wire per conduit. Unless indicated otherwise, a shared neutral is not permitted for 3-phase homeruns for branch circuits.
- I. Aluminum Conductors
  - 1. Increase the size of the conduit, wire gutter, or enclosure as necessary to accommodate the aluminum conductors, and to meet allowable code requirements. Sizes shown on plans are based on copper unless noted otherwise.
  - 2. Increase the size of the aluminum conductor to match the ampacity of the copper conductor circuit shown on the Drawings.

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3. Submit a feeder schedule to the Engineer for all conductor substitutions, indicating both the aluminum conductor wire and the conduit sizes.
4. Installation to begin only after Engineer's approval.

### 3.4 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-486B.
- B. Conductor Splices: Keep to a minimum. Obtain Engineer's approval before splicing any feeder more than once.
- C. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- D. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.
- E. Aluminum Conductor Connections:
  1. Terminate on a compression lug. Apply oxide-inhibiting joint compound during termination.
  2. Follow manufacturer's instructions and recommendations for compression connector installation.

### 3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

### 3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

### 3.7 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

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END OF SECTION 260519

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## SECTION 260523 - CONTROL-VOLTAGE ELECTRICAL POWER 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. Section Includes:
  1. RS-485 cabling.
  2. Low-voltage control cabling.
  3. Control-circuit conductors.
  4. Identification products.

#### 1.3 ACTION SUBMITTALS

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

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified layout technician, installation supervisor, and field inspector.

### PART 2 - PRODUCTS

#### 2.1 SYSTEM DESCRIPTION

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

#### 2.2 BACKBOARDS

- A. Description: Plywood, fire-retardant treated, 3/4 by 48 by 96 inches. Comply with requirements for plywood backing panels in Section 061000 "Rough Carpentry."
- B. Painting: Paint plywood on all sides and edges with flat gray latex paint. Comply with requirements in Section 099123 "Interior Painting."

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### 2.3 RS-485 CABLE

- A. Plenum-Rated Cable: NFPA 70, Type CMP.
  - 1. Paired, two pairs, No. 22 AWG, stranded (7x30) tinned-copper conductors.
  - 2. Fluorinated ethylene propylene insulation.
  - 3. Unshielded.
  - 4. Fluorinated ethylene propylene jacket.
  - 5. Flame Resistance: NFPA 262.

### 2.4 LOW-VOLTAGE CONTROL CABLE

- A. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.
  - 1. Multi-pair, twisted, No. 18 AWG, stranded (19x30) tinned-copper conductors.
  - 2. PVC insulation.
  - 3. Unshielded.
  - 4. PVC jacket.
  - 5. Flame Resistance: Comply with NFPA 262.

### 2.5 CONTROL-CIRCUIT CONDUCTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- B. Class 1 Control Circuits: Stranded copper, Type THHN-2-THWN-2, in raceway, complying with UL 83.
- C. Class 2 & 3 Control Circuits: Stranded copper, Type THHN-2-THWN-2, in raceway where run in exposed or inaccessible areas, otherwise power-limited cable, concealed in accessible building finishes, complying with UL 83. Install in cable tray where present.
- D. Class 2 Control Circuits and Class 3 Remote-Control and Signal Circuits That Supply Critical Circuits: Circuit Integrity (CI) cable.
  - 1. Smoke control signaling and control circuits.

## PART 3 - EXECUTION

### 3.1 INSTALLATION OF RACEWAYS AND BOXES

- A. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems" for raceway selection and installation requirements for boxes, conduits, and wireways as supplemented or modified in this Section.
  - 1. Outlet boxes shall be no smaller than 2 inches wide, 3 inches high, and 2-1/2 inches deep.

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2. Flexible metal conduit shall not be used.
- B. Comply with TIA-569-B for pull-box sizing and length of conduit and number of bends between pull points.
- C. Install manufactured conduit sweeps and long-radius elbows if possible.
- D. Raceway Installation in Equipment Rooms:
  1. Position conduit ends adjacent to a corner on backboard if a single piece of plywood is installed, or in the corner of the room if multiple sheets of plywood are installed around perimeter walls of the room.
  2. Install cable trays to route cables if conduits cannot be located in these positions.
  3. Secure conduits to backboard if entering the room from overhead.
  4. Extend conduits 3 inches above finished floor.
  5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.
- E. Backboards: Install backboards with 96-inch dimension vertical. Butt adjacent sheets tightly and form smooth gap-free corners and joints.

### 3.2 INSTALLATION OF CONDUCTORS AND CABLES

- A. Comply with NECA 1 and NFPA 70.
- B. General Requirements for Cabling:
  1. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
  2. Cables may not be spliced.
  3. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
  4. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii.
  5. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
  6. Cold-Weather Installation: Bring cable to room temperature before dereeling. Do not use heat lamps for heating.
  7. Pulling Cable: Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems".
  8. Support: Do not allow cables to lay on removable ceiling tiles.
  9. Secure: Fasten securely in place with hardware specifically designed and installed so as to not damage cables.
- C. Installation of Control-Circuit Conductors:
  1. Install wiring in raceways. Comply with requirements specified in Section 260533 "Raceways and Boxes for Electrical Systems."

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D. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend copper cable not in a wireway or pathway a minimum of 8 inches above ceilings by cable supports not more than 30 inches apart.
3. Cable shall not be run through or on structural members or in contact with pipes, ducts, or other potentially damaging items. Do not run cables between structural members and corrugated panels.

E. Separation from EMI Sources:

1. Comply with BICSI TDMM and TIA-569-B recommendations for separating unshielded copper voice and data communications cable from potential EMI sources including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
  - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 5 inches.
  - b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 12 inches.
  - c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 24 inches.
3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
  - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
  - b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 6 inches.
  - c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 12 inches.
4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
  - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: No requirement.
  - b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 3 inches.
  - c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 6 inches.
5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or 5 HP and Larger: A minimum of 48 inches.
6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches.



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### 3.3 REMOVAL OF CONDUCTORS AND CABLES

- A. Remove abandoned conductors and cables. Abandoned conductors and cables are those installed that are not terminated at equipment and are not identified for future use with a tag.

### 3.4 CONTROL-CIRCUIT CONDUCTORS

- A. Minimum Conductor Sizes:
  - 1. Class 1 remote-control and signal circuits; No 14 AWG.
  - 2. Class 2 low-energy, remote-control, and signal circuits; No. 16 AWG.
  - 3. Class 3 low-energy, remote-control, alarm, and signal circuits; No 12 AWG.

### 3.5 FIRESTOPPING

- A. Comply with requirements in Section 078413 "Penetration Firestopping."
- B. Comply with TIA-569-B, Annex A, "Firestopping."
- C. Comply with BICSI TDMM, "Firestopping" Chapter.

### 3.6 GROUNDING

- A. For low-voltage control wiring and cabling, comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

### 3.7 IDENTIFICATION

- A. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Identify data and communications system components, wiring, and cabling according to TIA-606-A; label printers shall use label stocks, laminating adhesives, and inks complying with UL 969.

### 3.8 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
  - 1. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.

END OF SECTION 260523

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## SECTION 260526 - GROUNDING AND BONDING 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. Section includes grounding and bonding systems and equipment.

#### 1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Burndy; Part of Hubbell Electrical Systems.
  2. Dossert; AFL Telecommunications LLC.
  3. ERICO International Corporation.
  4. Fushi Copperweld Inc.
  5. Galvan Industries, Inc.; Electrical Products Division, LLC.
  6. Harger Lightning and Grounding.
  7. ILSCO.
  8. O-Z/Gedney; A Brand of the EGS Electrical Group.
  9. Robbins Lightning, Inc.
  10. Siemens Power Transmission & Distribution, Inc.

#### 2.2 SYSTEM DESCRIPTION

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

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

### 2.3 CONDUCTORS

- A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
  - 1. Solid Conductors: ASTM B 3.
  - 2. Stranded Conductors: ASTM B 8.
  - 3. Tinned Conductors: ASTM B 33.
  - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
  - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
  - 6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
  - 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
- C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches in cross section, with 9/32-inch holes spaced 1-1/8 inches apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V.

### 2.4 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- D. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

### 2.5 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel; 5/8 by 96 inches.

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### PART 3 - EXECUTION

#### 3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Underground Grounding Conductors: Install barecopper conductor, No. 2/0 AWG minimum.
  - 1. Bury at least 24 inches below grade.
- C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.
- D. Grounding Bus: Install in electrical equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
  - 1. Install bus horizontally, on insulated spacers 2 inches minimum from wall, 6 inches above finished floor unless otherwise indicated.
  - 2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.
- E. Conductor Terminations and Connections:
  - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
  - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
  - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
  - 4. Connections to Structural Steel: Welded connectors.

#### 3.2 GROUNDING AT THE SERVICE

- A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

#### 3.3 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
  - 1. Feeders and branch circuits.
  - 2. Lighting circuits.
  - 3. Receptacle circuits.
  - 4. Single-phase motor and appliance branch circuits.
  - 5. Three-phase motor and appliance branch circuits.

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6. Flexible raceway runs.

- B. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
- C. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- D. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.
- E. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.
- F. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.4 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.
- C. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.
  - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
  - 2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.

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- D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
  - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
  - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
  - 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
  
- E. Grounding and Bonding for Piping:
  - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
  - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
  - 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
  
- F. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.
  
- G. Concrete-Encased Grounding Electrode (Ufer Ground): Fabricate according to NFPA 70; using electrically conductive coated steel reinforcing bars or rods, at least 20 feet long. If reinforcing is in multiple pieces, connect together by the usual steel tie wires or exothermic welding to create the required length.

### 3.5 FIELD QUALITY CONTROL

- A. Tests and Inspections:
  - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
  - 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
  - 3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal. Make tests at ground rods before any conductors are connected.
    - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural

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drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.

- b. Perform tests by fall-of-potential method according to IEEE 81.
- B. Grounding system will be considered defective if it does not pass tests and inspections.
  - C. Prepare test and inspection reports.
  - D. Report measured ground resistances that exceed the following values:
    1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
    2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
    3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
  - E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

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## SECTION 260529 - 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 DEFINITIONS

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

#### 1.4 PERFORMANCE REQUIREMENTS

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

#### 1.5 QUALITY ASSURANCE

- A. Comply with NFPA 70.



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## 1.6 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified together with concrete Specifications.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Section 077200 "Roof Accessories."

## PART 2 - PRODUCTS

### 2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allied Tube & Conduit.
    - b. Cooper B-Line, Inc.
    - c. ERICO International Corporation.
    - d. GS Metals Corp.
    - e. Thomas & Betts Corporation.
    - f. Unistrut; Atkore International.
    - g. Wesanco, Inc.
  - 2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
  - 3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
  - 4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
  - 5. Channel Dimensions: Selected for applicable load criteria.
- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
  - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

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- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1) Hilti, Inc.
  - 2) ITW Ramset/Red Head; Illinois Tool Works, Inc.
  - 3) MKT Fastening, LLC.
  - 4) Simpson Strong-Tie Co., Inc.
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.
    - 2) Empire Tool and Manufacturing Co., Inc.
    - 3) Hilti, Inc.
    - 4) ITW Ramset/Red Head; Illinois Tool Works, Inc.
    - 5) MKT Fastening, LLC.
  3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
  4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
  5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
  6. Toggle Bolts: All-steel springhead type.
  7. Hanger Rods: Threaded steel.

## 2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

## PART 3 - EXECUTION

### 3.1 APPLICATION

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

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- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
  - 1. Secure raceways and cables to these supports with single-bolt conduit clamps using spring friction action for retention in support channel.

### 3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceways shall not be supported solely by openings in structural members.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
  - 1. To Wood: Fasten with lag screws or through bolts.
  - 2. To New Concrete: Bolt to concrete inserts.
  - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
  - 4. To Existing Concrete: Expansion anchor fasteners.
  - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
  - 6. To Steel: 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.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

### 3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.

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- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

### 3.4 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Section 033000 "Cast-in-Place Concrete" or Section 033053 "Miscellaneous Cast-in-Place Concrete."
- C. Anchor equipment to concrete base.
  - 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
  - 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

### 3.5 PAINTING

- A. Touchup: Comply with requirements in Painting specification sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

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## SECTION 260533 - RACEWAYS 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. Section Includes:
  1. Metal conduits, tubing, and fittings.
  2. Nonmetal conduits, tubing, and fittings.
  3. Metal wireways and auxiliary gutters.
  4. Nonmetal wireways and auxiliary gutters.
  5. Surface raceways.
  6. Boxes, enclosures, and cabinets.

#### 1.3 ACTION SUBMITTALS

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

### PART 2 - PRODUCTS

#### 2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. [AFC Cable Systems, Inc.](#)
  2. [Allied Tube & Conduit.](#)
  3. [Anamet Electrical, Inc.](#)
  4. [Electri-Flex Company.](#)
  5. [O-Z/Gedney.](#)
  6. [Picoma Industries.](#)
  7. [Republic Conduit.](#)
  8. [Robroy Industries.](#)
  9. [Southwire Company.](#)
  10. [Thomas & Betts Corporation.](#)
  11. [Western Tube and Conduit Corporation.](#)

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12. [Wheatland Tube Company](#).

- B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. GRC: Comply with ANSI C80.1 and UL 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: Comply with ANSI C80.3 and UL 797.
- F. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
  - 1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
  - 2. Fittings for EMT:
    - a. Material: Steel.
    - b. Type: Setscrew.
  - 3. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
  - 4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.
- G. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

- A. [Manufacturers](#): Subject to compliance with requirements, provide products by one of the following:
  - 1. [AFC Cable Systems, Inc.](#)
  - 2. [Anamet Electrical, Inc.](#)
  - 3. [Arnco Corporation](#).
  - 4. [CANTEX Inc.](#)
  - 5. [CertainTeed Corporation](#).
  - 6. [Condux International, Inc.](#)
  - 7. [Electri-Flex Company](#).
  - 8. [Kraloy](#).

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9. [Lamson & Sessions](#); Carlon Electrical Products.
10. [Niedax-Kleinhuis USA, Inc.](#)
11. [RACO; Hubbell](#).
12. [Thomas & Betts Corporation](#).

- B. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
- D. LFNC: Comply with UL 1660.

~~Retain one or more of three HDPE paragraphs below. See Evaluations for a discussion of the three types.~~

- E. Rigid HDPE: Comply with UL 651A.
- F. Continuous HDPE: Comply with UL 651B.
- G. ~~Coilable HDPE: Preassembled with conductors or cables, and complying with ASTM D 3485.~~
- H. RTRC: Comply with UL 1684A and NEMA TC 14.
- I. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
- J. Fittings for LFNC: Comply with UL 514B.

~~Retain first paragraph below if required for LEED-NC, LEED-CI, or LEED-CS Credit IEQ 4.1. VOC limit is that for PVC welding compounds and adhesive primers for plastic.~~

- K. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

~~Retain paragraph below if required for LEED for Schools Credit IEQ 4.~~

- L. Solvent cements and adhesive primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

## 2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

~~Retain "Manufacturers" Paragraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.~~

- A. [Manufacturers](#): Subject to compliance with requirements, provide products by one of the following:

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1. [Cooper B-Line, Inc.](#)
2. [Hoffman.](#)
3. [Mono-Systems, Inc.](#)
4. [Square D.](#)
5. ~~<Insert manufacturer's name>.~~

B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 unless otherwise indicated, and sized according to NFPA 70.

1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Fittings and Accessories: Include covers, 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.

~~Retain one or more options in "Wireway Covers" Paragraph below. If retaining more than one type, indicate locations of each type on Drawings.~~

D. Wireway Covers: Hinged type where over 3' in length, otherwise screw-cover type unless otherwise indicated.

E. Finish: Manufacturer's standard enamel finish.

## 2.4 NONMETALLIC WIREWAYS AND AUXILIARY GUTTERS

~~Retain "Manufacturers" Paragraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.~~

A. [Manufacturers](#): Subject to compliance with requirements, provide products by one of the following:

1. [Allied Moulded Products, Inc.](#)
2. [Hoffman.](#)
3. [Lamson & Sessions](#); Carlon Electrical Products.
4. [Niedax-Kleinhuis USA, Inc.](#)
5. ~~<Insert manufacturer's name>.~~

B. Listing and Labeling: Nonmetallic wireways and auxiliary gutters shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

~~Retain one of two "Description" paragraphs below.~~

C. ~~Description: Fiberglass polyester, extruded and fabricated to required size and shape, without holes or knockouts. Cover shall be gasketed with oil resistant gasket material and fastened with captive screws treated for corrosion resistance. Connections shall be flanged and have stainless-steel screws and oil resistant gaskets.~~



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- D. Description: PVC, extruded and fabricated to required size and shape, and having snap-on cover, mechanically coupled connections, and plastic fasteners.
- E. Fittings and Accessories: Couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings shall match and mate with wireways as required for complete system.

~~Retain first paragraph below if required for LEED NC, LEED CI, or LEED CS Credit IEQ 4.1. VOC limit is that for PVC welding compounds and adhesive primers for plastic.~~

- F. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

~~Retain paragraph below if required for LEED for Schools Credit IEQ 4.~~

- G. Solvent cements and adhesive primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

## 2.5 SURFACE RACEWAYS

~~Insert requirements for finish coat paint color, if applicable, in "Surface Metal Raceways" Paragraph below. See painting Sections for optional field finish coats.~~

- A. Listing and Labeling: Surface raceways and tele-power poles shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Surface Metal Raceways: Galvanized steel with snap-on covers complying with UL 5. Manufacturer's standard enamel finish in color selected by Architect.

~~Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.~~

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
  - a. Mono-Systems, Inc.
  - b. Panduit Corp.
  - c. Wiremold / Legrand.
  - d. ~~<Insert manufacturer's name>.~~
2. Types, sizes, and channels as indicated and required for each application, with fittings that match and mate with raceways.
  - a. Single Channel for Power Locations: One-piece latching raceway with matching device boxes, fittings and all components necessary for a complete raceway system. Wiremold V500 or V700 series or equal to meet fill requirements.

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- b. Sing Channel, for Data / Phone Locations: Two-piece latching raceway with matching device boxes, fittings and all components necessary for a complete raceway system. Wiremold 2000 series or equal.
  - c. ~~Mini-Dual Channel, for Power and Data Outlet Locations: 2-piece construction, manufactured of steel. Raceway device brackets shall be provided for mounting standard devices in-line with the raceway. Devices shall have low profile mounting. Provide all components necessary for complete raceway system. Wiremold V2400D series or equal.~~
  - d. Dual Channel, for Power and Data Outlet Locations: 2-piece construction, manufactured of steel, black finish. Raceway device brackets shall be provided for mounting standard devices in-line with the raceway. Devices shall have low profile mounting. Provide all components necessary for complete raceway system. Wiremold 4000 series or engineer approved equal.
- C. Surface Nonmetallic Raceways: Two- or three-piece construction, complying with UL 5A, and manufactured of rigid PVC with texture and color selected by Architect from manufacturer's standard colors. Product shall comply with UL 94 V-0 requirements for self-extinguishing characteristics.

~~Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.~~

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Hubbell Incorporated.
  - b. Mono-Systems, Inc.
  - c. Panduit Corp.
  - d. Wiremold / Legrand.
  - e. ~~<Insert manufacturer's name>~~.
2. Types, sizes, and channels as indicated and required for each application, with fittings that match and mate with raceways.
  - a. Two Compartment for Power and Data Outlet Locations: 2-piece construction, manufactured of rigid PVC compound with matte texture. Raceway device brackets shall be provided for mounting standard devices in-line with the raceway. Devices shall have low profile mounting. Provide all components necessary for complete raceway system. Wiremold 5400 series or equal.
    - 1) Base: Wiremold 5400TB
    - 2) Cover: Wiremold 5400TC
    - 3) Device Bracket: Wiremold 5450T
    - 4) End Cap: Wiremold 5410
    - 5) Entrance End fitting: Wiremold 5410D
    - 6) Elbow: Wiremold 5411FO, 5417FO, 5418FO
    - 7) Tee: Wiremold 5415FO
    - 8) Angled Raceway Adapter for Data Devices: CM-ARA

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## 2.6 BOXES, ENCLOSURES, AND CABINETS

~~Retain "Manufacturers" Paragraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.~~

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- ~~1. Adalet.~~
  2. Cooper Technologies Company; Cooper Crouse-Hinds.
  3. EGS/Appleton Electric.
  4. Erickson Electrical Equipment Company.
  5. FSR Inc.
  6. Hoffman.
  7. Hubbell Incorporated.
  8. Kraloy.
  9. Milbank Manufacturing Co.
  10. Mono-Systems, Inc.
  11. O-Z/Gedney.
  12. RACO; Hubbell.
  - ~~13. Robroy Industries.~~
  - ~~14. Spring City Electrical Manufacturing Company.~~
  - ~~15. Stahlin Non-Metallic Enclosures.~~
  16. Thomas & Betts Corporation.
  17. Wiremold / Legrand.
  18. ~~<Insert manufacturer's name>.~~
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- E. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
- F. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.
- G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- H. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, galvanized, cast iron with gasketed cover.
- I. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

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- J. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.
- K. Device boxes for Audio/Video outlets (AV) (unless noted on drawings): Provide (2) gang 4 11/16" square by 2 1/8" deep with (2) 1 1/4" K.O.'s on each side and end. Steel City 72171 11/4 or equal. Provide with single or 2 gang mud ring as indicated on drawings.
- L. Gangable boxes are prohibited.
- M. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.
  - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
  - 2. Nonmetallic Enclosures: Plastic.
  - 3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.
- N. Cabinets:
  - 1. NEMA 250, Type 1 galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
  - 2. Hinged door in front cover with flush latch and concealed hinge.
  - 3. Key latch to match panelboards.
  - 4. Metal barriers to separate wiring of different systems and voltage.
  - 5. Accessory feet where required for freestanding equipment.
  - 6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

## 2.7 FLOOR BOXES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Thomas & Betts Corporation.
  - 2. Walker Systems, Inc.; Wiremold Company (The).
  - 3. FSR Inc.
  - 4. Floor Boxes, Slab-on-Grade, Multi-service, Extra Large Capacity: Provide extra large capacity multi-service cast iron recessed floor box, fully adjustable and device brackets for power, data, and A/V devices. FSR FL-600P-SLP-6 with pour pan FL-GRD4 or equal.
- B. Floor Boxes, concrete toppings greater than 2.5" non slab on grade applications: Provide multi-service shallow stamped steel recessed floor box, fully adjustable with tunnels and device brackets for both power and data devices. Walker RFB4-SS or equal.
  - 1. Activation Cover: S38BBTCAL (Aluminum) ~~S38BBTCBS (brass)~~ S38BBTCBK (black) flush without carpet insert. Assembly meets UL scrub water exclusion requirement.
  - 2. Receptacle Device Bracket: RFB-GFI-SS & RFB-RB-SS as applicable (provide 2 at each box).
  - 3. Communications Bracket: RFB-2AB-SS with two bezels (provide 2 at each box)

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- C. Floor Boxes, concrete toppings less than 2.5": Provide multi-service poke-through assembly with four 20 amp receptacles and 4 data activations. Provide with slide covers for dead front protection. Flip lids are not allowed. Provide Walker RC4ATCBK (BK = black, GY = gray, BZ = bronze, NK = nickel, BS = brass) or equal. Assembly meets UL scrub water exclusion requirement.
- D. Floor Boxes, concrete toppings less than 2.5", furniture feed: Provide multi-service poke-through assembly with (1) 3/4" trade size screw plug opening and one concentric 2"-1 1/4" trade size screw plug opening. Provide Walker 6ATCFFBK (BK = black, GY = gray, BZ = bronze, NK = nickel, BS = brass) or equal. Assembly meets UL scrub water exclusion requirement.
- E. Floor Boxes, Kitchen, single service locations: Cast iron, fully adjustable recessed floor box, single service, with solid brass activation plate appropriate for use. Walker 880CS1-1 series or equal.
1. Activation Cover: 817B. Assembly meets UL scrub water exclusion requirement.
  2. Cover Plate: 828GFITC, 829CK or similar to meet device requirements.
- F. Floor Boxes, Kitchen, dual service locations: Cast iron, fully adjustable recessed floor box, single service, with solid brass activation plate appropriate for use. Walker 880CS2-1 series or equal.
1. Activation Cover: 827B. Assembly meets UL scrub water exclusion requirement.
  2. Cover Plate: 828GFITC, 829CK or similar to meet device requirements.
  3. Communications Bezel: At communications portion of box, provide CM-MAB communications bezel.
- G. Floor Boxes, Gymnasium, multi-service locations: Stamped steel, multi-service, with solid brass activation plate appropriate for use. Walker 880W1, 880W2 and 880W3 as appropriate for device requirements indicated (may require more than one box).
1. Activation Cover: 817B, 827B and 837B. Assembly meets UL scrub water exclusion requirement.
  2. Cover Plate: 828GFITC or similar to meet device requirements.
  3. Communications Bezel: At communications portions of box, provide CM-MAB communications bezel for each gang serving communications devices.
  - 4.

## PART 3 - EXECUTION

### 3.1 RACEWAY APPLICATION

~~Retain this article to specify type of raceway to be installed. Coordinate with conductor and cable wiring methods specified in Section 260519 "Low Voltage Electrical Power Conductors and Cables" and in other electrical, communications, and security Sections. See "Writing Guide" Article in the Evaluations for instructions on editing this article.~~

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

1. Exposed Conduit: GRC.
2. Concealed Conduit, Aboveground: EMT.
3. Underground Conduit: RNC, Type EPC-40-PVC, **concrete encased for service entrance conductors.**

~~Retain first option in first subparagraph below if raceway may be exposed to physical damage.~~

4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

B. Indoors: Apply raceway products as specified below 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: GRC. Raceway locations include the following:
  - a. Loading dock.
  - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
  - c. ~~Mechanical rooms.~~
  - d. ~~Gymnasiums.~~
  - e. ~~<Insert designations of applicable spaces or locations>.~~
4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
6. Damp or Wet Locations: IMC.
7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations. **Type 4, nonmetallic in pool environments.**

C. Minimum Raceway Size: 1/2-inch trade size. **Homeruns shall be installed in a minimum 3/4 inch trade size.**

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
3. EMT: Use **setscrew or compression**, steel fittings. Comply with NEMA FB 2.10.
4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

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~~Retain first paragraph below for high-frequency installation.~~

- ~~E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.~~
- ~~F. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.~~

~~Coordinate first paragraph below with Drawings.~~

- G. Install surface raceways only where indicated on Drawings.
- H. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

### 3.2 INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- E. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- F. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- G. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.
  - 1. Run parallel or banked raceways together on common supports.
  - 2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.
- H. Support conduit within 12 inches of enclosures to which attached.
- I. Stub-ups to Above Recessed Ceilings:
  - 1. Use EMT, ~~IMC, or RMC~~ for raceways.
  - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

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- J. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- K. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- L. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- M. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- N. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- O. Surface Raceways:
  - 1. Install surface raceway with a minimum 2-inch radius control at bend points.
  - 2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
- P. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.

~~See Evaluations for discussion of types of and locations for raceway seals.~~

- Q. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
  - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  - 2. Where an underground service raceway enters a building or structure.
  - 3. **Where conduits pass from interior to exterior locations above grade.**
  - 4. Where otherwise required by NFPA 70.
- R. Comply with manufacturer's written instructions for solvent welding RNC and fittings.

~~Retain "Expansion Joint Fittings" Paragraph below unless locations for expansion fittings for RNC are indicated on Drawings. See Evaluations.~~

~~4. :~~



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- S. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
  - T. ~~Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.~~
  - U. Device / Outlet Box Installation:
    - 1. Outlet boxes shall not be mounted back-to-back; provide 6" minimum separation.
    - 2. Where device/outlet box symbols are shown adjacent to each other, separation of boxes shall not exceed 6". Provide additional backbox support as required.
    - 3. Locate device boxes such that cover or device faceplate does not span different wall finishes either vertically or horizontally.
    - 4. Exposed boxes, such as those in mechanical rooms, shall be cast metal boxes. Exposed sheet metal boxes are not allowed.
    - 5. Provide joint sealant around raceways and boxes in areas of above average sound levels (gymnasiums, music areas, locker areas, etc.) or in sound sensitive areas (media centers, auditoriums, sound recording spaces, etc.).
  - V. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
  - W. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
  - X. Set metal floor boxes level and flush with finished floor surface.
  - Y. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.
  - Z. See drawings for conduit sizing requirements for data, voice, and television outlet locations.
- 3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS
- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."
- 3.4 FIRESTOPPING
- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

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### 3.5 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
  - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
  - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

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SECTION 260544 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

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. Sleeves for raceway and cable penetration of non-fire-rated construction walls and floors.
2. Sleeve-seal systems.
3. Grout.
4. Silicone sealants.

B. Related Requirements:

1. Section 078413 "Penetration Firestopping" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

1.3 ACTION SUBMITTALS

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

B. LEED Submittals:

1. Product Data for Credit EQ 4.1: For sealants, documentation including printed statement of VOC content.
2. Laboratory Test Reports for Credit EQ 4: For sealants, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Wall Sleeves:

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1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

## 2.2 SLEEVE-SEAL FITTINGS

- A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber waterstop collar with center opening to match piping OD.

## 2.3 GROUT

- A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

## 2.4 SILICONE SEALANTS

- A. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below.
  1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.
  2. Sealant shall have VOC lower content when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  3. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

## PART 3 - EXECUTION

### 3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Comply with NECA 1.

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- B. Comply with NEMA VE 2 for cable tray and cable penetrations.
- C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:
  - 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
    - a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 079200 "Joint Sealants."
    - b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
  - 2. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches above finished floor level. Install sleeves during erection of floors.
- D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:
  - 1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
  - 2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.
- E. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- F. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing sleeve-seal system.

### 3.2 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Using grout, seal the space around outside of sleeve-seal fittings.

END OF SECTION 260544

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## SECTION 260553 - IDENTIFICATION 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. Section Includes:
  - 1. Identification for raceways.
  - 2. Identification of power and control cables.
  - 3. Identification for conductors.
  - 4. Warning labels and signs.
  - 5. Instruction signs.
  - 6. Equipment identification labels.
  - 7. Miscellaneous identification products.

#### 1.3 QUALITY ASSURANCE

- A. Comply with ANSI A13.1.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

#### 1.4 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

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- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

## PART 2 - PRODUCTS

### 2.1 CONDUCTOR IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- B. Self-Adhesive, Self-Laminating Polyester Labels: Write-on, 3-mil- thick flexible label with acrylic pressure-sensitive adhesive that provides a clear, weather- and chemical-resistant, self-laminating, protective shield over the legend. Labels sized to fit the conductor diameter such that the clear shield overlaps the entire printed legend.
- C. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
- D. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
  - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

### 2.2 FLOOR MARKING TAPE

- A. 2-inch- wide, 5-mil pressure-sensitive vinyl tape, with yellow and black stripes and clear vinyl overlay.
- B. **Construction:**
  - 1. Detectable three-layer laminate, consisting of a printed pigmented polyolefin film, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core, bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
  - 2. Overall Thickness: 5 mils.
  - 3. Foil Core Thickness: 0.35 mil.
  - 4. Weight: 28 lb/1000 sq. ft..
  - 5. 3-Inch Tensile According to ASTM D 882: 70 lbf, and 4600 psi.

### 2.3 WARNING LABELS AND SIGNS

- A. Comply with NFPA 70 and 29 CFR 1910.145.

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- B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.
- C. Metal-Backed, Butyrate Warning Signs:
  - 1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.
  - 2. 1/4-inch grommets in corners for mounting.
  - 3. Nominal size, 10 by 14 inches.
- D. Warning label and sign shall include, but are not limited to, the following legends:
  - 1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES." Add the following to the associated service disconnect:
  - 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."
  - 3. Warning at Service Disconnects: "ELECTRIC SERVICE DISCONNECT" and "DANGER – ELECTRIC SHOCK HAZARD!"
  - 4. The following arc-flash warning label shall be affixed to the front of all switchboards, meter socket enclosures, ~~motor control centers~~, distribution panels, and panelboards:

## WARNING!

Potential Arc Flash Hazard  
Appropriate PPE and tools are required  
when working on energized equipment

If panelboard is located in a finished space, affix the warning label behind the hinged door.

### 2.4 INSTRUCTION SIGNS

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches and 1/8 inch thick for larger sizes.
  - 1. Engraved legend with black letters on white face.
  - 2. Punched or drilled for mechanical fasteners.
  - 3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

### 2.5 CABLE TIES

- A. General-Purpose Cable Ties: Fungus inert, self extinguishing, one piece, self locking, Type 6/6 nylon.



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1. Minimum Width: 3/16 inch.
  2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
  3. Temperature Range: Minus 40 to plus 185 deg F.
  4. Color: Black except where used for color-coding.
- B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self extinguishing, one piece, self locking, Type 6/6 nylon.
1. Minimum Width: 3/16 inch.
  2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
  3. Temperature Range: Minus 40 to plus 185 deg F.
  4. Color: Black.
- C. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self locking.
1. Minimum Width: 3/16 inch.
  2. Tensile Strength at 73 deg F, According to ASTM D 638: 7000 psi.
  3. UL 94 Flame Rating: 94V-0.
  4. Temperature Range: Minus 50 to plus 284 deg F.
  5. Color: Black.

## 2.6 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

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- F. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:
  - 1. Outdoors: UV-stabilized nylon.
  - 2. In Spaces Handling Environmental Air: Plenum rated.
- G. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.
- H. Painted Identification: Comply with requirements in painting Sections for surface preparation and paint application.

### 3.2 IDENTIFICATION SCHEDULE

- A. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
  - 1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.
    - a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
    - b. Colors for 208/120-V Circuits:
      - 1) Phase A: Black.
      - 2) Phase B: Red.
      - 3) Phase C: Blue.
    - c. Colors for 480/277-V Circuits:
      - 1) Phase A: Brown.
      - 2) Phase B: Orange.
      - 3) Phase C: Yellow.
    - d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- B. Branch-Circuit Conductor Identification: Label boxes in permanent marker with circuit number and source panel.
- C. Device Circuit Identification: Label inside of each device faceplate in permanent marker with circuit number and source panel.

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- D. Control-Circuit Conductor Identification: For conductors and cables in pull ~~and junction~~ boxes, manholes, and handholes, use write-on tags with the conductor or cable designation, origin, and destination.
- E. Control-Circuit Conductor Termination Identification: For identification at terminations provide self-adhesive vinyl labels with the conductor designation.
- F. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source.
- G. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
  - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
  - 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
  - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
- H. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.
  - 1. Install underground-line warning tape for both direct-buried cables and cables in raceway.
- I. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- J. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.
  - 1. Comply with 29 CFR 1910.145.
  - 2. Identify system voltage with black letters on an orange background.
  - 3. Apply to exterior of door, cover, or other access.
  - 4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
    - a. Power transfer switches.
    - b. Controls with external control power connections.
- K. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
  - 1. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- high letters for emergency instructions at equipment used for power transfer and load shedding, **or other emergency equipment.**

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- L. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
1. Labeling Instructions:
    - a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high.
    - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
    - c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
    - d. Fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
  2. Equipment to Be Labeled:
    - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be engraved, laminated acrylic or melamine label.
    - b. Enclosures and electrical cabinets.
    - c. Access doors and panels for concealed electrical items.
    - d. Switchgear.
    - e. Switchboards.
    - f. Transformers: Label that includes tag designation shown on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
    - g. Emergency system boxes and enclosures.
    - h. Enclosed switches.
    - i. Enclosed circuit breakers.
    - j. Enclosed controllers.
    - k. Variable-speed controllers.
    - l. Push-button stations.
    - m. Contactors.
    - n. Remote-controlled switches, dimmer modules, and control devices.
    - o. Battery-inverter units.
    - p. Battery racks.
    - q. Power-generating units.
    - r. Monitoring and control equipment.
    - s. UPS equipment.

END OF SECTION 260553

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## SECTION 262726 - 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.

#### 1.2 SUMMARY

- A. Section Includes:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Twist-locking receptacles.
3. Tamper-resistant receptacles.
4. Weather-resistant receptacles.
5. Snap switches and wall-box dimmers.
6. Pendant cord-connector devices.
7. Cord and plug sets.
8. Company Switch

#### 1.3 DEFINITIONS

- A. GFCI: Ground-fault circuit interrupter.
- B. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

#### 1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  1. Receptacles for Owner-Furnished Equipment: Match plug configurations.
  2. Cord and Plug Sets: Match equipment requirements.

#### 1.5 ACTION SUBMITTALS

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

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## 1.6 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

## 1.7 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
  - 1. Cooper Wiring Devices; Division of Cooper Industries, Inc. (Cooper).
  - 2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
  - 3. Leviton Mfg. Company Inc. (Leviton).
  - 4. Pass & Seymour/Legrand (Pass & Seymour).
- B. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

### 2.2 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.
- C. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:
  - 1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
  - 2. Devices shall comply with the requirements in this Section.

### 2.3 STRAIGHT-BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596. Heavy Duty industrial specification grade, 3 wire grounding with one piece brass mounting strap and integral ground contacts. Push- or speed-wired devices are unacceptable.
  - 1. Products: Subject to compliance with requirements, provide one of the following:

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- a. Cooper; 5351 (single), CR5362 (duplex).
- b. Hubbell; HBL5351 (single), HBL5352 (duplex).
- c. Leviton; 5891 (single), 5352 (duplex).
- d. Pass & Seymour; 5361 (single), 5362 (duplex).

B. Tamper-Resistant Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498 Supplement sd, and FS W-C-596.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Cooper; TR8300.
- b. Hubbell; HBL8300SGA.
- c. Leviton; 8300-SGG.
- d. Pass & Seymour; TR63H.

## 2.4 GFCI RECEPTACLES

A. General Description:

1. Straight blade, feed-through type.
2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.
3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.
4. GFCI receptacles may feed other receptacles from the load side only if they are in the same room and within sight of each other.

B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Cooper; VGF20.
- b. Hubbell; GFR5352L.
- c. Pass & Seymour; 2095.
- d. Leviton; 7590.

C. Tamper-Resistant GFCI Convenience Receptacles, 125 V, 20 A:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

- a. Hubbell; GFTR20.
- b. Pass & Seymour; 2095TR.

2. Description:

- a. Straight blade, 125 V, 20 A; NEMA WD 6 Configuration 5-20R.

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- b. Equipment grounding contacts shall be connected only to the green grounding screw terminal of the device and with inherent electrical isolation from mounting strap. Isolation shall be integral to receptacle construction and not dependent on removable parts.

## 2.5 TWIST-LOCKING RECEPTACLES

- A. Single Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration L5-20R, and UL 498.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Cooper; CWL520R.
- b. Hubbell; HBL2310.
- c. Leviton; 2310.
- d. Pass & Seymour; L520-R.

- B. Isolated-Ground, Single Convenience Receptacles, 125 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Cooper; IGL520R.
- b. Hubbell; IG2310.
- c. Leviton; 2310-IG.
- d. Pass & Seymour; IG4700.

2. Description:

- a. Comply with NEMA WD 1, NEMA WD 6 Configuration L5-20R, and UL 498.
- b. Equipment grounding contacts shall be connected only to the green grounding screw terminal of the device and with inherent electrical isolation from mounting strap. Isolation shall be integral to receptacle construction and not dependent on removable parts.

## 2.6 PENDANT CORD-CONNECTOR DEVICES

- A. Description:

1. Matching, locking-type plug and receptacle body connector.
2. NEMA WD 6 Configurations L5-20P and L5-20R, heavy-duty grade, and FS W-C-596.
3. Body: Nylon, with screw-open, cable-gripping jaws and provision for attaching external cable grip.
4. 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.



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## 2.7 TOGGLE SWITCHES

- A. Comply with NEMA WD 1, UL 20, and FS W-S-896.
- B. Switches, 120/277 V, 20 A:
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - 1) Single Pole:
    - 2) Cooper; AH1221.
    - 3) Hubbell; HBL1221.
    - 4) Leviton; 1221-2.
    - 5) Pass & Seymour; CSB20AC1.

## 2.8 WALL-BOX DIMMERS

- A. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters.
- B. Control: Continuously adjustable slider; with single-pole or three-way switching. Comply with UL 1472.
- C. LED Dimmers: 120V or 277V; control shall be 0-10V type dimmer with integral on-off switch. Ensure dimmer type is compatible with fixtures installed on the project.

## 2.9 WALL PLATES

- A. Single and combination types shall match corresponding wiring devices.
  - 1. Plate-Securing Screws: Metal with head color to match plate finish.
  - 2. Material for Finished Spaces: 0.035-inch- thick, satin-finished, Type 302 stainless steel.
  - 3. Material for Unfinished Spaces: Galvanized steel.
  - 4. Material for Damp Locations: Thermoplastic with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.

## 2.10 FINISHES

- A. Device Color:
  - 1. Wiring Devices Connected to Normal Power System: Match existing conditions.
  - 2. Wiring Devices Connected to Emergency Power System: Red.

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2.11 Company Switch

A. General

1. Switch shall be 120/208V: 100A, or 100A; 3-phase, 4-wire.
2. Switch shall be UL and cUL listed and shall meet all applicable NEC standards.
3. Enclosure shall be NEMA 1 rated.

B. Mechanical

1. Switch shall be fabricated of 16 gauge steel and finished with fine-textured scratch resistant epoxy paint.
2. The door which provides access to output connections shall be lockable with shunt trip interlock.
3. Enclosure size shall be approximately 25" high by 15.5" wide and 6" deep.
4. Switch shall protect against access to power connections while the cabinet is energized so it can be guaranteed that output is in a "power off" state while connecting or disconnecting portable output cabling.
5. Switch shall protect the user from unsecured access to output terminals and connectors in the following methods:
6. Door brackets shall lock swing hinged covers in place until the front door is opened. These brackets shall prevent insertion of connections under power.

Electrical

1. Six, single pole, CAM style connectors shall be supported for each phase, neutral, and ground. Standard order connector genders shall be females for each phase, with male ground and neutral connectors. Other connector gender combinations shall be available on request.
2. The enclosure shall accept up to 100A copper or aluminum to the full name plate rating of the enclosure at 100% of the rated main breaker with a minimum AIC rating of 65,000A.
3. System rating of Company Switch shall be 65,000 amps symmetrical Short Circuit Current Rating (SCCR). Company Switch products that rely only on breaker AIC rating as a short circuit safety factor shall be deemed unacceptable. Company Switch products that have not proven this safety rating through high current short circuit testing with UL shall not be deemed safe for use under UL SCCR requirements and therefore are not acceptable.

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### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Comply with NECA 1, Reference drawings for mounting height schedule.
- B. Coordination with Other Trades:
  - 1. Protect installed devices and their boxes. 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 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 right 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. WACO or similar speed wire splice devices are prohibited.
- D. Device Installation:
  - 1. Replace devices that have been in temporary use during construction and that 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. Use a torque screwdriver when a torque is recommended or required by manufacturer.
  - 5. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
  - 6. Tighten unused terminal screws on the device.
  - 7. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

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- E. Receptacle Orientation:
  - 1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the left, so the neutral terminal is at the top.
- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
- G. Dimmers:
  - 1. Install dimmers within terms of their listing.
  - 2. Verify that dimmers used for fan speed control are listed for that application.
  - 3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.
- H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical. Group adjacent switches under single, multigang wall plates.
- I. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

### 3.2 GFCI RECEPTACLES

- A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

### 3.3 IDENTIFICATION

- A. Comply with Section 260553 "Identification for Electrical Systems."
- B. Identify each receptacle with panelboard identification and circuit number. On inside of faceplate, use permanent marker to identify circuit.

### 3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
  - 1. Test Instruments: Use instruments that comply with UL 1436.
  - 2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- B. Tests for Convenience Receptacles:
  - 1. Line Voltage: Acceptable range is 105 to 132 V.
  - 2. Test wiring devices for proper polarity and ground continuity.
  - 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.

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- C. Wiring device will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

END OF SECTION 262726

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## SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Fusible switches.
  - 2. Nonfusible switches.
  - 3. Shunt trip switches.
  - 4. Enclosures.

#### 1.3 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
  - 1. Enclosure types and details for types other than NEMA 250, Type 1.
  - 2. Current and voltage ratings.
  - 3. Short-circuit current ratings (interrupting and withstand, as appropriate).
  - 4. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
- B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Wiring Diagrams: For power, signal, and control wiring.

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#### 1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
  - 1. Test procedures used.
  - 2. Test results that comply with requirements.
  - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
  - 1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.

#### 1.7 QUALITY ASSURANCE

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Comply with NFPA 70.

#### 1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
  - 1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
  - 2. Altitude: Not exceeding 6600 feet.
- B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

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1. Notify Architect no fewer than seven days in advance of proposed interruption of electric service.
2. Indicate method of providing temporary electric service.
3. Do not proceed with interruption of electric service without Architect's written permission.
4. Comply with NFPA 70E.

## 1.9 COORDINATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Coordinate disconnect sizes with equipment ratings. Sizes indicated on the drawings are based on "basis-of-design" of equipment. In the case where the equipment provided requires a disconnect of different ratings, provide the proper rated disconnect at no additional cost to the Owner.

## PART 2 - PRODUCTS

### 2.1 FUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
  3. Siemens Energy & Automation, Inc.
  4. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
  1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
  2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
  3. Auxiliary Contact Kit: Two NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open.
  4. Lugs: Mechanical type, suitable for number, size, and conductor material.
  5. Service-Rated Switches: Labeled for use as service equipment.
  6. Accessory Control Power Voltage: Remote mounted and powered; Voltage as required.



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## 2.2 NONFUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
  3. Siemens Energy & Automation, Inc.
  4. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
  2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
  3. Lugs: Mechanical type, suitable for number, size, and conductor material.

## 2.3 SHUNT TRIP SWITCHES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Cooper Bussmann, Inc.
  2. Ferraz Shawmut, Inc.
  3. Littelfuse, Inc.
- B. General Requirements: Comply with ASME A17.1, UL 50, and UL 98, with 200-kA interrupting and short-circuit current rating when fitted with Class J fuses.
- C. Switches: Three-pole, horsepower rated, with integral shunt trip mechanism and Class J fuse block; lockable handle with capability to accept three padlocks; interlocked with cover in closed position.
- D. Control Circuit: 120-V ac; obtained from integral control power transformer, with primary and secondary fuses, with a control power transformer of enough capacity to operate shunt trip, connected pilot, and indicating and control devices.
- E. Accessories:
1. Mechanically interlocked auxiliary contacts that change state when switch is opened and closed.
  2. Form C alarm contacts that change state when switch is tripped.
  3. Three-pole, double-throw, fire-alarm voltage monitoring relay complying with NFPA 72.

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## 2.4 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
  - 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
  - 2. Outdoor Locations: NEMA 250, Type 3R.
  - 3. Kitchen Areas: NEMA 250, Type 4X, stainless steel.
  - 4. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
  - 5. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- C. Install fuses in fusible devices.
- D. Comply with NECA 1.

### 3.3 IDENTIFICATION

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems."
  - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
  - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

### 3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections.

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B. Acceptance Testing Preparation:

1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

3.5 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION 262816

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## SECTION 263600 - TRANSFER SWITCHES

### 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 transfer switches rated 600 V and less, including the following:
  - 1. Automatic transfer switches.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, weights, operating characteristics, furnished specialties, and accessories.
- B. Shop Drawings: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
  - 1. Features and operating sequences, both automatic and manual.
  - 2. List of all factory settings of relays; provide relay-setting and calibration instructions, including software, where applicable.

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## 1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Maintain a service center capable of providing training, parts, and emergency maintenance repairs within a response period of less than eight hours from time of notification.
- B. Source Limitations: Obtain automatic transfer switches through one source from a single manufacturer.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Comply with NEMA ICS 1.
- E. Comply with NFPA 70.
- F. Comply with NFPA 110.
- G. Comply with UL 1008 unless requirements of these Specifications are stricter.

## 1.7 FIELD CONDITIONS

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service:
  - 1. Notify Architect no fewer than two days in advance of proposed interruption of electrical service.
  - 2. Do not proceed with interruption of electrical service without Architect's written permission.

## 1.8 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Section 033000 "Cast-in-Place Concrete."

## PART 2 - PRODUCTS

### 2.1 MANUFACTURED UNITS

- A. Contactor Transfer Switches:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Emerson; ASCO Power Technologies, LP.

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## 2.2 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

- A. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.
- B. Tested Fault-Current Closing and Withstand Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.
- C. Solid-State Controls: Repetitive accuracy of all settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.
- D. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.
- E. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism, mechanically and electrically interlocked in both directions.
- F. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
  - 1. Switch Action: Double throw; mechanically held in both directions.
  - 2. Contacts: Silver composition or silver alloy for load-current switching. Conventional automatic transfer-switch units, rated 225 A and higher, shall have separate arcing contacts.
- G. Neutral Switching. Provide neutral pole switched simultaneously with phase poles.
- H. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, either by color-code or by numbered or lettered wire and cable tape markers at terminations. Color-coding and wire and cable tape markers are specified in Section 260553 "Identification for Electrical Systems."
  - 1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
  - 2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
  - 3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.
- I. Enclosures: General-purpose NEMA 250, Type 1, complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

## 2.3 AUTOMATIC TRANSFER SWITCHES

- A. Comply with Level 1 equipment according to NFPA 110.

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- B. Switching Arrangement: Double-throw type, incapable of pauses or intermediate position stops during normal functioning, unless otherwise indicated.
- C. Manual Switch Operation: Under load, with door closed and with either or both sources energized. Transfer time is same as for electrical operation. Control circuit automatically disconnects from electrical operator during manual operation.
- D. Signal-Before-Transfer Contacts: A set of normally open/normally closed dry contacts operates in advance of retransfer to normal source. Interval is adjustable from 1 to 30 seconds.
- E. Automatic Closed-Transition Transfer Switches: Include the following functions and characteristics:
  - 1. Fully automatic make-before-break operation.
  - 2. Load transfer without interruption, through momentary interconnection of both power sources not exceeding 100 ms.
  - 3. Initiation of No-Interruption Transfer: Controlled by in-phase monitor and sensors confirming both sources are present and acceptable.
    - a. Initiation occurs without active control of generator.
    - b. Controls ensure that closed-transition load transfer closure occurs only when the 2 sources are within plus or minus 5 electrical degrees maximum, and plus or minus 5 percent maximum voltage difference.
  - 4. Failure of power source serving load initiates automatic break-before-make transfer.
- F. In-Phase Monitor: Factory-wired, internal relay controls transfer so it occurs only when the two sources are synchronized in phase. Relay compares phase relationship and frequency difference between normal and emergency sources and initiates transfer when both sources are within 15 electrical degrees, and only if transfer can be completed within 60 electrical degrees. Transfer is initiated only if both sources are within 2 Hz of nominal frequency and 70 percent or more of nominal voltage.
- G. Automatic Transfer-Switch Features:
  - 1. Undervoltage Sensing for Each Phase of Normal Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage is adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
  - 2. Adjustable Time Delay: For override of normal-source voltage sensing to delay transfer and engine start signals. Adjustable from zero to six seconds, and factory set for one second.
  - 3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
  - 4. Time Delay for Retransfer to Normal Source: Adjustable from 0 to 30 minutes, and factory set for 10 minutes to automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.

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5. Test Switch: Simulate normal-source failure.
6. Switch-Position Pilot Lights: Indicate source to which load is connected.
7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.
  - a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
  - b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."
8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
9. Transfer Override Switch: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
11. Engine Shutdown Contacts: Time delay adjustable from zero to five minutes, and factory set for five minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.
12. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods are adjustable from 10 to 30 minutes. Factory settings are for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:
  - a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
  - b. Push-button programming control with digital display of settings.
  - c. Integral battery operation of time switch when normal control power is not available.

## 2.4 SOURCE QUALITY CONTROL

- A. Factory test and inspect components, assembled switches, and associated equipment. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Identify components according to Section 260553 "Identification for Electrical Systems."



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- B. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

### 3.2 CONNECTIONS

- A. Wiring to Remote Components: Match type and number of cables and conductors to control and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner if necessary to accommodate required wiring.
- B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- C. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

### 3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
  - 1. After installing equipment and after electrical circuitry has been energized, test for compliance with requirements.
  - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
  - 3. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.
    - a. Check for electrical continuity of circuits and for short circuits.
    - b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
    - c. Verify that manual transfer warnings are properly placed.
    - d. Perform manual transfer operation.
  - 4. After energizing circuits, demonstrate interlocking sequence and operational function for each switch at least three times.
    - a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.
    - b. Simulate loss of phase-to-ground voltage for each phase of normal source.
    - c. Verify time-delay settings.
    - d. Verify pickup and dropout voltages by data readout or inspection of control settings.

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- e. Test bypass/isolation unit functional modes and related automatic transfer-switch operations.
- C. Coordinate tests with tests of generator and run them concurrently.
- D. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.
- E. Remove and replace malfunctioning units and retest as specified above.
- F. Prepare test and inspection reports.

### 3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment as specified below. Refer to Section 017900 "Demonstration and Training."
  - 1. Video record training and turn over to Owner after training is complete.
- B. Coordinate this training with that for generator equipment.

END OF SECTION 263600

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## 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 luminaires and accessories.
  - 2. Lamps and light engines.
  - 3. Ballasts, drivers and lighting power supplies.
  - 4. Emergency lighting units.
  - 5. Exit signs.
  - 6. Lighting fixture supports.
- B. Related Sections include the following:
  - 1. Division 26 Section "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multi-pole lighting relays and contactors.
  - 2. Division 26 Section "Wiring Devices" for manual wall-box dimmers for incandescent lamps.
  - 3. Division 26 Section "Network Lighting Controls" for manual or programmable control systems with low-voltage control wiring or data communication circuits.

#### 1.3 REFERENCES

- A. ANSI C78.377 – Specifications for the Chromaticity of Solid State Lighting Products
- B. ANSI C82.1 – High Frequency Fluorescent Lamp Ballasts
- C. ANSI C82.77 – Harmonic Emission Limits – Related Power Quality Requirements for Lighting
- D. IEEE C2 – National Electrical Safety Code
- E. IES LM-79-08 – Electrical and Photometric Measurements of Solid State Lighting Products
- F. IES LM-80-08 – Measuring Lumen Maintenance of LED Light Sources
- G. NEMA SSL-3-2010 – High-Power White LED Binning for General Illumination
- H. NFPA 70 – National Electrical Code
- I. UL 935 – Standard for Fluorescent Lamp Ballasts
- J. UL 1598 - Luminaires
- K. UL 8750 – LED Equipment for Use in Lighting Products

#### 1.4 DEFINITIONS

- A. BF: Ballast factor.
- B. CRI: Color-rendering index.
- C. CU: Coefficient of utilization.
- D. LER: Luminaire efficacy rating.
- E. Luminaire: Complete lighting fixture, including ballast housing if provided.
- F. RCR: Room cavity ratio.

#### 1.5 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 including battery and charger.
  - 3. Ballast and driver.
  - 4. Energy-efficiency data.
  - 5. Life, output, and energy-efficiency data for lamps.
  - 6. Photometric data, in IESNA format, based on laboratory tests of each lighting fixture type, outfitted with lamps, ballasts, and accessories identical to those indicated for the lighting fixture as applied in this Project.
    - a. Photometric data shall be certified by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program (NVLAP) for Energy Efficient Lighting Products.
- B. Shop Drawings: Shop drawings of all special or modified standard lighting equipment shall be submitted in reproducible form. Fixture fabrication details shall be drawn at either full size or half size scale. Fixture fabrication details shall illustrate a minimum of three (3) critical views indicating all fabrication, and assembly methods, materials, material gauges and finishes to be employed.
  - 1. Wiring Diagrams: Power and control wiring.
  - 2. Mounting Details and coordination with surroundings.
  - 3. Wiring connectors and harness assembly components.
- C. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
  - 1. Lighting fixtures.
  - 2. Suspended or shaped ceiling components, coves, columns, niches.
  - 3. Structural members to which suspension systems for lighting fixtures will be attached.
  - 4. Other items in area, including the following:
    - a. Air outlets and inlets.
    - b. Speakers.
    - c. Sprinklers.
    - d. Smoke and fire detectors.
    - e. Occupancy sensors.
    - f. Access panels.
    - g. Piping, ductwork, conduit.
  - 5. Moldings, decorations, mosaics.
- D. Product Certificates: For each type of ballast for bi-level and dimmer-controlled fixtures, signed by product manufacturer.

- E. Submittals required prior to project closeout shall include:
  - 1. Field quality-control test reports.
  - 2. Operation and Maintenance Data: For lighting equipment and luminaires to include in emergency, operation, and maintenance manuals.
  - 3. Warranties: Special warranties specified in this Section.

#### 1.6 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. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Comply with NFPA 70.
- E. All lighting fixtures shall be manufactured, furnished, and installed in compliance with all government agencies having jurisdiction. All fixtures shall bear the appropriate UL (or ETL) and IBEW identifications.
- F. Manufacturers: Provide products of firms regularly engaged in the manufacture of interior and exterior lighting equipment of the types and ratings whose products have been in satisfactory use in similar service for not less than 5 years.
- G. National Electrical Manufacturers Association (NEMA): Comply with applicable requirements of NEMA LE 4, "Recessed Luminaires, Ceiling Compatibility" pertaining to recessed luminaires.
- H. Underwriters Laboratories, Inc. (UL): Comply with applicable UL standards pertaining to interior lighting equipment.
- I. Materials and equipment, as well as workmanship shall conform to the highest commercial standards and shall be as specified and/or as indicated on the drawings. Parts not specifically identified shall be made of materials most appropriate for their intended use.
- J. Manufacturers: manufacturers listed as "prime spec" or approved equal in the lighting equipment schedule shall be assumed capable of supplying the listed fixtures unless clearly written exceptions are set forth in their quotations. Any such exceptions shall immediately be brought to the attention of the Architect/Engineer and the Lighting Designer. Manufacturers not listed (as prime or approved equal) must comply with the following:
  - 1. Experience: Manufacturers shall have not less than five years experience in design and manufacturing of lighting fixtures of the type and quality shown. Submission must include a list of completed projects and dated catalogue pages or drawings indicating length of experience.
  - 2. Samples: Manufacturers shall submit a prototype sample of each fixture for review by the Lighting Designer. Prototype samples shall be sufficiently detailed and operational to allow evaluation of compliance with the salient features of the specification. Preliminary design or shop drawings shall not be accepted in place of prototype samples.

#### 1.7 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.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Lighting fixtures shall be wrapped for protection during delivery, storage, and handling. Wet or damp wrapping shall be removed, and disposed of, to prevent staining finish.
- B. Deliver materials in manufacturer's original, unopened, protective packaging.
- C. Store materials in original packaging in a manner to prevent soiling and physical damage, prior to installation.
- D. Handle in a manner to prevent damage to finished surfaces.
- E. Where possible, maintain protective covering until installation is complete and remove such coverings as part of final cleanup.

1.9 WARRANTY

- A. All ballasts / drivers shall carry a minimum three (3) year warranty.
- B. All LED lighting fixtures (unless noted otherwise) and accessories shall carry a minimum five year (5) warranty after final written acceptance by the Owner.

1.10 TECHNICAL AND ADMINISTRATIVE REQUIREMENTS

- A. All information identified in the following Schedules, Details, Layouts and Specifications [Section 265100 and 265600] shall be considered to form a complete and integrated Specification for Lighting Fixtures and Control Systems in the agreed upon Scope Areas. The Contractor shall be responsible for contacting the Architect/Engineer regarding the proper interpretation of all information indicated on the Lighting Fixture Schedules, Fixture Cuts, Details and Specifications.
- B. The submission of a proposal by the Contractor will be construed as evidence that a careful, complete and thorough examination of the premises, existing job conditions and Contract Documents has been made and later claims for labor, materials or equipment required or for difficulties encountered, which could have been foreseen had such an examination been made, will not be recognized. It shall also constitute a representation that the Contractor has checked and verified all quantities, work and materials involved and shall take complete responsibility for any deficiencies encountered thereafter.
- C. The Contractor shall be solely responsible for verifying all fixture quantities, lengths and clearances required and shall inform the Architect/Engineer of job conditions at variance with fixtures as specified or detailed which affect installation or location at the time bid submission is made.
- D. The Contractor shall insure that the lighting fixture manufacturer shall keep on file and make available for review by the Architect/Engineer and the Owner complete Quality Control and Quality Assurance records for all phases of production for all lighting fixtures to be supplied under this project.
- E. Upon request the Contractor shall submit for review by the Architect/Engineer and the Owner verification that he has solicited pricing from all manufacturers which have been listed as "prime spec" and "approved equal." Upon request the Contractor shall submit for review itemized (line item) unit equipment costs for all fixtures to be provided under the Scope of this Contract.
- F. Under multiple phase / separate contracts, same fixture type shall be provided by single manufacturer with exact same specifications. Later phase contractor shall submit specification to match earlier phase.

- G. The Contractor shall be solely responsible for coordinating and expediting the timely procurement and delivery for all lighting equipment, lamps, ballasts and related components for the project.
- H. Specifications and drawings are intended to convey the salient features, function and character of the fixtures only, and do not undertake to illustrate or set forth every item or detail necessary for the work. Minor details not usually indicated on the drawings nor specified, but that are necessary or normally required for the proper execution, completion, installation and operation of the fixtures, shall be included, the same as if they were herein specified or indicated on the drawings.
- I. Omissions: The Owner shall not be held responsible for the omission or absence of any detail, construction feature, etc. which may be normally required in the production of the lighting fixtures. The full and complete responsibility for accurately purchasing, fabricating and installing the lighting fixtures described herein to the fulfillment of those specifications including compliance with all regulatory bodies (i.e.: UL) shall rest solely with the Contractor.

#### 1.11 SPARES

As part of this contract, the Contractor shall furnish the following:

- A. Lamps / LED modules: 1 for each 10 [10%] of each type and rating installed. Furnish at least 40'-0" of fixture type C1, and furnish at least 10 of fixture type C2 series.
- B. Louvers/Lenses : 1 for each 20 [5%] of each type and rating installed. Furnish at least 10 of fixture type C2 series.
- C. Ballasts/ Drivers: 1 for each 10 [10%] of each type and rating installed. Furnish at least 10 of fixture type C2 series.

#### 1.12 SAMPLES

- A. Upon request, the contractor shall submit for review one representative sample for each or any lighting fixture required under this Contract. After sample acceptance, the fixture shall be sent to the project for use as a standard. In the event the submission is rejected, the fixture will be returned to the manufacturer who shall immediately make a new submission which meets the contract requirements.
- B. Shipping: The samples must be actual working unit of fixtures to be supplied and shall be submitted complete with specified lamp(s), 120 volt ballast/transformer complete with cord and plug set and ready for hanging, energizing and examining sample shall be shipped (prepaid) by Contractor to the Lighting Designer or as otherwise specified or directed.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers listed on the Luminaire Schedule as the basis of design are the approved Manufacturers for each luminaire type. Those listed as approved equal Manufacturers are permitted to submit products meeting this specification and the performance criteria as scheduled. Listing as an approved equal manufacturer does not guarantee that products submitted by said equal manufacturer will be accepted for this project.
- B. Luminaires shall be specification grade and listed by an approved agency for intended use and location.
- C. Primary lighting sources shall be LED.

Approved lamp manufacturers for types listed on the Luminaire Schedule shall include the following:

1. Halogen Incandescent: Philips, Osram Sylvania, GE, Ushio
2. Linear Fluorescent: Philips, Osram Sylvania, GE
3. Compact Fluorescent: Philips, Osram Sylvania, GE
4. HID: Philips, Osram Sylvania, Venture, GE, Ushio

D. Approved chip engine manufacturers for solid state luminaires listed on the Luminaire Schedule shall include the following:

1. CREE
2. GE
3. Nichia
4. Osram Sylvania
5. Philips
6. Seoul Semiconductor
7. Soraa
8. Toshiba
9. Xicato.

## 2.2 LUMINAIRE SCHEDULE

A. Refer to Electrical drawing for schedule of luminaire types specified for this project.

## 2.3 LIGHTING FIXTURES AND COMPONENTS, GENERAL REQUIREMENTS

- A. Lighting fixtures shall be of rigid construction, dimensionally stable, and shall be assembled with secure fastenings. Ferrous parts shall be protected from corrosion by plating or shall be finished with high reflectance enamel with non-yellowing binder and high pigment to binder ratio, with semi-gloss finish. Ferrous parts shall be prepared for finish by industry standard finishing process (see Finishes). Non ferrous metals (i.e. aluminum) unless otherwise noted be treated with a semi-gloss polyester powder coat enamel finish.
- B. Provide each fixture with lamps as indicated in the lighting fixture schedule. Where/or if lamps are not indicated, contact the Architect/Engineer for clarification.
- C. Hinged door closure frames shall operate smoothly without binding. Where possible fabricate frames to allow lamp installation/removal without tools. Hinge mechanism shall be designed to preclude accidental falling of hinged door closure frames during relamping operations and while secured in operating position.
- D. Recessed, surface or pendant lighting fixtures shall be suspended from structural members or ceiling structure members of minimum 1-1/2" channels, by standard bar hangers, or other approved means. Fixture locations shall be coordinated with ceiling patterns. Refer to architectural reflected ceiling plan for exact location of fixtures and architectural rooms finish schedule for ceiling construction details and mounting heights. The installing contractor shall provide all structural steel and related supports as required or necessary to properly and safely install and support the fixtures.
- E. Fixture wiring shall be suitable for the temperature rating of the fixture; wiring through fluorescent channels shall be done with Type SFF2 wire. Where a junction box is required, to change from branch circuit to fixture wiring, use approved feed through, pre-wired fixture wiring, and install a separate junction box. The junction box shall be fully accessible after installation of covering materials. Where flexible conduit or portable cord is used, a grounding jumper shall be installed. All fixtures shall be grounded. Housings shall be so constructed that all electrical components are easily accessible and replaceable without removing fixtures from their mountings, or disassembling adjacent construction.



- F. All recessed, pendant and surface mounted lighting fixtures unless otherwise noted or directed shall be UL listed for through-wiring and shall be furnished complete with all required integral wiring and all required flexible conditions, pigtailed and related accessories necessary for suitable operation and installation.
- G. All recessed fixtures, which are to be installed in insulated ceilings, shall be provided with UL listed thermocouple protection.
- H. All materials, accessories, and other related fixture parts shall be new and free from defects which in any manner may impair their character, appearance, strength, durability and function, and be effectively protected from any damage or injury from the time of fabrication to the time of delivery and until final written acceptance of the work by the Owner.
- I. Enclosures: Fabricate fixture enclosures with a minimum No. 20 gauge (0.0359 inch) thick cold rolled sheet steel. Enclosures may be constructed of other metals, provided they are equivalent in mechanical strength, durability and in compliance with local codes and acceptable for the purpose.
- J. Sheet metal work: All sheet metal work shall be free from tool marks and dents, and shall have accurate angles bent as sharp as compatible with the gauges of the required metal. All intersections and joints shall be formed true of adequate strength and structural rigidity to prevent any distortion after assembly.
- K. Castings: All aluminum, iron or composite castings shall be exact replicas of the approved patterns and shall be free of sand pits, blemishes, scales and rust, and shall be smoothly furnished. Tolerance shall be provided for any shrinkage of the metal castings in order that the finished castings will accurately fit in their designated locations. Unless otherwise noted for cast aluminum components use copper free 319 or 443 aluminum alloy only. For cast iron components use ASTM Spec A48-83 Class 30 gray iron.
- L. Mounting frames and rings: If ceiling system requires, each recessed fixture shall be furnished with a mounting frame or ring compatible with the ceiling in which they are to be installed. The frames and rings shall be one piece or constructed with electrically welded butt joints and of sufficient size and strength to sustain the weight of the fixture.
- M. Yokes, brackets and supplementary supporting members needed to mount lighting fixtures to carrier channels, suitable ceiling members or other structure shall be furnished and installed by the Contractor.
- N. For steel and aluminum fixtures all screws, bolts, nuts and other fastening and latching hardware shall be cadmium or equivalent plated. For stainless steel fixtures, all hardware shall be stainless steel. Whenever possible all fasteners shall be captive type. Where indicated provide tamper resistant fasteners.
- O. Welding shall be in accordance with recommendations of the American Welding Society and shall be done with electrodes and/or methods recommended by the manufacturers of the metals being welded. Welds shall be continuous, except where spot welding is specifically permitted. Welds exposed to view shall be ground flush and dressed smooth. All welds on or behind surfaces which will be exposed to view shall be done so that finished surfaces will be free of imperfections such as pits, runs, splatter, cracks, warping, dimpling, depressions or other forms of distortion or discoloration. All welded surfaces shall be free of weld splatter and welding oxides.
- P. Extruded aluminum frame and trim shall be rigid and manufactured from 6063-T3 aluminum alloy without blemish or warpage in the installed product. Miter cuts shall be accurate. Joints shall be flush and without burrs. Cuts shall maintain alignment with the light fixture located in its final position.
- Q. All extruded aluminum fixtures shall be fabricated of 6063-T3 alloy (min. wall thickness .120) and in all cases shall be provided with heavy gauge internal alignment brackets in order to assure tight joints and a clean level and continuous appearance after installation. Unless otherwise noted, all end plates shall be continuously welded, filled and ground prior to application of final paint finishes so as to present a clean, seamless and monolithic appearance. Exposed fasteners on end plates shall be absolutely prohibited.

- R. All fixtures with removable louvers, lenses, reflectors, refractors, cones or other shielding devices shall be supplied with integral safety chains. Contractor shall be responsible for insuring that all safety chains are securely fastened to shielding device and fixture housing.
  - S. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.
  - T. Metal Parts: Free of burrs and sharp corners and edges.
  - U. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.
  - V. 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.
  - W. 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 Metallized Film: 90 percent.
  - X. Adjustable Luminaires:
    - 1. Recessed Luminaires shall be aimable using pan/tilt adjustment accessible through the aperture, either by means of worm drive screws or thumbwheels. Removal of trim or optic shall not be required.
    - 2. Surface or Pendant Luminaires shall have mounts that permit maximum range of motion for aiming. Moving elements shall have set screw locking or otherwise suitable friction fittings to ensure that luminaire does not shift after aiming.
    - 3. During installation, aim each luminaire in general target area as scheduled, so that luminaires may be visible during testing prior to commissioning.
    - 4. Where applicable, allow slack at fixture whips to permit aiming without causing strain on conductors. After aiming, neatly dress remaining slack tight to fixture yoke or mounts.
  - Y. Luminaire Accessories:
    - 1. Extra lenses, louvers, snoots, and other scheduled accessories shall be installed as directed by Specifier during system aiming and commissioning. All unused accessories shall be turned over to Owner after commissioning for attic stock.
- 2.4 EXIT SIGNS
- A. Description: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.
  - B. Internally Lighted Signs:
    - 1. Lamps for AC Operation: LEDs, 70,000 hours minimum rated lamp life.
      - a. Battery: Sealed, maintenance-free, nickel-cadmium type.
      - b. Charger: Fully automatic, solid-state type with sealed transfer relay.
      - c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
      - d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
      - e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

- f. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.

## 2.5 EMERGENCY LIGHTING UNITS

- A. Description: Self-contained units complying with UL 924.
  1. Battery: Sealed, maintenance-free, lead-acid type.
  2. Charger: Fully automatic, solid-state type with sealed transfer relay.
  3. Operation: Relay automatically turns lamp on when power supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
  4. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
  5. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

## 2.6 SOLID STATE (LED) LUMINAIRE SYSTEMS

- A. Light emitting diodes used for interior applications shall have CRI as scheduled, with a minimum CRI of 80 if not identified. CRI of LEDs shall also have a CQS value matching the CRI, following the NIST color quality scale. CCT shall be as scheduled.
- B. LED luminaires shall have integral light engine, heat sink, driver, and optic package. Minimum LM-80 depreciation to L70 at 50,000 hours under installed conditions. Minimum CRI of 85 with less than 50K CCT shift over mean life, binning to 2-step McAdams ellipse.
- C. LED light engines shall be thermally fixed to heat sinks sized to appropriately dissipate gate heat under design load in the installed conditions. Lumen maintenance calculations shall be based upon the average ambient temperature at the luminaire housing or cavity area.
  1. All interior LED luminaires shall be designed to meet an L70 mean life of at least 50,000 hours with scheduled drive currents.
  2. All exterior LED luminaires shall be designed to meet an L70 mean life of at least 60,000 hours with scheduled drive currents.
- D. LED drivers:
  1. Drivers shall be solid state with integral heat sink. Driver shall have overload and short circuit protection, with a power factor of 0.9 to 1.0 and maximum THD of 20%.
  2. Remote drivers shall be enclosed in NEMA enclosures.
  3. Drivers shall be dimmable as scheduled.
  4. Drivers shall have minimum mean life of 50,000 hours, with unlimited switching.
- E. LED dimming and color control:
  1. Verify that all scheduled LED luminaire drivers are compatible with the means of control indicated, either DMX-512, 0-10VDC, or low voltage dimmer.
  2. Compatibility: Certified by manufacturer for use with individually specified luminaire and individually specified power supplies and/or drivers.

## 2.7 FINISHES

- A. Painted surfaces shall be synthetic enamel with acrylic, alkyd, epoxy, polyester or polyurethane base, light stabilized, baked on at 350 degrees Fahrenheit minimum, catalytically or photochemically polymerized after application.
- B. White finishes minimum 90% reflectance (semi-gloss).
- C. Selection: Unless otherwise indicated, all external fixture finishes shall be as selected by the Architect/Engineer. Unless otherwise indicated, all fixture finishes shall be semi-gloss polyester powder coat enamel (color to be selected by Architect).
- D. Undercoat: Except for stainless steel all ferrous metal surfaces shall be given a five stage phosphate treatment or other acceptable base bonding treatment before final painting and after fabrication.
- E. Unpainted non-reflecting surfaces shall be satin finished and coated with a baked-on clear lacquer to preserve the finish. Where aluminum surfaces are treated with an anodic process, the clear lacquer coating may be omitted.
- F. Unpainted aluminum surfaces: Finish interior aluminum trims with an anodized coating of not less than 7 mg. per square inch, of a color and surface finish as selected by the Architect/Engineer. Finish exterior aluminum and aluminum trims with an anodized coating of not less than 35 mg. per square inch of a color and surface finish as selected by the Architect/Engineer.
- G. Metal finishes: Provide finishes of the color and type indicated and having the following properties:
  - 1. Protection of metal from corrosion: 5-year warranty against perforation or erosion of the finish from weathering.
  - 2. Color retention: 5-year warranty against fading, staining, or chalking from weathering including solar radiation.

## 2.8 REFLECTORS

- A. Reflectors, cones or baffles shall be absolutely free of spinning lines, stains, ripples or any marks or indentations caused by riveting to other assembly techniques. No rivets, springs or other hardware shall be visible after installation.
- B. Downlight reflectors shall provide minimum 45 degree lamp and lamp image cut-off unless otherwise specified.
- C. Cone flanges shall be formed as an integral part of the cone and shall have identical color and finish as the cone, except as shown. The flange's major surface shall be perpendicular to the cone axis.
- D. The reflecting surface of the cone or reflector shall be tested for proper sealing. Test per ASTM B136-63T. If any stain is visible, the specimen shall not be considered to have been properly sealed. Reflector cones shall be free of manufactured defects. The reflector inner surface shall be free of water spotting and shall maintain a reflectivity ratio of not less than 83% on clear specular finish.
- E. All alzak parabolic cones shall be guaranteed by the manufacturer against discoloration for a minimum of ten years and in the event of premature discoloration shall be replaced by the manufacturer (including both materials and the cost of labor) at no cost to the Owner.
- F. Where modification of standard fixtures are specified, fixtures shall be modified as required with lamp sockets positioned to provide desired photometric performance.
- G. Where or if a "specular black alzak insert" is specified, high gloss baked black enamel applied to the reflector shall be considered an acceptable alternate.

- H. Specular clear alzak reflector cones and parabolic louvers specified with the use of compact fluorescent lamps or triphosphor fluorescent lamps shall be provided with clear non-iridescent coating.
- I. All fixtures with removable reflectors, louvers or baffles shall be supplied with safety chains. Contractor shall be responsible for insuring that all safety chains are securely fastened to reflector and housing.

## 2.9 STEMS

- A. Each stem shall have a brass or steel swivel, hang straight, or other self-aligning device.
- B. Stems shall be made of rigid metallic (steel) pipe only, minimum wall thickness of 0.062".
- C. Wherever a fixture or its hanger canopy is applied to a surface mounted outlet box a finishing ring shall be utilized to conceal the box.
- D. Unless otherwise indicated, all stems shall match in color and finish the color of the fixture which they support. Where no color is indicated, stems shall be semi-gloss baked white enamel.
- E. Stems shall at the completion of installation and all other work be free of clamp marks, scratches and all other visual imperfections.
- F. Unless otherwise indicated, stems shall be provided in order to adequately mount and level each fixture run with proper structural support per manufacturer's recommendations.
- G. Pendant Fixtures: Install pendant lighting fixtures plumb and at a height from the floor as specified on the drawings. In cases where conditions make this impractical, refer to the Architect/Engineer for direction. Use ball aligners and canopies on pendant fixtures unless otherwise noted.
- H. Pendant stems shall be equally spaced along every fixture run. If field conditions or fixture construction do not allow for this condition, the installing Contractor shall immediately notify the Architect/Engineer prior to commencement of the work.

## 2.10 LENSES, LOUVERS AND DIFFUSERS

- A. Lenses/Louvers: General:
  - 1. All lenses, diffusers, and shielding media shall be properly and securely mounted within fixture assemblies. Lay in type lenses and louvers shall not be acceptable. All shielding materials shall be tightly fitted with no loose panels or parts and shall show no visible light leaks of unintentional or unscheduled light.
  - 2. All fixtures with removable cones, louvers or other shielding devices shall be supplied with safety chains. Contractor shall be responsible for insuring that all safety chains are securely fastened to housing and shielding device.
- B. Lenses: Plastic
  - 1. Unless otherwise indicated or otherwise authorized, all plastic shielding, lenses and diffusers shall be white opal clear 100% UV stabilized virgin acrylic or in special cases high impact polycarbonate (lexan). Use of polycarbonate lenses shall be restricted to those areas outlined in the National Electric Code (latest Bulletin). Use of polystyrene components is absolutely prohibited.
  - 2. Plastic for lenses and diffusers shall be formed of colorless 100% virgin acrylic as manufactured by Rohm & Haas, DuPont, G.E. or equally acceptable manufacturers. The quality of the raw material must meet American Society of Testing Materials (ASTM) standards, as tested by an independent test laboratory. Acrylic plastic lenses and diffusers shall be properly cast, molded or extruded as specified and shall remain free of any dimensional instability, discoloration, embrittlement or loss of light transmittance for at least 15 years.

C. Lenses: Glass

1. Unless otherwise indicated or authorized all glass shielding, diffusers or lenses shall be clear tempered borosilicate glass. Soda lime glass material shall not be acceptable. Submit samples of glass elements upon request.
2. Glass used for lenses, refractors and diffusers in incandescent and tungsten halogen lighting fixtures shall be tempered for high impact and heat resistance; the glass shall be crystal clear in quality with a transmittance of not less than 92%. For exterior fixtures use tempered borosilicate glass, Corning No. 7740 or equal. For fixtures directly exposed to the elements and aimed above the horizontal with a radiant energy of 4.16 watts per square inch or greater, use Corning Vycor glass or equal.
3. Where optical lenses are used, they shall be free from spherical or chromatic aberrations and other imperfections, which may hinder the functional performance of the lenses.
4. Mechanical: All lenses, louvers or other light diffusing elements shall be removable but positively held so that hinging or other normal motion will not cause them to drop out.

2.11 MISCELLANEOUS

- A. Comply with Division 26 Section "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.
- B. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm)
- C. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.
- D. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.
- E. Where (or if) indicated all remote step-down transformers and ballasts shall be properly wired to fixtures to insure that voltage drop does not exceed 5%, regardless of transformer's or ballast's location.
- F. All remote step down transformers and ballasts shall be mounted in approved NEMA type enclosures and only located in areas previously deemed to be readily accessible by the Owner's maintenance personnel.
- G. Where indicated, all upright or wallwash coves utilizing fluorescent equipment shall be installed so as to produce a continuous and unbroken band of light free of visual imperfections, socket shadows, light gaps, etc. The inability to provide this appearance shall be brought immediately to the Architect's/Engineer's attention prior to installation.
- H. All fixture lengths whether straight or curvilinear shall be fabricated based upon the fixture manufacturer's or contractor's field verified dimensions only.
- I. Fixture manufacturer shall coordinate conduit entry locations with installing contractor.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The Contractor shall furnish and install lighting fixtures as noted on the drawings. Fixtures shall be completely wired and lamps installed and shall be in perfect operating condition at the time of completion.
- B. Setting and Securing: The Contractor shall set lighting fixtures plumb, square, and level with ceiling and walls, in alignment with adjacent lighting fixtures, and secure in accordance with manufacturers' directions and approved shop drawings. Conform to the requirements of NFPA 70.

- C. Mounting: Mounting heights specified or indicated are to bottom of fixture for suspended and ceiling mounted fixtures and to center of fixture for wall mounted fixtures. Obtain approval of the exact mounting for lighting fixtures on the job before installation is commenced and, where applicable, after coordinating with the type, style, and pattern of the ceiling being installed.
- D. Coordination: The installing Contractor shall communicate with other trades as appropriate to properly interface, schedule and coordinate installation of lighting fixtures with other work.
- E. Grounding: The Contractor shall ground non current carrying parts of electrical equipment. Where the copper grounding conductor is connected to a metal other than copper, provide specially treated or lined connectors suitable for this purpose.
- F. Installation of fixture locations shall be in strict accordance with the intent of the contract drawings and approved shop, specifications and drawings.
- G. Fixture locations: Do not scale electrical drawings for exact location of the lighting fixtures. In general, the architectural reflected ceiling plans indicate the proper locations of lighting fixtures, unless otherwise noted on architectural plans.
- H. Unless otherwise shown on the Contract Drawings, lighting fixtures and/or fixture outlet boxes shall be provided with hangers to adequately support the complete weight of the lighting fixture. The design of hangers and the method of fastening other than what is shown on the Contract Drawings, or herein specified, shall be submitted to the Architect/Engineer for approval.
- I. The Contractor shall provide all hangers, rods, mounting brackets, supports, frames, earthquake clips and other equipment normally required for the proper, safe and distortion-free installation in the various surfaces in which they appear. Determine surface types from the architectural drawings.
- J. Instructions: Each lighting fixture shall be packaged with complete illustration and instructions showing how to install. Install lighting fixtures in strict conformance with manufacturer's recommendations and instructions.
- K. The Contractor shall rigidly align continuous rows of lighting fixtures for true aligned appearance.
- L. The Contractor shall support all lighting fixtures independently of ductwork or piping.
- M. Splices in internal wiring shall be made with approved insulated "wire nut" type mechanical connectors, suitable for the temperature and voltage conditions to which they are subjected.
- N. All wire utilized for connections to or between individual lamp sockets and lamp auxiliaries (i.e., wires which do not constitute "through circuit" wiring) shall be suitable for temperature, current, and voltage conditions to which it is subjected.
- O. The Contractor shall install reflector cones, baffles, aperture plates, light controlling elements for air handling fixtures and decorative elements after completion of ceiling tiles, painting and general cleanup.
- P. The Contractor shall replace blemished, damaged, or unsatisfactory fixtures as directed by the Owners' representative.
- Q. All pendant mounted lighting fixtures within the same room or area shall be installed plumb, and at a uniform height from the finished floor. Adjustment of desired height (if required) shall be made during the installation phase. Unless otherwise shown on the Contract Drawings, stems and canopies shall be matched to the associated lighting fixtures.
- R. Support for Lighting Fixtures in or on Grid-Type Suspended Ceilings: Use grid as a support element.

1. Install a minimum of four ceiling support system rods or wires for each fixture. Locate not more than 6 inches (150 mm) from lighting fixture corners.
  2. Support Clips: Fasten to lighting fixtures and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application.
  3. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch (20-mm) metal channels spanning and secured to ceiling tees.
- S. Suspended Lighting Fixture Support:
1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
  2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
  3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
- T. Embedded luminaires: In-grade or floor-embedded luminaires shall be set flush to surrounding surface.
- U. Remote power supplies, drivers, ballasts, and controllers shall be located in accessible areas, out of view of occupants. Coordinate locations with Architect and other trades.
- V. Adjust aimable lighting fixtures to provide required light intensities.
- W. Connect power and control wiring in accordance with Division 26 specifications and Manufacturer instructions.
- X. Lamp Seasoning:
1. Operate all solid state luminaires for 50 hours at full output prior to request for checkout. Contractor shall identify and replace any luminaire observed to have changes in output or color exceeding the specified range during the seasoning period.
- Y. Addressable Luminaires:
1. Configure digitally addressable luminaires so that their control address aligns with schedules and control system drawings. Follow Manufacturer instructions for configuration of address at each luminaire.
- Z. Fixture types [U1, U1A, U1B, U11, U16, U17, U18 and U18A] for gypsum board (including acoustical gyp) ceiling shall be installed for trimless spackle mud-in installation. Acoustic plaster ceiling back of panel shall be cut-out to install recessed mounting lighting fixture properly.
- AA. All perimeter wall wash luminaires shall run wall-to-wall. Submittal shall include exact run length plan drawings for all locations based on field verified dimensions.
- 3.2 FIELD QUALITY CONTROL
- A. Tests: Upon completion of installation of lighting fixtures, and after building circuits have been energized, apply electrical energy to demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting.
- B. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.
- C. 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.

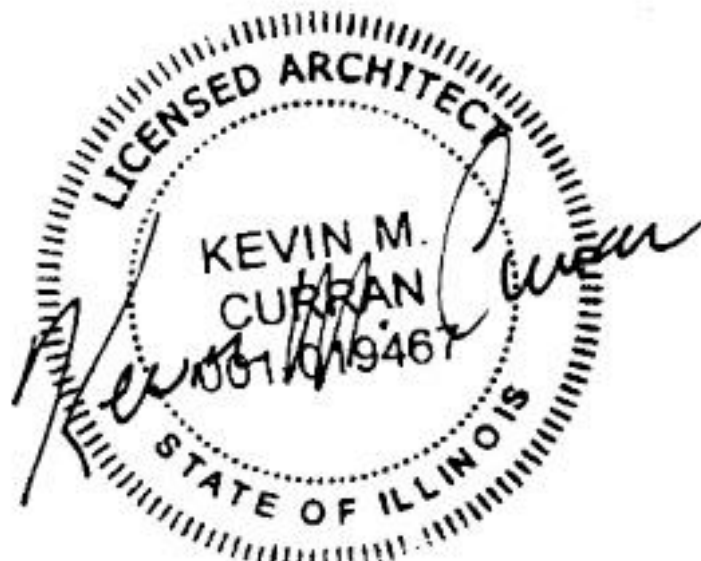


3.3 AIMING AD ADJUSTMENT

- A. All adjustable lighting units shall be aimed, focused, locked, etc., by the Contractor under the supervision of the Lighting Designer. The Lighting Designer shall indicate the number of crews (foreman and apprentice) required. All aiming and adjusting shall be carried out after the entire installation is complete. All ladders, scaffolds, lift equipment, safety belts, flashlights, walkie talkie equipment, etc. required shall be furnished by the Contractor at the direction of the Lighting Designer. As aiming and adjusting is completed, locking set screws and bolts and nuts shall be tightened securely.
- B. Night work: Where possible, units shall be focused during the normal working day. However, where daylight interferes with seeing, aiming shall be accomplished at night.
- C. Prior to final inspection, relamp all fixtures which have failed lamps, or lamps where visible color shift has occurred, and leave all lighting fixtures, equipment, and accessories in good, uniform operating condition. The Contractor shall replace any burned-out lamp during the first 100 days after the completion of the Contract.

END OF SECTION 26 51 00

**EXHIBIT C DRAWINGS**



# SRC 2000

## CONFERENCE AREA RENOVATION

425 FAWELL BLVD  
GLEN ELLYN, ILLINOIS

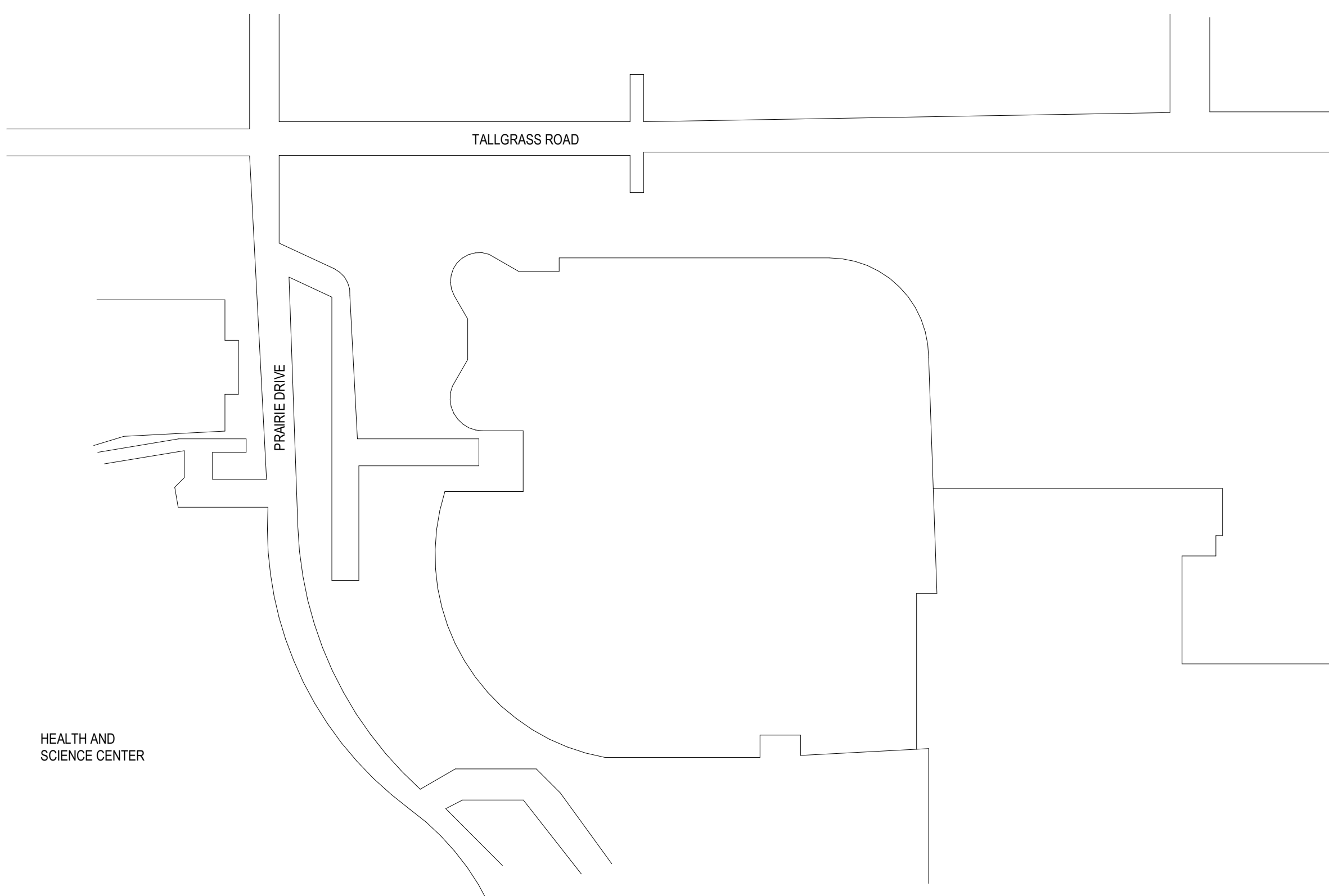
### PERMIT & BID DOCUMENTS

DECEMBER 18, 2017

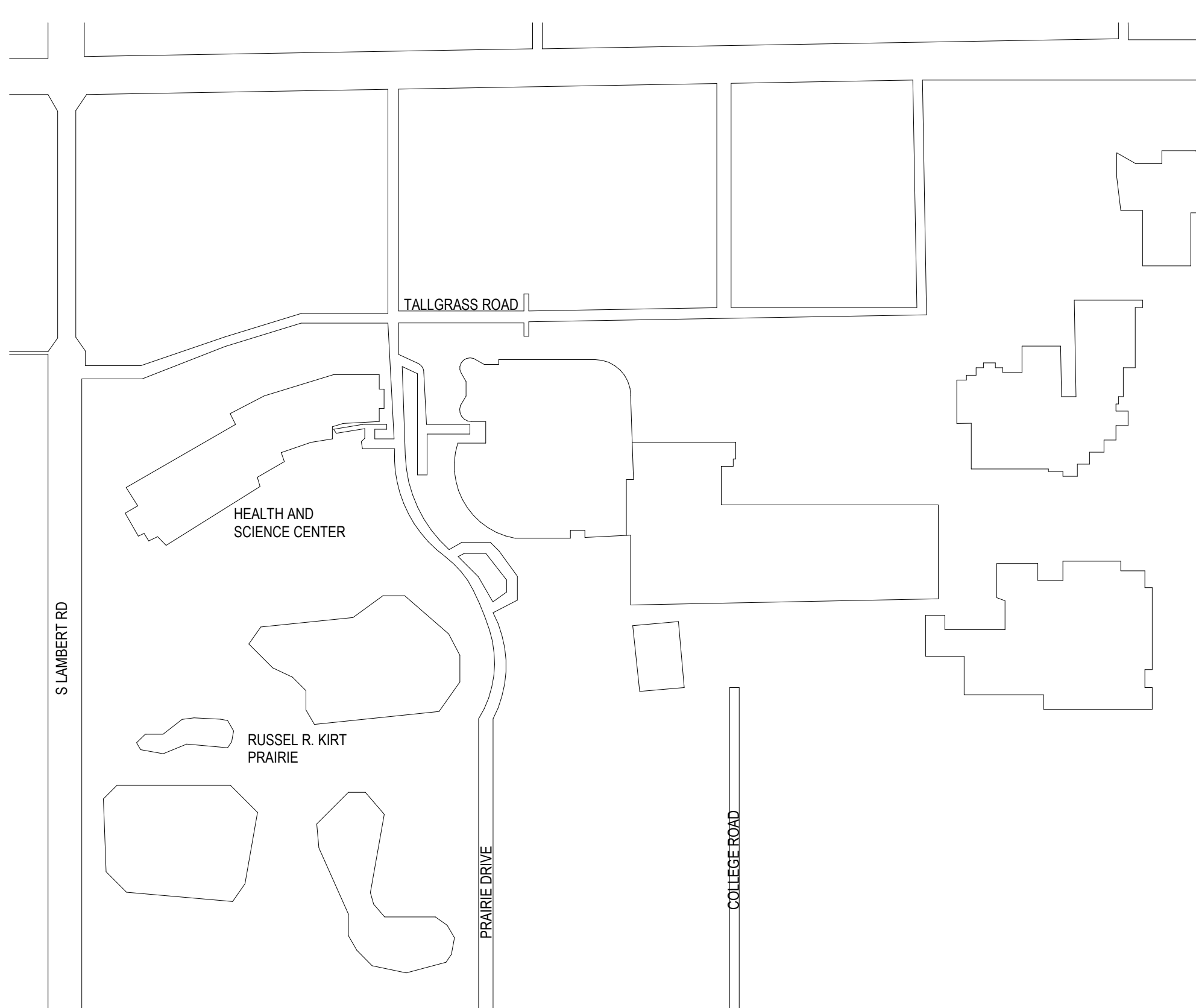
#### PROJECT DESCRIPTION

THIS PROJECT CONSISTS OF REMODELING OF EXISTING SRC 2000 CONFERENCE CENTER. THE SCOPE INCLUDES NEW ARCHITECTURAL FINISHES, NEW AV SYSTEM, NEW THEATRICAL LIGHTING AND NEW ARCHITECTURAL LIGHTING.

#### PROPERTY LOCATION



#### SITE MAP



#### INDEX OF DRAWINGS

.GENERAL.		.ARCHITECTURAL.	
0.0	COVER SHEET	CPI.1	CODE PLAN
0.1	SYMBOLS AND ABBREVIATIONS	A1.1	FLOOR PLAN, SECOND FLOOR
		A3.1	REFLECTED CEILING PLAN, SECOND FLOOR
		A12.1	INTERIOR ELEVATIONS
.ELECTRICAL.		.SPECIAL SYSTEMS.	
E0.0	ELECTRICAL SYMBOLS AND ABBREVIATIONS	QT-001	THEATRICAL GENERAL NOTES
E1.1	SECOND FLOOR LIGHTING PLAN	QT-100	LEVEL 2 - STAGE LIGHTING PLAN
E2.1	SECOND FLOOR POWER & SPECIAL SYSTEMS PLAN	QT-101	CONTROL RM LEVEL - STAGE LIGHTING PLAN
E3.1	ELECTRICAL ONE-LINE DIAGRAMS	QT-110	LEVEL 2 - STAGE DRAPERY PLAN
E7.1	ELECTRICAL SCHEDULES	QT-120	CONTROL RM LEVEL - STAGE RIGGING PLAN
ED1.1	SECOND FLOOR DEMO LIGHTING PLAN	QT-220	STAGE RIGGING SECTION ON CENTER
ED1.2	SECOND FLOOR DEMO POWER & SPECIAL SYSTEMS PLAN	QT-501	LIGHTING DETAILS AND SCHEDULES
		QT-601	LIGHTING SCHEDULES AND RISER
		TA-001	AV GENERAL NOTES
		TA-102	SECOND FLOOR WIRING DEVICE PLAN
		TA-103	CONTROL ROOM WIRING DEVICE PLAN
		TA-201	SRC2000 REFLECTED CEILING PLAN

#### APPLICABLE CODES

- ICC 2009 INTERNATIONAL BUILDING CODE
- ICC 2009 INTERNATIONAL RESIDENTIAL CODE
- ICC 2009 INTERNATIONAL FIRE CODE
- ICC 2009 INTERNATIONAL MECHANICAL CODE
- ICC 2009 INTERNATIONAL PROPERTY MAINTENANCE CODE
- ICC 2009 INTERNATIONAL FUEL GAS CODE
- NEA 2011 NATIONAL ELECTRICAL CODE
- DUPAGE COUNTY COUNTRYWIDE STORMWATER FLOODPLAIN ORDINANCE, 2013
- ILLINOIS STATE PLUMBING CODE, 2004 (SUPERCEDED BY ILLINOIS STATE PLUMBING CODE, 2014)
- ILLINOIS NFPA 101 LIFE SAFETY CODE, 2009
- VILLAGE CODE - TITLE 2, CHAPTER 8 - APPEARANCE GUIDELINES ORDINANCE 5508VC
- VILLAGE CODE - TITLE 4, CHAPTER 1 - CONTRACTOR REGISTRATION REQUIREMENTS
- VILLAGE CODE - TITLE 4, CHAPTER 5 - SIGN CODE
- VILLAGE CODE - TITLE 4, CHAPTER 7 - STORMWATER AND FLOODPLAIN REGULATIONS
- VILLAGE CODE - TITLE 7, CHAPTER 9 - SEWER USE REGULATIONS
- VILLAGE CODE - TITLE 7, CHAPTER 10 - WATER SYSTEM REGULATIONS
- VILLAGE CODE - TITLE 8, CHAPTER 1 - STREETS AND SIDEWALKS
- VILLAGE CODE - TITLE 8, CHAPTER 4 - FORESTRY MANAGEMENT
- VILLAGE CODE - TITLE 8, CHAPTER 6 - PUBLIC UTILITY CONSTRUCTION REGULATIONS
- VILLAGE CODE - TITLE 10, CHAPTER 1 - ZONING CODE
- VILLAGE CODE - TITLE 10, CHAPTER 2 - SUBDIVISIONS REGULATIONS
- VILLAGE CODE - TITLE 10, CHAPTER 4 - ANNEXATION REGULATIONS
- DUPAGE COUNTY FOOD SERVICE DESIGN AND CONSTRUCTION REGULATIONS
- DUPAGE COUNTY PRIVATE WATER SUPPLY ORDINANCE
- DUPAGE COUNTY PRIVATE SEWERAGE DISPOSAL ORDINANCE
- ILLINOIS ACCESSIBILITY CODE, 1997
- ILLINOIS ENERGY CONSERVATION CODE (ICC 2015 INTERNATIONAL ENERGY CONSERVATION CODE WITH AMENDMENTS)
- ILLINOIS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION
- ILLINOIS UTILITY LOCATION ACT 220 ILCS 50 (JULIE)
- ILLINOIS ASHRAE ENERGY STANDARD 90.1, 2004
- ILLINOIS ENVIRONMENTAL PROTECTION AGENCY, ASBESTOS ABATEMENT
- ILLINOIS ENVIRONMENTAL PROTECTION AGENCY, RADON RESISTANT CONSTRUCTION ACT
- ILLINOIS STATE FIRE MARSHALL, BOILER REGULATIONS
- ILLINOIS STATE FIRE MARSHALL, UNDERGROUND STORE TANK REGULATIONS
- ILLINOIS STATE FIRE MARSHALL, ELEVATOR REGULATIONS
- USEPA RENOVATION, REPAIR AND PAINTING PROGRAM RULE (LEAD)
- APPLICABLE REGULATIONS OF OTHER FEDERAL, STATE AND LOCAL AGENCIES AND PUBLIC UTILITY SERVICE PROVIDERS

- ORDINANCES
- VILLAGE CODE - TITLE 2, CHAPTER 8 - APPEARANCE GUIDELINES ORDINANCE 5508VC
- VILLAGE CODE - TITLE 4, CHAPTER 1 - CONTRACTOR REGISTRATION REQUIREMENTS
- VILLAGE CODE - TITLE 4, CHAPTER 5 - SIGN CODE
- VILLAGE CODE - TITLE 4, CHAPTER 7 - STORMWATER AND FLOODPLAIN REGULATIONS
- VILLAGE CODE - TITLE 4, CHAPTER 8 - TREE PRESERVATION REGULATIONS
- VILLAGE CODE - TITLE 7, CHAPTER 9 - SEWER USE REGULATIONS
- VILLAGE CODE - TITLE 7, CHAPTER 10 - WATER SYSTEM REGULATIONS
- VILLAGE CODE - TITLE 8, CHAPTER 1 - STREETS AND SIDEWALKS
- VILLAGE CODE - TITLE 8, CHAPTER 4 - FORESTRY MANAGEMENT
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- USEPA RENOVATION, REPAIR AND PAINTING PROGRAM RULE (LEAD)
- APPLICABLE REGULATIONS OF OTHER FEDERAL, STATE AND LOCAL AGENCIES AND PUBLIC UTILITY SERVICE PROVIDERS

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100% CD

Community College District 502  
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Renovation  
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Glen Ellyn, Illinois 60137

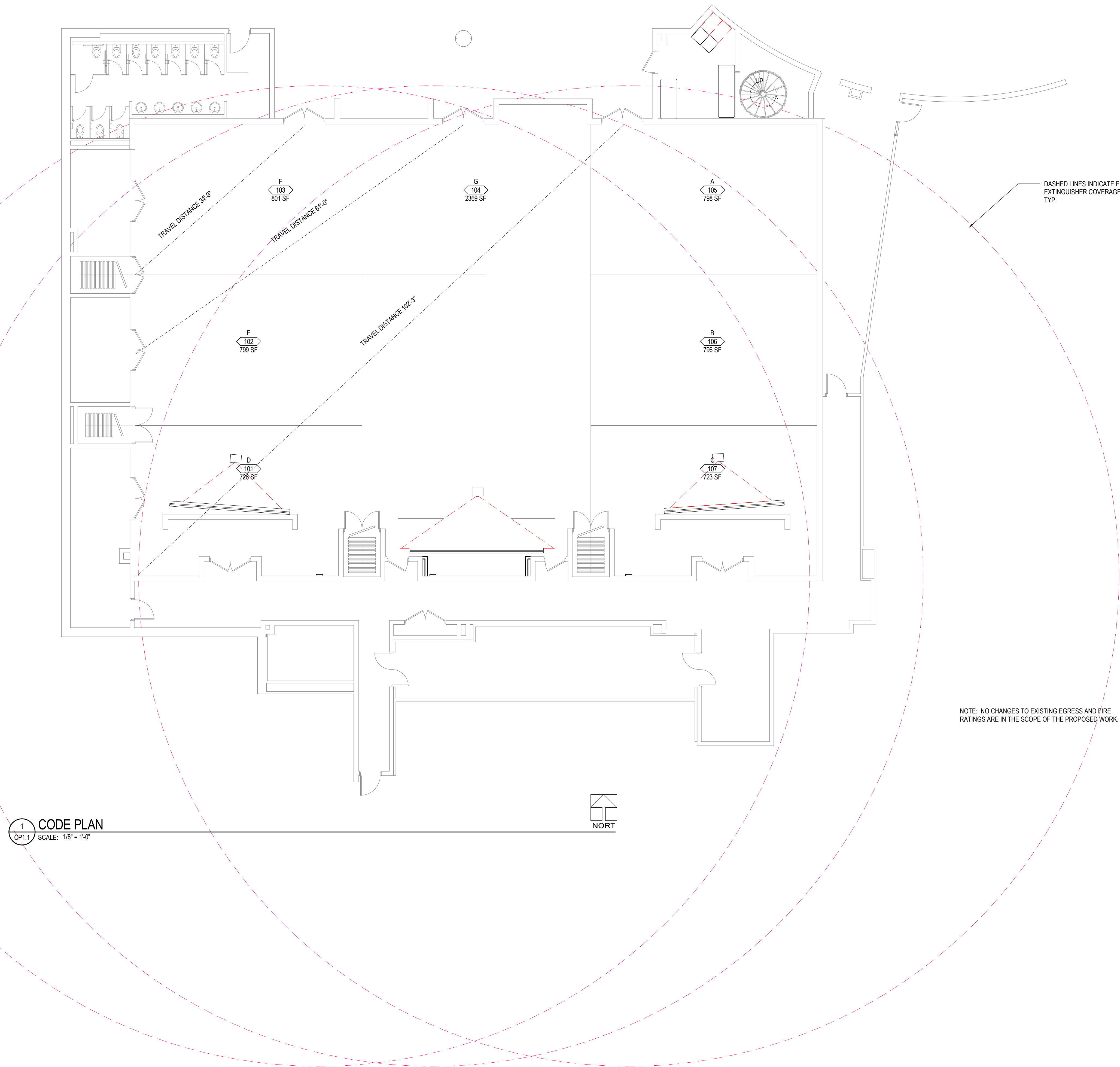
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22-1742-00  
10/06/17  
Revision

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Architecture Engineering Planning Interiors  
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# ABBREVIATIONS

AC	AIR CONDITIONING	CR	CORROSION RESISTANT	FB	FACE BRICK	IAQ	INDOOR AIR QUALITY	NC	NOISE CRITERIA	RPM	REVOLUTIONS PER MINUTE	UGE	UNDERGROUND ELECTRICAL
A AMP	AMPERE	CS	COUNTERSINK	FC	FOOT CANDLE	IAW	IN ACCORDANCE WITH	NC	NORMALLY CLOSED	RVL	REDUCED PRESSURE BACKFLOW PREVENTER	UGT	UNDERGROUND TELEPHONE
AAP	AREA ALARM PANEL	CS	COMBINATION SEWER	FCU	FLOOR CLEAN OUT	IC	INTERCOM	NC	NATIONAL ELECTRICAL CODE	RZ	RAIN WATER LEADERS SENSOR	UL	UNDERWRITERS LABORATORIES
AAV	AUTOMATIC AIR VENT	CSK	COUNTERSINK	FCU	FAN COIL UNIT	IE	INSIDE DIAMETER	NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSN.	S	SINK	UNEX	UNEXCAVATED
AAV	ANCHOR BOLT	CSK	CALCIUM SULFATE MASONRY UNIT	FD	FLOOR DRAIN	IE	INVERT ELEVATION	UNEN	UNFINISHED	S	SANITARY SEWER	UR	UNDERGROUND RESIDENTIAL DISTRIBUTION
ABS	ACRYLONITRILE BUTADIENE STYRENE	CSP	COMBINATION STANDPIPE	FD	FLOOR DRAIN	IES	ILLUMINATING ENGINEERING SOCIETY	NIC	NOT IN CONTRACT	S	SOAP DISH	UNO	UNLESS NOTED OTHERWISE
AC	ACOUSTICAL CEILING	CSJK	CONSTRUCTION JOINT	FDC	FIRE DEPARTMENT CONNECTION	IF	INSIDE FACE	NO	NORMALLY OPEN	S	SOUTH	UR	UNDERGROUND RESIDENTIAL DISTRIBUTION
ACC	AIR COOLED CONDENSER	CSEW	CASEWORK	FDM	FIRE DEPARTMENT MOUNTED	IG	ISOLATED GROUND	NO	NORMALLY OPEN	S	SANITARY WASTE	US	UTILITY
ACCU	AIR COOLED CONDENSING UNIT	CT	CERAMIC TILE	FEE	FIRE EXTINGUISHER	IS	ISOLATION JOINT	NTS	NOT TO SCALE	SA	SUPPLY AIR	UTL	UTILITY
ACM	ALUMINUM COMPOSITE MATERIAL	CT	CERAMIC TILE	FE	FIRE EXTINGUISHER	IS	ISOLATION JOINT	NTS	NOT TO SCALE	SA	SANITARY WASTE	UTL	UTILITY
ACST	ACOUSTIC	CTR	CENTER TRANSFORMER	FF	FINISH FLOOR	IMC	INTERMEDIATE METAL CONDUIT	OM	OPERATION AND MAINTENANCE	SC	SOLID CORE	V	VENT
AD	ACCESS DOOR	CU	COPPER	FH	FIRE HYDRANT	IN	INCH	O	OVERALL	SCD	SEAT COVER DISPENSER	V	VENT
ADN	AREA DRAIN	CU	CONDENSING UNIT	FHC	FIRE HOSE CABINET	IN	INCH	O	OVERALL	SCD	SEAT COVER DISPENSER	V	VENT
ADJ	ADJUSTABLE	CU	COMBINATION UNIT	FHC	FIRE HOSE CABINET	IN	INCH	O	OVERALL	SCD	SEAT COVER DISPENSER	V	VENT
ADJ	ADJACENT	CUH	CUMULATIVE UNIT HEATER	FIG	FIGURE	INT	INTERIOR	OP	OPEN TO OUTSIDE	SCD	SEAT COVER DISPENSER	V	VENT
ADMN	ADMINISTRATION	CW	COLD WATER	FIX	FIXTURE	IP	IRON PIPE	OSB	OSB	SCD	SEAT COVER DISPENSER	V	VENT
AF	AIR FILTER	CV	CONDOM VENDOR	FL	FLOOR	JAN	JANITOR	OD	OUTSIDE DIAMETER	SCD	SEAT COVER DISPENSER	V	VENT
AF	ABOVE FINISH FLOOR	CWR	CHILLED WATER RETURN	FL	FLOOR	JAN	JANITOR	OD	OUTSIDE DIAMETER	SCD	SEAT COVER DISPENSER	V	VENT
AHJ	AUTHORITY HAVING JURISDICTION	CWS	CHILLED WATER SUPPLY	FL	FLOOR	JAN	JANITOR	OD	OUTSIDE DIAMETER	SCD	SEAT COVER DISPENSER	V	VENT
AHU	AIR HANDLING UNIT	CY	CUBIC YARD	FLUOR	FLUORESCENT	JST	JOINT	OVFL	OVERFLOW	SCW	SOFT COLD WATER	VCP	VITRIFIED CLAY PIPE
AI	AREA INLET	D	DRINKING	FLM	FULL LENGTH MIRROR	JT	JOINT	OFF	OFFICE	FLG	FLOOR GRATING	VP	VOLUME DAMPER - MANUAL
ALT	ALTERNATE	D	DEPTH	FM	FACTORY MUTUAL	KCJ	KEYED CONSTRUCTION JOINT	OHP	OWNER FURNISHED OWNER INSTALLED	SD	STORM DRAIN	VENT	VENTILATION
ALUM	ALUMINUM	D	DEPTH	FM	FACTORY MUTUAL	KCJ	KEYED CONSTRUCTION JOINT	OHP	OWNER FURNISHED OWNER INSTALLED	SD	STORM DRAIN	VENT	VENTILATION
AMB	AMBIENT	DB	DRY BULB	FME	FLOW MEASURING EQUIPMENT	KD	KITCHEN HOOD	OHT	OVERHEAD TELEPHONE	SE	SEAM EXHAUST VENT	VEL	VELOCITY
ANCH	ANCHOR	DB	DRY BULB	FME	FLOW MEASURING EQUIPMENT	KD	KITCHEN HOOD	OHT	OVERHEAD TELEPHONE	SE	SEAM EXHAUST VENT	VEL	VELOCITY
AP	ACCESS PANEL	DB	DRY BULB	FME	FLOW MEASURING EQUIPMENT	KD	KITCHEN HOOD	OHT	OVERHEAD TELEPHONE	SE	SEAM EXHAUST VENT	VEL	VELOCITY
APC	ACOUSTICAL PANEL CEILING	DBA	DEFORMED BAR ANCHOR	FO	FACE OF	KH	KITCHEN HOOD	OPG	OPENING	SEC	SECONDARY	VERT	VERTICAL
APPROX	APPROXIMATE	DBA	DEFORMED BAR ANCHOR	FO	FACE OF	KH	KITCHEN HOOD	OPG	OPENING	SEC	SECONDARY	VERT	VERTICAL
AR	ACID RESISTING	DC	DIRECT CURRENT	FOF	FACE OF FINISH	KIT	KITCHEN	OSD	OVERFLOW STORM DRAIN	SEC	SECTION	VFT	VARIABLE FREQUENCY DRIVE
ARCH	ARCHITECTURAL	DCJ	DUST COLLECTOR	FOF	FACE OF FINISH	KIT	KITCHEN	OSD	OVERFLOW STORM DRAIN	SEC	SECTION	VFT	VARIABLE FREQUENCY DRIVE
ASB	ASBESTOS	DCJ	DUST COLLECTOR	FOF	FACE OF FINISH	KIT	KITCHEN	OSD	OVERFLOW STORM DRAIN	SEC	SECTION	VFT	VARIABLE FREQUENCY DRIVE
ASPH	ASPHALT	DCJ	DUST COLLECTOR	FOF	FACE OF FINISH	KIT	KITCHEN	OSD	OVERFLOW STORM DRAIN	SEC	SECTION	VFT	VARIABLE FREQUENCY DRIVE
AUTO	AUTOMATIC	DDC	DIRECT DIGITAL CONTROL	FOR	FUEL OIL RETURN	KVA	KILOVOLT AMPERES	OSY	OUTSIDE SCREW AND YOKES	SF	SQUARE FOOT	VOL	VOLUME
AV	AIR VENT	DE	DEIONIZED WATER	FOS	FUEL OIL SUPPLY	KVA	KILOVOLT AMPERES	OSY	OUTSIDE SCREW AND YOKES	SF	SQUARE FOOT	VOL	VOLUME
AV	AIR VENT	DE	DEIONIZED WATER	FOS	FUEL OIL SUPPLY	KVA	KILOVOLT AMPERES	OSY	OUTSIDE SCREW AND YOKES	SF	SQUARE FOOT	VOL	VOLUME
AV	AIR VENT	DE	DEIONIZED WATER	FOS	FUEL OIL SUPPLY	KVA	KILOVOLT AMPERES	OSY	OUTSIDE SCREW AND YOKES	SF	SQUARE FOOT	VOL	VOLUME
AW	ACID WASTE	DEP	DEPRESSION(ED)	FOV	FUEL OIL VENT	KW	KILOWATT	OVFL	OVERFLOW	SCW	SOFT COLD WATER	VCP	VITRIFIED CLAY PIPE
AWG	AMERICAN WIRE GAUGE	DEPT	DEPARTMENT	FOV	FUEL OIL VENT	KW	KILOWATT	OVFL	OVERFLOW	SCW	SOFT COLD WATER	VCP	VITRIFIED CLAY PIPE
AWP	ACOUSTICAL WALL PANEL	DET	DETECTION	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
B/B	BACK TO BACK	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
B/B	BACK TO BACK	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BC	BALANCING COCK	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BCM	BURNISHED CONCRETE MASONRY UNIT	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BD	BOARD	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BD	BACK DRAFT DAMPER	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BET	BETWEEN	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BFP	BACKFLOW PREVENTOR	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BEL	BELOW FLOOR	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BF	BOLTER FEED	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BFV	BUTTERFLY VALVE	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BHP	BREAK HORSE POWER	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BKR	BREAKER	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BL	BUILDING LINE	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BLD	BUILDING	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BLK	BLOCK	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BLK	BLOCK	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BKGD	BULKHEAD	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BM	BEAM	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BM	BENCH MARK	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BO	BOTTOM OF DUCT	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BOF	BOTTOM OF FOOTING	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BOTT	BOTTOM	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BRD	BRIDGING	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BRG	BEARING	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BRKT	BRACKET	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BSMT	BASEMENT	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BT	BATH TUB	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BTU	BRITISH THERMAL UNIT	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BTU	BRITISH THERMAL UNIT PER HOUR	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BUR	BUILT UP ROOFING	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
BV	BALL VALVE	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
C	CONDENSER WATER	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
C	CONDUIT	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CA	COMBINATION AIR CABINET	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CAB	CANTILEVER	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CAP	CAPACITY	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CAS	CASING	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CB	CHALKBOARD	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CD	CONDENSATE DRAIN	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CD	CLOSED CIRCUIT TELEVISION	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CE	COVER ELEVATION	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CEM	CEMENT	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CEM	CENTRIFUGAL	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CER	CERAMIC	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CF	CUBIC FEET PER HOUR	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CFM	CUBIC FEET PER MINUTE	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CG	CHANNEL	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CG	CORNER GUARD	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CH	CHANNEL	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CI	CAST IRON	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CI	CURB INLET	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CL	CLEAR	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CL	CIRCUIT LINE	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CLG	CEILING	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CLOS	CLOSET	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CLR	CLEAR	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CM	CEILING MOUNTED	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CMP	CORRUGATED METAL PIPE	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CMU	CONCRETE MASONRY UNIT	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CO	CLEAN OUT	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CO	CONDUIT ONLY	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CO2	CARBON DIOXIDE	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
COL	COLUMN	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
COM	COMMON	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
COMB	COMBINATION	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
COMM	COMMUNICATIONS	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
COMP	COMPOSITE	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
COMP	COMPRESSOR UNIT	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
COMPR	COMPRESSIBLE	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CONC	CONCRETE	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CONF	CONFERENCE	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL
CONFG	CONFIGURATION	DFA	DEFORMED BAR ANCHOR	FR	FIRE RESISTIVE	L	LABORATORY	PAR	PARALLEL	PAR	PARALLEL	PAR	PARALLEL



1  
CP1.1  
CODE PLAN  
SCALE: 1/8" = 1'-0"

NOTE: NO CHANGES TO EXISTING EGRESS AND FIRE RATINGS ARE IN THE SCOPE OF THE PROPOSED WORK.

**SYMBOL LEGEND**

- ### - OCCUPANCY LOAD
- - ACCESSORY USE AREA (OCCUPANCY LOAD IS NOT INCLUDED IN LOADS BEYOND THIS ROOM)
- 0 - COMBINED OCCUPANT LOAD AT A GIVEN DOOR OR STAIR (THE CAPACITY OF DOORS ARE DETERMINED AS FOLLOWS: CLEAR OPENING WIDTH IN INCHES DIVIDED BY 0.2 THE CAPACITY OF STAIRS ARE DETERMINED AS FOLLOWS: WIDTH IN INCHES DIVIDED BY 0.3)
- 0 - COMBINED OCCUPANT LOAD AT A GIVEN EXIT DOOR. (SUM OF THESE EQUALS TOTAL OCCUPANT LOAD) (THE CAPACITY OF DOORS ARE DETERMINED AS FOLLOWS: CLEAR OPENING WIDTH IN INCHES DIVIDED BY 0.2)
- PD - PANIC DEVICE
- XX MIN - DOOR FIRE RATING

**WALL SEPARATION LEGEND**

WALL HOURLY FIRE RATING	WALL FIRE RATING TYPE
0 = 0 HOUR	C = CORRIDOR
1/2 = 1/2 HOUR	EW = EXTERIOR WALL
1 = 1 HOUR	FB = FIRE BARRIER
2 = 2 HOUR	FP = FIRE PARTITION
3 = 3 HOUR	FSB = FIRE/SMOKE BARRIER
SP = SMOKE PARTITION	FW = FIRE WALL
SW = SMOKE WALL	HK = HORIZONTAL EXIT
	SB = SMOKE BARRIER
	VS = VERTICAL SHAFT
	VX = VERTICAL EXIT
	XP = EXIT PASSAGEWAY

**BUILDING DATA - SRC 2000 SPACE AND AUXILIARY SPACES:**  
OCCUPANCY GROUPS: ASSEMBLY GROUP A STORAGE GROUP (S-1)

CONSTRUCTION TYPE: IIB, NONCOMBUSTIBLE (BC)

**FIRE PROTECTION SYSTEMS:**  
EXISTING TO REMAIN FULLY AUTOMATIC SPRINKLER SYSTEM THROUGHOUT (WET SYSTEM).

**FIRE RESISTIVE REQUIREMENTS - TYPE IIB CONSTRUCTION - NONCOMBUSTIBLE (PER TABLE 601)**

PRIMARY STRUCTURAL FRAME	0 HOUR
STRUCTURAL FRAME (SUPPORTING ROOF ONLY)	0 HOUR
BEARING WALLS - EXTERIOR	0 HOUR
BEARING WALLS - INTERIOR	0 HOUR
NON-BEARING WALLS - EXTERIOR (1'-6")	1 HOUR (IBC TABLE 602)
NON-BEARING WALLS - EXTERIOR (10'-0"X30')	0 HOUR (IBC TABLE 602)
NON-BEARING WALLS - EXTERIOR (X-30')	0 HOUR (IBC TABLE 602)
NON-BEARING WALLS - INTERIOR	0 HOUR
FLOOR CONSTRUCTION	0 HOUR
ROOF CONSTRUCTION	0 HOUR

MAXIMUM AREA OF EXTERIOR WALL OPENINGS (TABLE 704.8) - FIRE SEPARATION DISTANCE: >30' = NO LIMIT

**FIRE RESISTIVE SEPARATIONS:**

**CORRIDORS** - (IBC 1016.1 "b" + S-11) - IN BUILDINGS OF R OCCUPANCY PROTECTED THROUGHOUT BY AN APPROVED SUPERVISED AUTOMATIC SPRINKLER SYSTEM IN ACCORDANCE WITH 903.3.1.1 OR 903.3.1.2. CORRIDOR WALLS (FIRE PARTITIONS) NOT REQUIRED TO BE RATED.

**ELEVATOR MACHINE ROOMS** - ENCLOSED BY FIRE BARRIER RATED NOT LESS THAN THE RATING OF THE HOISTWAY ENCLOSURE (IBC 3006.4).

**FIRE PUMP ROOM** - 1 HOUR FIRE BARRIER (NFPA 20)

SWITCH GEAR - THE EMERGENCY POWER SOURCE AND ITS TRANSFER SWITCH MUST BE SEPARATED FROM THE NORMAL POWER TRANSFORMERS AND SWITCH GEAR BY A MINIMUM OF A 1 HOUR FIRE BARRIER (NFPA 110)

DRY TRANSFORMERS > 112.5 KVA (NEC) - 1 HOUR FIRE BARRIER (NFPA 70, SECTION 450.21(B))

**EXIT REQUIREMENTS:**

CORRIDOR WIDTH:	44" MIN.
CORRIDOR DEAD-END MAXIMUM:	50' W/ AUTOMATIC SPRINKLER SYSTEM (IBC 1017.2)
COMMON PATH OF TRAVEL:	100' W/ AUTOMATIC SPRINKLER SYSTEM (IBC 1014.3)
TRAVEL DISTANCE:	300' W/ AUTOMATIC SPRINKLER SYSTEM (IBC 1016.1)

SEPARATION OF EXITS - SEPARATION OF NOT LESS THAN 1/3 OF THE LENGTH OF THE MAXIMUM OVERALL DIAGONAL DIMENSION OF THE AREA SERVED (1015.2.1, EXCEPTION 2)

**MINIMUM EGRESS WIDTH:**

STAIRWAYS:	0.3' / OCCUPANT (NFPA 101)	LIFE
SAFETY, TABLE 7.3.3.1)		
OTHER EGRESS COMPONENTS:	0.2' / OCCUPANT (NFPA 101)	LIFE
SAFETY, TABLE 7.3.3.1)		

**STAIRWAYS:**

STAIRWAY WIDTH:	44" MIN.
HEADROOM:	80" MIN.

ROOF ACCESS - ONE ALTERNATING TREAD DEVICE REQUIRED IN BUILDINGS FOUR OR MORE STORIES ABOVE GRADE AT ONE STAIRWAY (IBC 1009.11)

**ACCESSIBLE MEANS OF EGRESS** - TWO MEANS OF ACCESSIBLE EGRESS IS REQUIRED (IBC 1007.1)

- IN BUILDINGS WHERE A REQUIRED ACCESSIBLE FLOOR IS FOUR OR MORE STORIES ABOVE A LEVEL OF EXIT DISCHARGE, AT LEAST ONE REQUIRED ACCESSIBLE MEANS OF EGRESS SHALL BE AN ELEVATOR COMPLYING WITH 1007.2.1. ELEVATOR 2 IS THE DESIGNATED ACCESSIBLE ELEVATOR.

- IN ORDER FOR A STAIRWAY TO BE CONSIDERED PART OF AN ACCESSIBLE MEANS OF EGRESS, AN EXIT ACCESS STAIRWAY SHALL HAVE A CLEAR WIDTH OF 48 INCHES MIN BETWEEN HANDRAILS AND SHALL BE ACCESSED FROM AN AREA OF RESCUE (IBC 1007.3).

\*EXCEPTION 3 INDICATES THAT 48 INCHES BETWEEN HANDRAILS IS NOT REQUIRED IN BUILDINGS EQUIPPED WITH AN AUTOMATIC SPRINKLER SYSTEM.

- IN ORDER TO BE CONSIDERED PART OF AN ACCESSIBLE MEANS OF EGRESS, AN ELEVATOR SHALL COMPLY WITH THE EMERGENCY OPERATION AND SIGNALING DEVICE REQUIREMENTS OF SECTION 2.27 OF ASME A17.1. STANDBY POWER SHALL BE PROVIDED IN ACCORDANCE WITH SECTIONS 2702 AND 3003. THE ELEVATOR SHALL BE ACCESSED FROM EITHER AN AREA OF REFUGE OR COMPLIING WITH 1007.6 OR A HORIZONTAL EXIT (IBC 1007.4).

**AREA OF REFUGE** - WHERE AN ELEVATOR LOBBY IS USED AS AN AREA OF REFUGE, THE SHAFT AND LOBBY SHALL COMPLY WITH SECTION 1001.1.1 FOR SMOKEPROOF ENCLOSURES EXCEPT WHERE THE ELEVATORS ARE IN AN AREA OF REFUGE FORMED BY A HORIZONTAL EXIT OR SMOKE BARRIER (IBC 1007.6).

**SIZE** - ONE 30" X 48" SPACE / 200 OCCUPANTS (IBC 117.6.1)

**TWO-WAY COMMUNICATION**: REQUIRED AT AREA OF REFUGE (IBC 1007.6.3). THE SYSTEM SHALL PROVIDE COMMUNICATION BETWEEN EACH REQUIRED LOCATION AND A CENTRAL POINT LOCATION APPROVED BY THE FIRE DEPARTMENT. SIGNAGE SHALL BE PROVIDED BY 1007.6.5 AND 1007.7.

**EGRESS ILLUMINATION** - THE MEANS OF EGRESS, INCLUDING THE EXIT DISCHARGE, SHALL BE ILLUMINATED AT ALL TIMES WHEN THE BUILDING IS OCCUPIED (IBC 1006.1)

**EMERGENCY LIGHTING** - PER SECTION IBC CHAPTER 1006

**EXIT SIGNS**: PER SECTION IBC CHAPTER 1011.

**OCCUPANCY LOAD FACTORS** (50 FT PER OCCUPANT) PER TABLE 1004.1.1

ACCESSORY STORAGE / MECHANICAL:	300 GROSS
ASSEMBLY WITHOUT FIXED SEATS:	7 NET (CHAIRS ONLY)
ASSEMBLY WITH FIXED SEATS:	15 NET (TABLES AND CHAIRS)

**LEGEND**  
LEGEND NOTES ARE COMMON TO ALL SHEETS. SOME NOTES MAY NOT APPLY TO THIS SHEET.

**INTERIOR FINISH PLAN GENERAL NOTES**

- INTERIOR PLAN GENERAL NOTES APPLY TO ALL INTERIOR FINISH PLAN SHEETS.
- NOT ALL FLOOR AND WALL FINISHES ARE NOTED ON THE INTERIOR FINISH PLANS. SEE ROOM FINISH SCHEDULE FOR FLOOR AND WALL FINISHES NOT NOTED.
- FLOOR PATTERN DIMENSIONS AND LOCATIONS ARE APPROXIMATE. MINOR ADJUSTMENTS MAY BE MADE FOR LAYOUT AND TO MINIMIZE WASTE AS LONG AS THE DESIGN INTENT IS MAINTAINED.

**WALL TYPE GENERAL NOTES**

- THE SIDE OF THE PARTITION THAT THE WALL TYPE SYMBOL IS LOCATED ON (AS SHOWN ON THE FLOOR PLANS), INDICATES THE SIDE OF THE PARTITION TO RECEIVE DOUBLE LAYER GYPSUM BOARD AND/OR MATERIAL INDICATED BY THE WALL TYPE.
- SEE "0" SERIES SHEETS FOR LOCATIONS OF FIRE RATED WALLS.
- REFER TO THE GENERAL NOTES ON SHEET A0.1 FOR ADDITIONAL REQUIREMENTS REGARDING GWB PARTITIONS.
- CONSTRUCT FIRE RATED GWB PARTITIONS ACCORDING TO FIRE RATED ASSEMBLIES INDICATED BELOW WALL TYPE.
- ALL NEW WALLS TO BE BRACED TO STRUCTURE ABOVE. PROVIDE SHOP DRAWINGS.
- PROVIDE SHOP DRAWINGS FOR ALL NEW STEEL LOCATIONS.

**DOOR AND WINDOW FRAME SCHEDULE GENERAL NOTES**

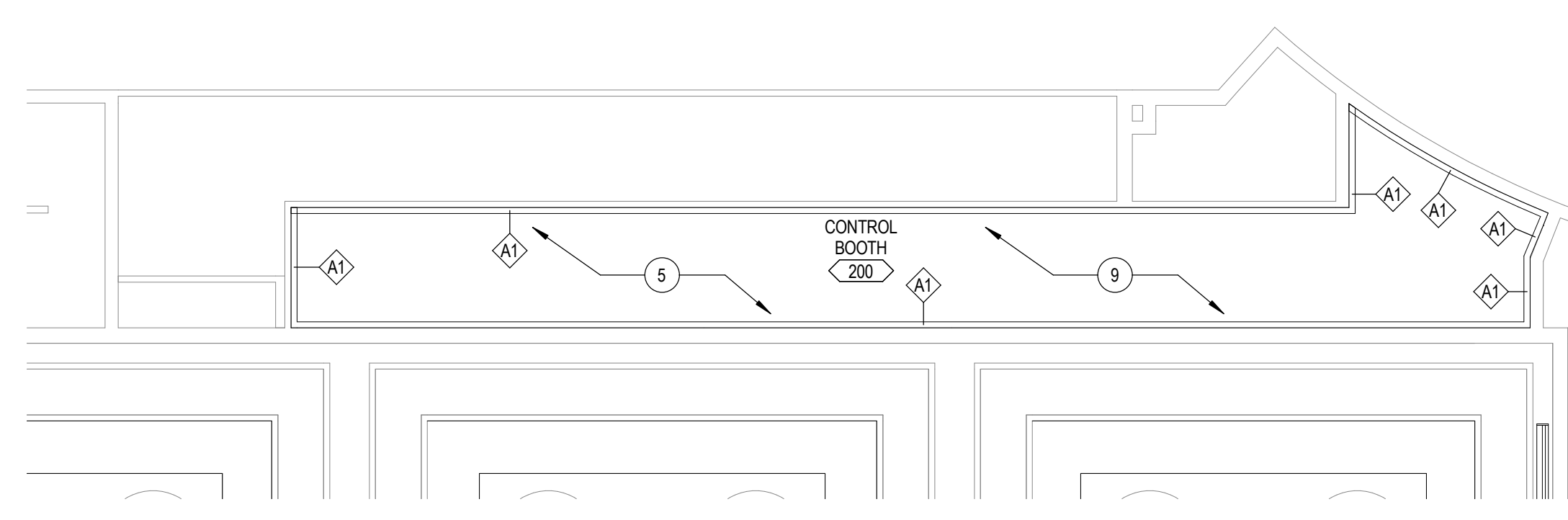
- ALL HOLLOW METAL FRAMES SHALL BE GROUTED SOLID.
- INSTALL EXTERIOR FRAMES WITH 1/4 INCH SHIM AND JOINT SEALANT AROUND PERIMETER OF FRAME.
- GLASS TYPES FOR DOORS ARE INDICATED IN NOTES COLUMNS OF DOOR AND FRAME SCHEDULE OR IN SPECIFICATIONS. GLASS TYPES FOR FRAMES ARE INDICATED ON FRAME ELEVATIONS OR IN SPECIFICATIONS.
- FRAME MANUFACTURER SHALL COORDINATE LOCATIONS OF CONCEALED CONDUIT AND J-BOXES REQUIRED FOR SECURITY SYSTEM HARDWARE PRIOR TO MANUFACTURING OF HOLLOW METAL FRAMES AND COORDINATE WITH SECURITY HARDWARE AND DEVICES.

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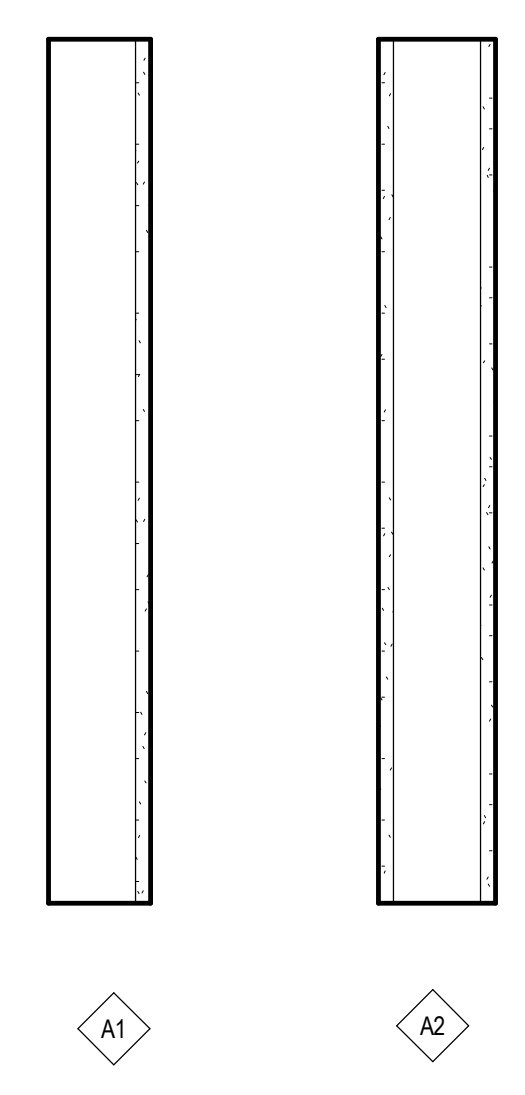
FLOOR PLAN, SECOND FLOOR  
SRC 2000

A1.1  
22-1742-00  
10/06/17  
Revision

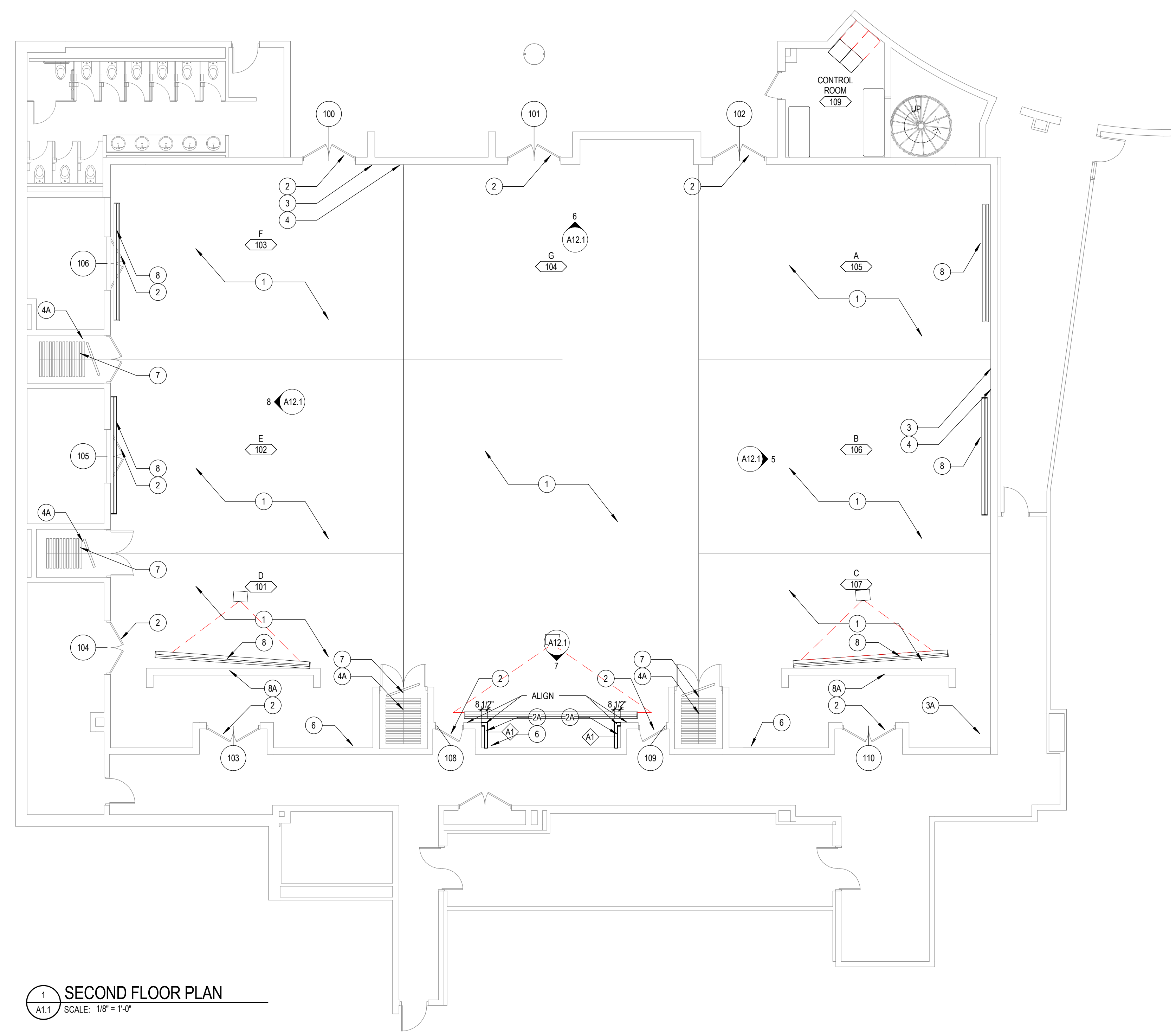
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2 CONTROL ROOM FLOOR PLAN  
A1.1 SCALE: 1/8" = 1'-0"



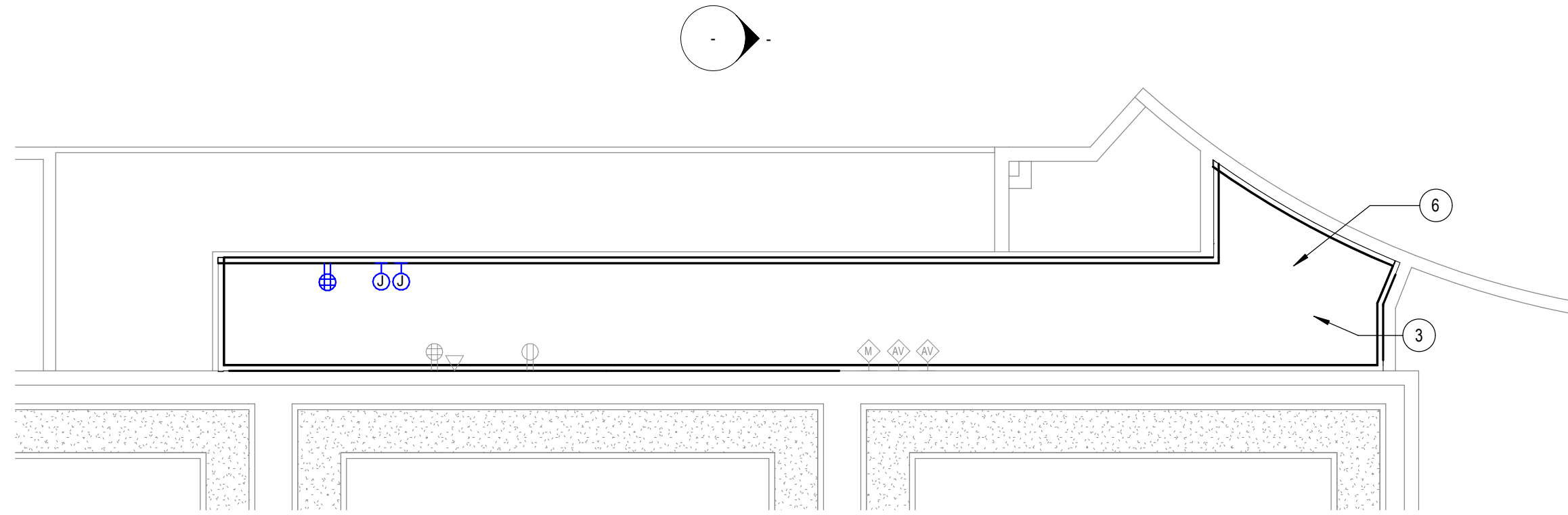
WALL TYPE	FIRE RATING	TESTED ASSEMBLIES	STC RATING	NOTES
A1	None			3 5/8" STEEL STUDS AT 16" O.C., 1 LAYER OF 5/8" WALLS EXTEND TO UNDERSIDE OF DECK AND BRACE. NO SOUND ATTENUATING BLANKET INSULATION.
A2	None			3 5/8" STEEL STUDS AT 16" O.C., 1 LAYER OF 5/8" ON EACH SIDE. WALLS EXTEND TO UNDERSIDE OF DECK AND BRACED. NO SOUND ATTENUATING BLANKET INSULATION.



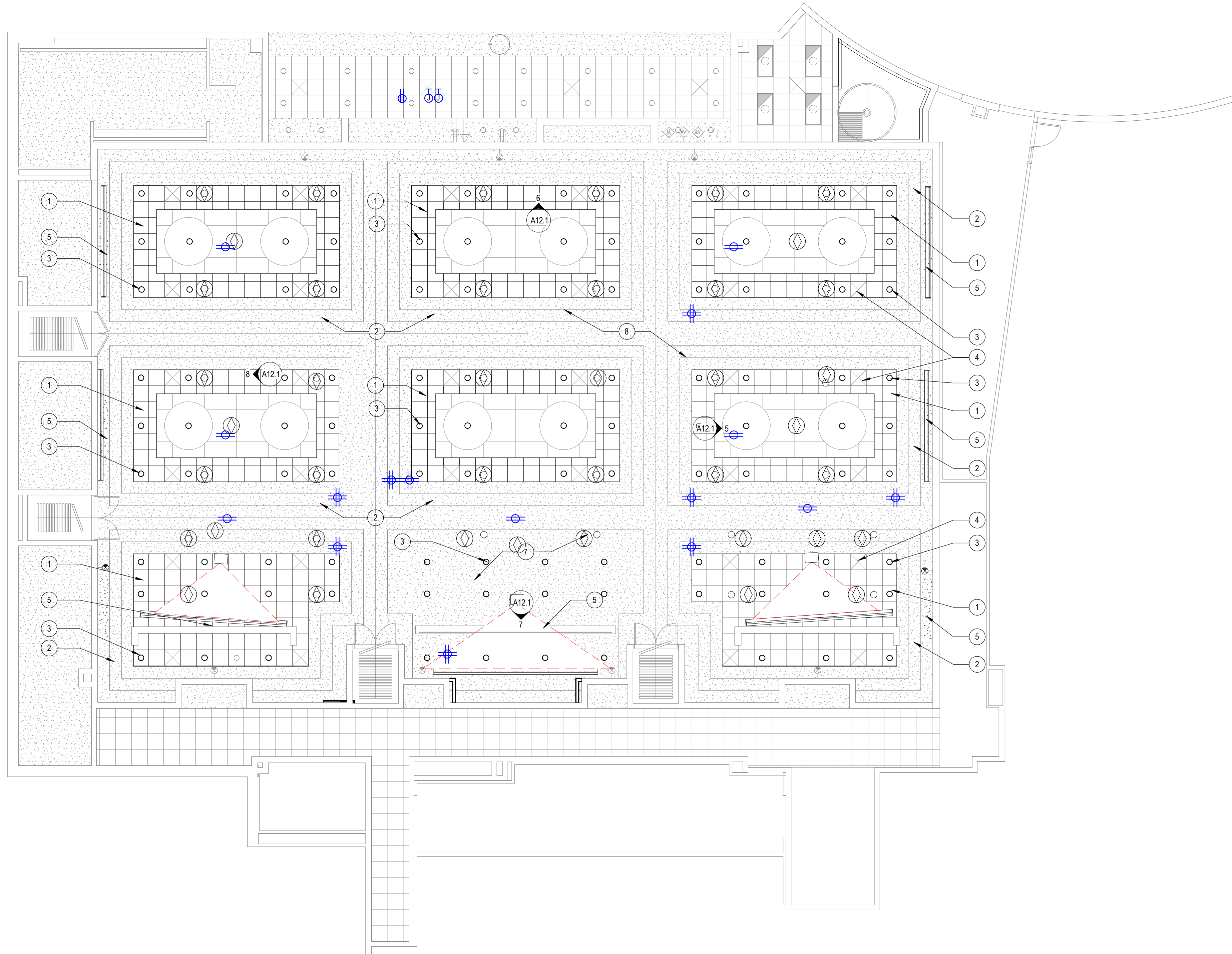
1 SECOND FLOOR PLAN  
A1.1 SCALE: 1/8" = 1'-0"

_DOOR AND FRAME SCHEDULE_														
NUMBER	NO. OF PANELS	WIDTH	HEIGHT	THICKNESS	MATERIAL	GLAZING	TYPE	DEPTH	FRAME MATERIAL	TYPE	FIRE RATING	HARDWARE SET	DETAILS	COMMENTS
100	2	3'-0"	7'-0"	1 3/4"	HM			5 3/4"	HM					
101	2	3'-0"	7'-0"	1 3/4"	HM			5 3/4"	HM					
102	2	3'-0"	7'-0"	1 3/4"	HM			5 3/4"	HM					
103	2	3'-0"	7'-0"	1 3/4"	HM			5 3/4"	HM					
104	2	3'-0"	7'-0"	1 3/4"	HM			5 3/4"	HM					
105	2	3'-0"	7'-0"	1 3/4"	HM			5 3/4"	HM					
106	2	3'-0"	7'-0"	1 3/4"	HM			5 3/4"	HM					
107	1	3'-0"	7'-0"	1 3/4"	HM			5 3/4"	HM					
108	1	3'-0"	7'-0"	1 3/4"	HM			5 3/4"	HM					
109	1	3'-0"	7'-0"	1 3/4"	HM			5 3/4"	HM					
110	2	3'-0"	7'-0"	1 3/4"	HM			5 3/4"	HM					

- CPT-1
- NEW DOORS
- NEW 3 5/8" MTL STUD WALL WITH 5/8" GYP SIDES. RELOCATE EXISTING RECEPTILES TO NEW WALLS
- WC-1 ABOVE ACOUSTICAL PANELS
- NEW 3 5/8" MTL STUD WALL WITH 5/8" GYP BOTH SIDES. RELOCATE EXISTING RECEPTILES TO NEW WALLS
- RELOCATE EXISTING ACOUSTICAL PANELS
- MODERNFOLD NEW FABRIC
- NEW PLYWOOD FLOORING
- NEW RECESSED FIRE EXTINGUISHER CABINET
- REFURBISH EXISTING MODERNFOLD WALL. UNHINGE PANELS. TAKE POCKET DOORS AND JAMBS DOWN. REMOVE EXISTING FABRIC FINISH. DISPOSE OF IN OWNERS DUMPSTER AND PREPARE PANEL SWING. FURNISH MODERNFOLD STANDARD FABRIC (COLOR TO BE APPROVED BY ARCHITECT), ADHESIVE AND MISCELLANEOUS SUPPLIES AND RECOVER 72 PANELS (144 SIDES) AND (4) SETS OF POCKET DOORS AND JAMBS. REHINGE PANELS. REHANG POCKET DOORS. REALIGN, RE-ANCHOR AND REINSTALL ALL TRIM AND HARDWARE.
- PRIME AND PAINT WALLS, TYP.



2 CONTROL ROOM REFLECTED CEILING PLAN  
A3.1 SCALE: 1/8" = 1'-0"



1 2ND FLOOR REFLECTED CEILING PLAN  
A3.1 SCALE: 1/8" = 1'-0"

**LEGEND**

LEGEND NOTES ARE COMMON TO ALL SHEETS UNLESS NOTED OTHERWISE.

**REFLECTED CEILING PLAN NOTES:**

- A. REFLECTED CEILING PLAN GENERAL NOTES APPLY TO ALL REFLECTED CEILING PLAN SHEETS.
- B. ALL CEILING CROSSPANS SHALL BE CENTERED IN EACH ROOM UNLESS NOTED OTHERWISE.
- C. CEILING HEIGHTS ARE AS NOTED ON THE REFLECTED CEILING PLAN UNLESS NOTED OTHERWISE.
- D. ALL ELECTRICAL FIXTURES, SPEAKERS, SMOKE AND THERMAL DETECTORS, MECHANICAL GRILLES, SPRINKLER HEADS, ETC. SHALL BE CENTERED BETWEEN CEILING GRIDS UNLESS NOTED OTHERWISE. SPRINKLER HEADS SHALL BE WITHIN A 5' RADIUS CENTERED BETWEEN CEILING GRIDS.
- E. IN ACOUSTICAL CEILING PANELS WITH SCORE IN THE CENTER, CENTER DEVICES REFERENCED IN NOTED, IN ONE HALF OF THE TILE. DO NOT LOCATE ON THE SCORE. FOR APC WITH MULTIPLE SCORED PATTERNS, COORDINATE LOCATION WITH ARCHITECT.
- F. PROVIDE SUSPENSION SYSTEM AROUND ELECTRICAL FIXTURES, MECHANICAL GRILLES, DIFFUSERS, ETC. AT ACOUSTICAL PANEL CEILING.
- G. ALL DIMENSIONS ON REFLECTED CEILING PLANS ARE ACTUAL AND ARE TO THE FOLLOWING UNLESS NOTED OTHERWISE:
  - 1. FACE OF FINISHED WALL
  - 2. FACE OF FINISHED BULKHEADS
  - 3. CENTERLINE OF COLUMNS
  - 4. CENTERLINE OF TEES
- H. IN AREAS WITH EXPOSED STRUCTURE CEILING, COORDINATE EXACT LOCATIONS OF MECHANICAL GRILLES, DIFFUSERS, DUCTWORK, AND ELECTRICAL FIXTURES WITH EACH RESPECTIVE SUBCONTRACTOR.
- I. ALL WALLS EXTEND TO UNDERSIDE OF DECK EXCEPT THOSE SHOWN SHADED IN WHICH GYPSUM BOARD OR MASONRY EXTENDS MIN. 4" ABOVE FINISHED CEILING. ALL METAL STUDS EXTEND TO UNDERSIDE OF STRUCTURE.

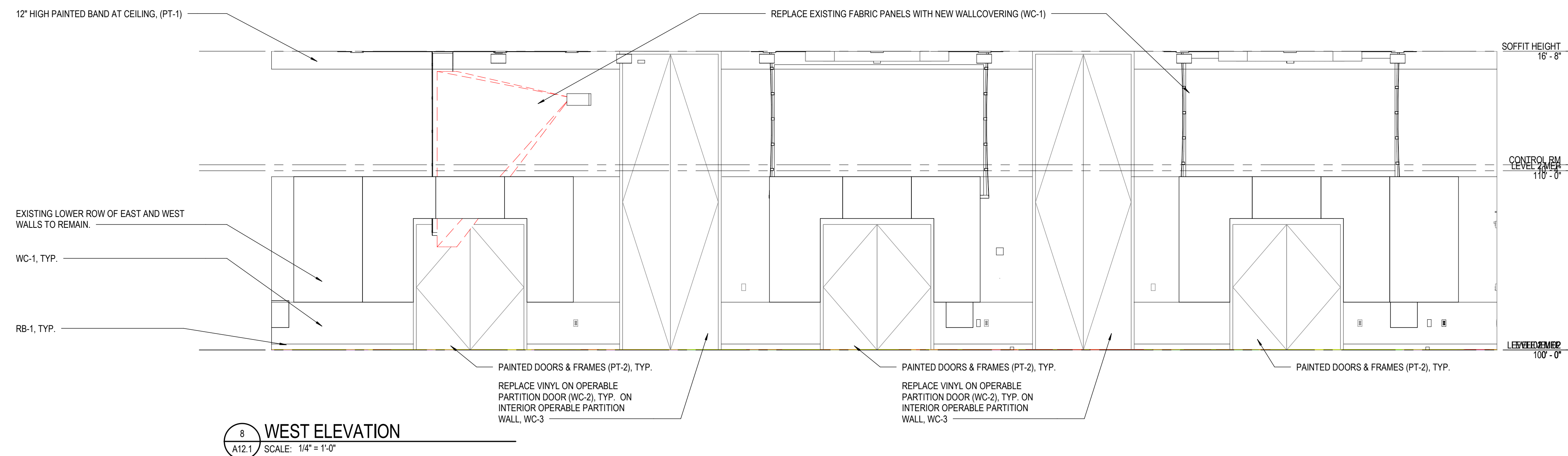
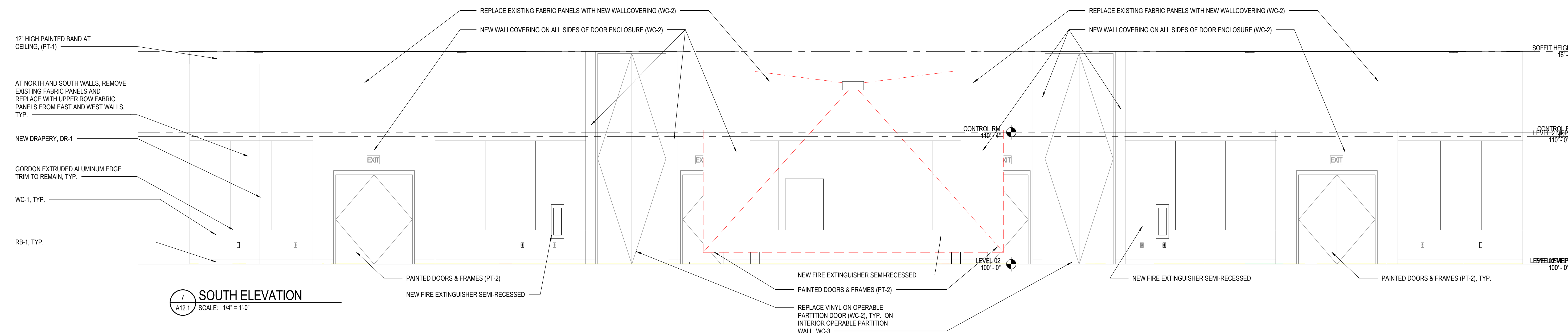
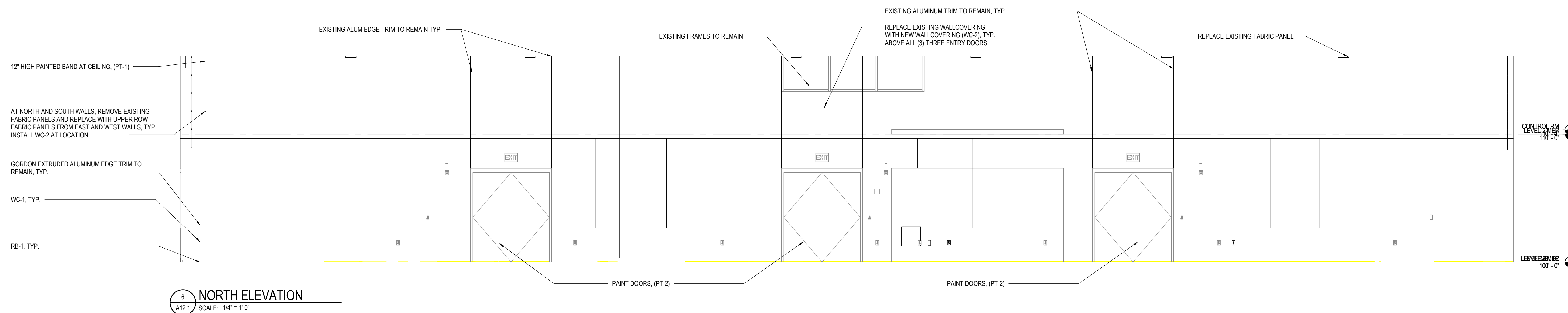
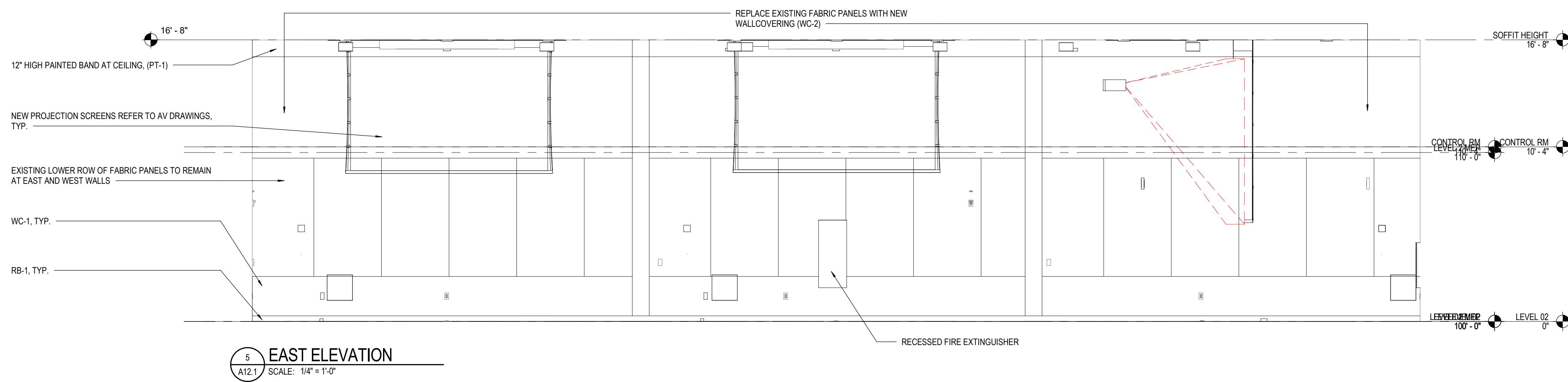
- 1 NEW ACT TILE ACT-1. EXISTING GRID TO REMAIN. REFER TO FINISH SCHEDULE.
- 2 PAINT AT EXISTING SOFFITS 3 SIDES.
- 3 NEW LIGHT FIXTURES, REFER TO ELECTRICAL SCHEDULE.
- 4 EXISTING DIFFUSERS TO REMAIN.
- 5 NEW PROJECTION SCREEN, REFER TO AV DRAWINGS.
- 6 EXISTING CEILING TO REMAIN.
- 7 PATCH DRYWALL CEILING AT REMOVED LIGHT LOCATIONS.
- 8 VERIFY ALL EXISTING STEEL. COORDINATE STEEL ELEVATIONS FOR NEW ALL NEW STEEL LOCATIONS WITH ARCHITECT DURING CONSTRUCTION.
- 9 EDIT TEXT HERE.
- 10 EDIT TEXT HERE.

**LEGEND**

LEGEND NOTES ARE COMMON TO ALL ROOM FINISH SCHEDULE SHEETS. SOME NOTES MAY NOT APPLY TO THIS SHEET.

**ROOM FINISH SCHEDULE GENERAL NOTES**

- A. ROOM FINISH SCHEDULE GENERAL NOTES APPLY TO ALL ROOM FINISH SCHEDULE SHEETS.
- B. SEE SPECIFICATIONS FOR PAINTING OF ITEMS NOT NOTED IN THE ROOM FINISH SCHEDULE.
- C. EXPOSED CONCRETE FLOOR SLABS NOT SCHEDULED TO RECEIVE A FINISH SHALL RECEIVE A CURING AND SEALING COMPOUND UNLESS OTHERWISE NOTED.
- D. CEILING HEIGHTS, AS NOTED ON THE REFLECTED CEILING PLANS, ARE MEASURED FROM THE FINISH FLOOR OF THE ROOM.
- E. WHERE FLOOR FINISH CHANGES FROM ONE ROOM TO ANOTHER, SET JOINT OF THE MATERIALS AT THE CENTER OF THE COMMUNICATING DOOR.
- F. SEE REFLECTED CEILING PLANS FOR CEILING TYPES AND HEIGHT.



**ROOM FINISH SCHEDULE SPECIFIC NOTES**

FLOOR MATERIALS	MANUFACTURER	STYLE	COLOR
CPT-1	CM HOSPITALITY	1/10 COLORPOINT	CM1822
RB-1	JOHNSONITE		32 PEBBLE

**WALL MATERIALS**

PT-1	BENJAMIN MOORE	ONYX 2133-10
PT-2	BENJAMIN MOORE	GRAY HUSKIE 1473
WC-1	TRETFORD	338 SILVER BIRCH
WC-2	MDC	TWINE Y4721TN
WC-3	KOROSEAL	KASHI
DR-1	ROSEBRAND	2202 ENCORE SYNTHETIC VELOUR, IFR

**CEILING MATERIALS**

ACT-1	ARMSTRONG	ULTIMA
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ROOM FINISH SCHEDULE					
ROOM NUMBER	ROOM NAME	FLOOR FINISH	BASE FINISH	WALL MATERIAL	COMMENTS
101	D	CPT-1	RB-1	WALL COVERING, ACOUSTIC PANEL PAINT	REFER TO INTERIOR ELEVATIONS FOR LOCATIONS
102	E	CPT-1	RB-1	WALL COVERING, ACOUSTIC PANEL PAINT	REFER TO INTERIOR ELEVATIONS FOR LOCATIONS
103	F	CPT-1	RB-1	WALL COVERING, ACOUSTIC PANEL PAINT	REFER TO INTERIOR ELEVATIONS FOR LOCATIONS
104	G	CPT-1	RB-1	WALL COVERING, ACOUSTIC PANEL PAINT	REFER TO INTERIOR ELEVATIONS FOR LOCATIONS
105	A	CPT-1	RB-1	WALL COVERING, ACOUSTIC PANEL PAINT	REFER TO INTERIOR ELEVATIONS FOR LOCATIONS
106	B	CPT-1	RB-1	WALL COVERING, ACOUSTIC PANEL PAINT	REFER TO INTERIOR ELEVATIONS FOR LOCATIONS
107	C	CPT-1	RB-1	WALL COVERING, ACOUSTIC PANEL PAINT	REFER TO INTERIOR ELEVATIONS FOR LOCATIONS



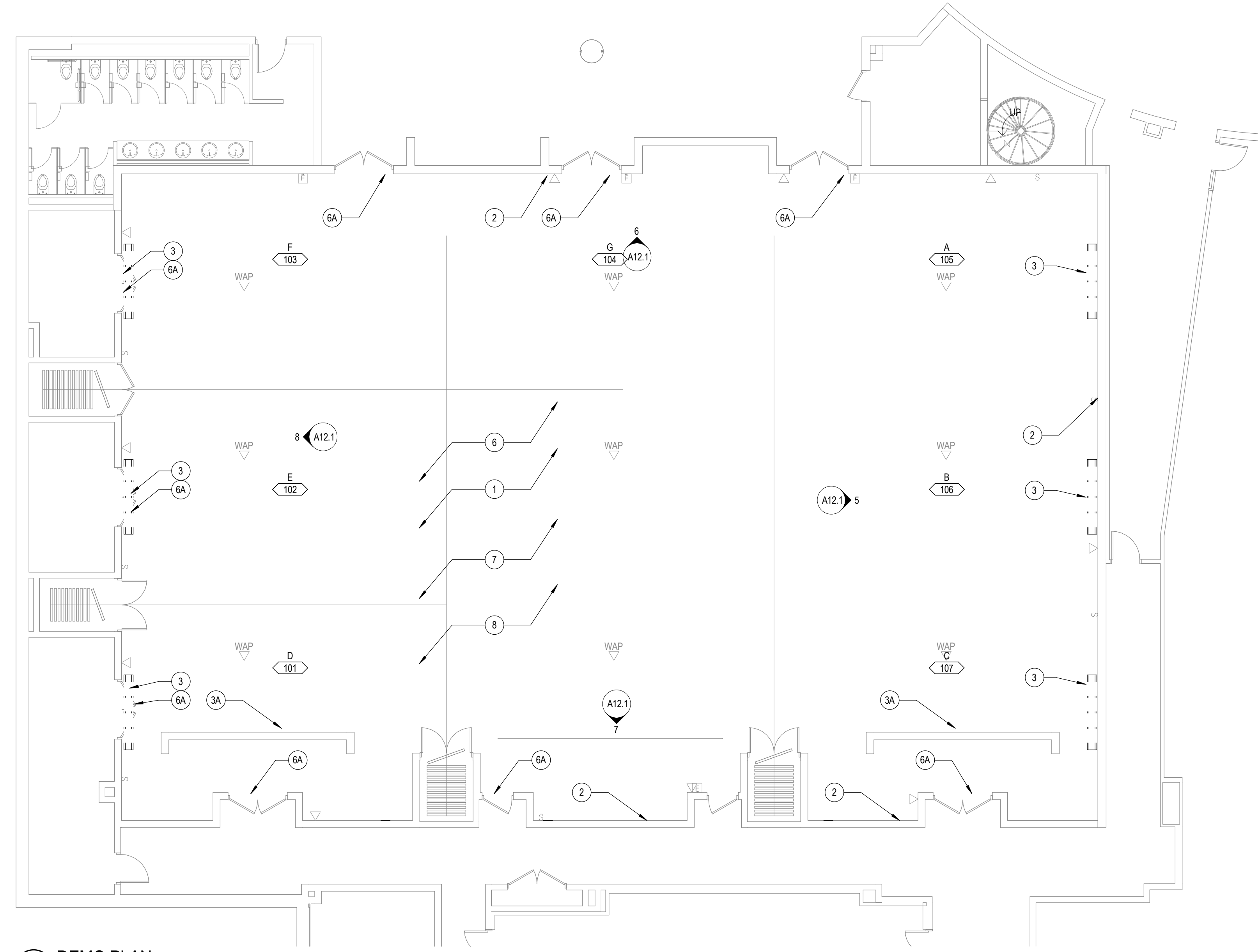
**LEGEND**

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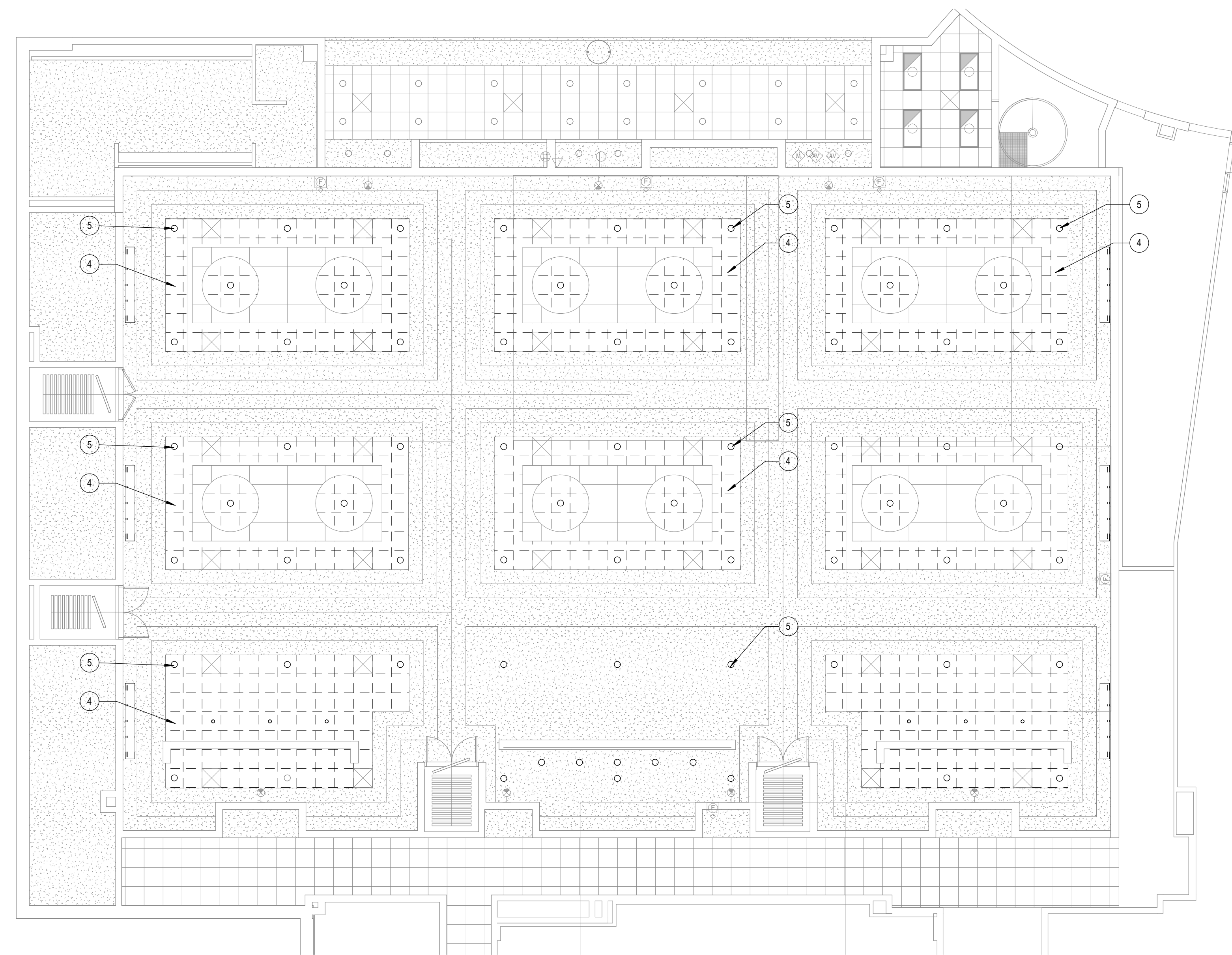
- 1 REMOVE EXISTING WALL BASE, CARPET, BACKING AND ADHESIVES. EXPOSE EXISTING FLOOR AND PREPARE TO RECEIVE NEW FINISHES
- 2 REMOVE UPPER TIER OF ACOUSTICAL PANELS
- 3 DISCONNECT AND REMOVE PROJECTION SCREENS
- 3A REMOVE LIGHT LOCK WALLS
- 4 DEMO EXISTING CEILING TILE, GRID TO REMAIN, TYP.
- 5 DEMO EXISTING LIGHT FIXTURES, TYP. SALVAGE ALL LAMPS FOR OWNER
- 6 DEMO EXISTING DOOR
- 6A DEMO EXISTING DOOR
- 7 SALVAGE ALL FLOOR TRANSITIONS FOR REINSTALLATION
- 8 DEMO EXISTING WALL BASE
- 9 EDIT TEXT HERE
- 10 EDIT TEXT HERE

**DEMOLITION NOTES**

- A. DEMOLITION GENERAL NOTES APPLY TO ALL DEMOLITION SHEETS.
- B. COORDINATE DEMOLITION AND PHASING EFFORTS WITH ARCHITECT AND OWNER'S REPRESENTATIVES. EVERY EFFORT SHALL BE MADE TO MINIMIZE DISRUPTION OF OWNER'S OPERATIONS AND TO PROVIDE BUILDING USER'S SAFETY. EXCESSIVE NOISE OR VIBRATION SHALL BE PRE-APPROVED AND COORDINATED WITH OWNER'S REPRESENTATIVE.
- C. COORDINATE DISRUPTION OF UTILITY SERVICES WITH OWNER AND AS SPECIFIED.
- D. CONSTRUCT TEMPORARY CONSTRUCTION PARTITIONS WITHIN EXISTING BUILDING WHICH OFFER A ONE-HOUR ENCLOSURE TO ISOLATE DEMOLITION AND CONSTRUCTION WORK FROM GENERAL PUBLIC AND AS DEEMED NECESSARY BY OWNER AND CODE OFFICIAL HAVING JURISDICTION. COORDINATE LOCATIONS WITH OWNER AND MAINTAIN MEANS OF EGRESS THROUGHOUT THE WORK.
- E. MAINTAIN A SECURE AND WEATHER-TIGHT ENCLOSURE.
- F. VERIFY EXISTING CONDITIONS, DIMENSIONS, AND ELEVATIONS AND NOTIFY ARCHITECT OF DISCREPANCIES.
- G. REMOVE EXISTING WALLS, DOORS, MILLWORK, PLUMBING FIXTURES, CEILING, SOFFITS, MARKERBOARDS, ETC. IN THEIR ENTIRETY AND AS REQUIRED TO EXECUTE DEMOLITION AND CONSTRUCTION WORK DESCRIBED ON THE DRAWINGS.
- H. THE OWNER SHALL RESERVE THE RIGHT TO SALVAGE ANY MATERIALS.
- I. PROVIDE PROTECTION FOR EXISTING BUILDING MATERIALS AND EQUIPMENT FROM DAMAGE DUE TO DEMOLITION OR CONSTRUCTION-RELATED INCIDENT PERFORMED UNDER THIS CONTRACT.
- J. REPAIR OR REPLACE ITEMS DAMAGED AS A RESULT OF DEMOLITION OR CONSTRUCTION TO MATCH EXISTING FINISH AND/OR CONDITION.
- K. EXISTING MATERIALS SHALL NOT BE REUSED UNLESS NOTED OTHERWISE OR AS AUTHORIZED BY ARCHITECT.
- L. VERIFY AND MAINTAIN LOCATION OF EXISTING POWER, COMMUNICATION AND DATA CABLES TO PREVENT INTERRUPTION OF SERVICE.
- M. PATCH FLOOR, WALL AND CEILING PENETRATIONS RESULTING FROM REMOVAL OR REROUTING OF NEW OR EXISTING PIPING, DUCTWORK, CONDUIT, ETC. AS REQUIRED TO MAINTAIN FIRE SEPARATIONS. MATCH FINISH OF NEW OR EXISTING ADJACENT SURFACES.
- N. SEE ELECTRICAL DRAWINGS AND NOTES FOR FURTHER SEQUENCING AND SCOPE OF WORK.
- O. WHERE CMU WALLS ARE INDICATED TO BE REMOVED, PREPARE ADJACENT WALLS TO RECEIVE NEW PATCHFINISH BY REMOVING CMU IN TOOTH-IN PATTERN BOTH SIDES OF DEMOLITION FOR CONTRACTOR TO TOOTH IN NEW CMU PATCHES.
- P. WHERE PLASTER/STUO WALLS ARE INDICATED TO BE REMOVED, PREPARE ADJACENT WALLS TO RECEIVE NEW PATCHFINISH BY SAWCUTTING ADJACENT PLASTER FINISH A MINIMUM OF 12 INCHES BEYOND DEMOLITION.



**1 DEMO PLAN**  
SCALE: 1/8" = 1'-0"



**2 REFLECTED CEILING DEMO PLAN**  
SCALE: 1/8" = 1'-0"

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DEMO PLAN  
SRC 2000

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10/06/17  
Revision

**ABBREVIATIONS**

A	AMPERE
AC	ABOVE COUNTER
AC	AMPERE INTERRUPTING CAPACITY
AF	AMP FRAME (CIRCUIT BREAKER)
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHJ	AUTHORITY HAVING JURISDICTION
AL	ALUMINUM
AWG	AMERICAN WIRE GAUGE
AW	WIRELESS ACCESS POINT
AT	AMP TRIP (CIRCUIT BREAKER OR FUSE)
ATS	AUTOMATIC TRANSFER SWITCH
AV	AUDIO/VIDEO
BAS	BUILDING AUTOMATION SYSTEM
BJ	BONDING JUMPER
BKR	BREAKER
BLDG	BUILDING
BMS	BUILDING MANAGEMENT SYSTEM
C	CONDUIT
CB	CIRCUIT BREAKER
CA	CABLE TELEVISION
CC	CLOSED CIRCUIT TELEVISION
CKT	CIRCUIT
CLG	CEILING
CU	COPPER
DB	DECIBEL
DC	DIRECT CURRENT
DISC	DISCONNECT
DIV	SPECIFICATION DIVISION
DP	DISTRIBUTION PANELBOARD
DW	DISHWASHER
EAC	EACH
ECS	EMERGENCY COMMUNICATIONS SYSTEM
EL	ELECTRIC(IAL)
EMD	ESTIMATED MAXIMUM DEMAND
EP	EXPLOSION PROOF
EQ	EQUAL
EQUIP	EQUIPMENT
ER	EXISTING (TO BE) RELOCATED
ERC	ELECTRIC WATER COOLER
EXT	EXTERIOR
FA	FIRE ALARM
FAA	FIRE ALARM ANNUNCIATOR
FACP	FIRE ALARM CONTROL PANEL
FC	FOOT CANDLE
FLA	FULL LOAD AMPS
FLUOR	FLUORESCENT
FS	FLOW SWITCH
FSD	FIRE SMOKE DAMPER
FT	FEET (FOOT)
G	EQUIPMENT GROUNDING CONDUCTOR
GEN	GENERATOR
GF1	GROUND FAULT CIRCUIT INTERRUPTER
GF2	GROUND FAULT CIRCUIT INTERRUPTER
GND	EQUIPMENT GROUNDING CONDUCTOR
HH	HANDHOLE
HOA	HAND-OFF AUTOMATIC
HP	HORSE POWER
IC	INTERCOM
IG	ISOLATED GROUND
IN	INCH
INT	INTERIOR
JB	JUNCTION BOX
KAC	THOUSAND AMPERE INTERRUPTING CURRENT
KV	KILOVOLT
KVA	KILOVOLT AMPERES
KW	KILOWATT
LT	LIGHT
LTG	LIGHTING
MAX	MAXIMUM
MCA	MINIMUM CIRCUIT AMPACITY
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MOC	MAXIMUM OVERCURRENT PROTECTION
MRTS	MOTOR RATED TOGGLE SWITCH
MSB	MAIN SWITCHBOARD
MTD	MOUNTED
MTG	MOUNTING
MTS	MANUAL TRANSFER SWITCH
N	NEUTRAL
N.C.	NORMALLY CLOSED
N.O.	NORMAL OPEN
NF	NON-FUSED
NC	NOT IN CONTRACT
NL	NIGHT LIGHT
NTS	NOT TO SCALE
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OH	OVERHEAD
P	POLE(S)
PA	PUBLIC ADDRESS
PB	PULL BOX
PH	PHASE
PV	POST INDICATOR VALVE
PNL	PANEL
PWR	POWER
RECEP	RECEPTACLE
SCCR	SHORT CIRCUIT CURRENT RATING
SD	SMOKE DAMPER
SEC	SECONDARY
SIM	SIMILAR
SPD	SURGE PROTECTION DEVICE
SWBD	SWITCHBOARD
TBB	TELECOMMUNICATIONS BONDING BACKBONE
TC	TIME CLOCK
TGB	TELECOMMUNICATIONS GROUNDING BUSBAR
TMBG	TELECOMMUNICATIONS MAIN GROUNDING BUSBAR
TO	TELECOMMUNICATIONS OUTLET
TR	TELECOMMUNICATIONS ROOM
TS	TAMPER SWITCH
TV	TELEVISION
TYP	TYPICAL
UG	UNDERGROUND
UNO	UNLESS NOTED OTHERWISE
V	VOLT
VA	VOLT-AMPERE
VFD	VARIABLE FREQUENCY DRIVE
W	WIRE
WA	TELECOMMUNICATIONS WORK AREA
WG	WIRE GUARD
WP	WEATHER-PROOF (NEMA 3R)
XFMR	TRANSFORMER

**NOTES**

**GENERAL LIGHTING NOTES**

- A. PROVIDE CONDUIT AND WIRING DEVICES FOR ALL SYSTEMS WHICH REQUIRE LOW VOLTAGE POWER AND CONTROL. REFER TO AUDIO VISUAL AND THEATRICAL DRAWINGS FOR ADDITIONAL INFORMATION AND LOCATIONS OF ELECTRICAL WIRING DEVICES AND CONDUIT.
- B. PER NEC SHARED NEUTRALS ARE NOT ALLOWED. IF EXISTING CIRCUIT IS REUSED ENSURE DEDICATED NEUTRAL IS USED. PROVIDE ADDITIONAL CONDUCTOR OR BREAKER TRIP PROTECTION.
- C. UNLESS NOTED OTHERWISE ALL LED 0-10V FIXTURES SHALL BE DIMMABLE TYPE. REFER TO LIGHT FIXTURE SCHEDULE FOR DRIVER PROTOCOL. ALL SWITCHING SHALL BE CAPABLE OF DIMMING.
- D. ALL 0-10V FIXTURES SHALL BE PROVIDED WITH MC CABLE WHIP WITH CLASS 2 DIMMING WIRING.
- E. UPON FINAL INSTALLATION ENSURE ALL FIXTURES ARE THE SAME COLOR TEMP CHANGE OUT LAMPS OR LED FIXTURES WHICH DO NOT MATCH. ENSURE SIMILAR LED BURNING IS USED.
- F. CLEAN ALL FIXTURES OF DEBRIS AND PRINTS.
- G. ENSURE ALL FLANGED FIXTURES ARE MOUNTED FLUSH TO GYP OR CEILING PANEL.
- H. IF CIRCUITING IS NOT INDICATED, THEN THE FIXTURE SHALL BE CONNECTED TO THE CIRCUIT SHOWN SERVING THAT ROOM. REFER TO THE POWER PLANS FOR PANEL LOCATIONS.
- I. REFER TO ARCHITECTURAL DETAILS FOR MORE INFORMATION IF MOUNTING HEIGHT IS NOT NOTED ON PLAN. MOUNTING HEIGHT REFERS TO THE DISTANCE ABOVE FINISHED FLOOR TO BOTTOM OF FIXTURE.
- J. ENSURE ALL FIXTURES ARE SUSPENDED FROM TWO POINTS TO STRUCTURE.
- K. EXTEND UNWIRING LEGS OF THE BRANCH CIRCUIT SERVING A PARTICULAR AREA TO THE EXIT SIGNS AND EMERGENCY LIGHTING RELAYS LOCATED IN THIS SAME AREA. EMERGENCY RELAYS SHALL BE WIRED FOR SWITCHED OPERATION. LIGHT SWITCHES SHALL BE MOUNTED ON LATCH SIDE OF DOOR, WITHIN 12" OF DOOR/SLIGHT FRAMING, UNLESS NOTED OTHERWISE. LIGHT SWITCHES INSTALLED ADJACENT TO DOOR SWINGS SHALL BE MOUNTED CLEAR OF DOOR SWING AND WITHIN 12" OF DOOR IN OPEN POSITION. COORDINATE LOCATION WITH OTHER WALL DEVICES.
- M. CONNECT 3-WAY SWITCHES SO THAT ALL LIGHTS ARE TURNED OFF WHEN ALL 3-WAY SWITCHES ARE IN THE DOWN POSITION.
- N. IN FINISHED SPACES, EXPOSED FIXTURE WHIPS ARE NOT ALLOWED. RUN EMT WHEN TRANSITIONING FROM VARIOUS CEILING TYPES. PAINT TO MATCH SURROUNDING SURFACE.
- O. UTILIZE MANUFACTURER'S RECOMMENDATIONS AND OWNER INPUT TO ADJUST AND SET BOTH TIME DELAYS AND LIGHT LEVEL SENSORS ACCORDING TO AREA BEING SERVED. RECORD SETTINGS AND TURN OVER TO OWNER. DO NOT LEAVE SENSORS ON FACTORY DEFAULTS. PROVIDE FINAL WALK THRU WITH OWNER UPON COMPLETION TO VERIFY ACCURACY OF SETTINGS.

**GENERAL SPECIAL SYSTEMS NOTES**

- A. PROVIDE CONDUIT AND WIRING DEVICES FOR ALL SYSTEMS WHICH REQUIRE LOW VOLTAGE POWER AND CONTROL. REFER TO AUDIO VISUAL AND THEATRICAL DRAWINGS FOR ADDITIONAL INFORMATION AND LOCATIONS OF ELECTRICAL WIRING DEVICES AND CONDUIT.
- B. REFER TO ARCHITECTURAL CASEWORK ELEVATIONS FOR ADDITIONAL INFORMATION ON LOCATION OF ELECTRICAL DEVICES MOUNTED IN OR NEAR CASEWORK. COORDINATE MOUNTING HEIGHT AND PLACEMENT OF DEVICES DESIGNATED "AC" (ABOVE COUNTER). REPORT DISCREPANCIES TO ENGINEER PRIOR TO INSTALLATION.
- C. PROVIDE FIRE RATED SEALS ON PENETRATIONS IN FIRE RATED FLOORS AND WALLS. REFER TO CODE PLANS FOR RATED FLOOR AND WALL LOCATIONS.
- D. PROVIDE ACOUSTICAL SEALANT ON ALL WALL PENETRATIONS. REFER TO ARCHITECTURAL SPECIFICATIONS FOR DETAILS.
- E. ALIGN DEVICES VERTICALLY WHERE DEVICES OF DIFFERENT MOUNTING HEIGHTS ARE INDICATED CLOSE TO OTHER DEVICES.
- F. DATA RECEPTABLES SHALL BE MOUNTED AT THE SAME ELEVATION AND WITHIN 12" OF THE ADJACENT POWER RECEPTACLE. REFER TO POWER PLANS FOR LOCATIONS.
- G. PROVIDE INSULATED BUSHINGS OVER CONDUIT ENDS AT ROUGH-IN AND CONDUIT SLEEVE LOCATIONS PRIOR TO INSTALLATION OF ANY CABLING.
- H. REFER TO MECHANICAL SCHEDULES FOR DUCT SMOKE DETECTOR REQUIREMENTS AND LOCATIONS. COORDINATE WITH MECHANICAL CONTRACTOR.
- I. DEVICES INSTALLED IN THE CEILING GRID SHALL BE CENTERED IN THE TILE. CORRIDOR DEVICES SHALL BE MOUNTED IN A STRAIGHT LINE AS SHOWN ON PLANS.
- J. PROVIDE FIRE ALARM CONNECTIONS TO EACH SMOKE, FIRE/SMOKE DAMPER, POWER SHALL BE PROVIDED THROUGH NORMALLY CLOSED FIRE ALARM RELAY. THE CONNECTION TO THE DAMPER SHALL BE A SUPERVISORY CIRCUIT MONITORING THE STATUS OF THE INTEGRAL SMOKE DETECTOR AND SHALL PROVIDE REMOTE RESET. FIRE/SMOKE DAMPERS MAY BE GROUPED TOGETHER ON SUPERVISORY CIRCUITS TO SIMPLIFY WIRING (MAX OF FIVE). COORDINATE WITH DAMPER MANUFACTURER. REFER TO DETAILS. COORDINATE LOCATIONS WITH MECHANICAL CONTRACTOR.
- K. LOCATE SMOKE DETECTORS AT LEAST 5' FROM SUPPLY AIR DIFFUSERS.
- L. PROVIDE DOUBLE GANG J-BOX WITH SINGLE GANG MDR RING AND BLANK COVER PLATE FOR DATA, VOICE, AND TV LOCATIONS. ROUTE 1/2" UP INTO CONCEALED ACCESSIBLE CEILING SPACE. PROVIDE NYLON BUSHINGS AND PULL STRING IN CONDUIT.
- M. EXPOSED CABLES IN FINISHED SPACES: PROVIDE 3/4" INCH MINIMUM CONDUIT FOR ALL LOW-VOLTAGE CABLES IN EXPOSED STRUCTURE AREAS. PAINT ALL CONDUIT, BOXES, AND ASSOCIATED MOUNTING HARDWARE TO MATCH ADJACENT FINISHES.
- N. SLEEVES FOR LOW VOLTAGE CABLES: COORDINATE WITH PATH OF DUCTWORK TO ENSURE ACCESSIBILITY. INSTALL ALL SLEEVES 12" ABOVE HIGHER CEILING OF TWO ADJACENT SPACES. REFER TO ROOM FINISH SCHEDULES AND REFLECTED CEILING PLANS FOR CEILING HEIGHTS). STUB SLEEVES INTO JOIST SPACE OF FINISHED ROOMS WITH EXPOSED STRUCTURE. PROVIDE INSULATED BUSHINGS ON BOTH ENDS OF ALL SLEEVES INCLUDING UNUSED SLEEVES. PROVIDE GROUT OR ESCUTCHEONS TO SECURE SLEEVES TO WALL. FIRESTOP AT ALL FIRE-RATED WALLS WHERE REQUIRED FOR LISTING OF FIRE-RATED WALL CABLE PATHWAY ASSEMBLY.
- O. INSTALL SLEEVES FOR INSTALLATION OF ALL LOW VOLTAGE CABLING. FOLLOW INDUSTRY STANDARDS TO MAINTAIN 40% FILL REQUIREMENTS IN ALL SLEEVES. PROVIDE ADDITIONAL SLEEVES (MEETING REQUIREMENTS) AS REQUIRED.
- P. ROUTE ALL LOW VOLTAGE CABLING INSTALLED IN LOCATIONS WITH NO CEILING (EXPOSED STRUCTURE) IN MINIMUM 3/4" CONDUIT TO ACCESSIBLE SPACE ABOVE NEAREST LAY-IN CEILING.
- Q. ALL DEVICES IN EXPOSED CEILING SHALL BE IN CONDUIT. ALL CONDUIT SHALL BE PAINTED TO MATCH CEILING.

**MOUNTING HEIGHT SCHEDULE**

DEVICE	CENTERLINE OF BOX ABOVE FINISHED FLOOR U.O.
1. SWITCH	42 INCHES
2. RECEPTACLE	18 INCHES
3. DOOR PUSHBUTTON	42 INCHES
4. DISCONNECT SWITCH	54 INCHES
5. MOTOR STARTER	54 INCHES
6. PANELBOARD	72 INCHES TO TOP
7. PULL STATION	42 INCHES
8. FIRE HORN WITH VISUAL WARNING*	90 INCHES
9. VISUAL WARNING LIGHT	90 INCHES
10. FIRE SPEAKER WITH VISUAL WARNING*	90 INCHES
11. FIRE SPEAKER HORN (WALL MOUNT)	144 INCHES
12. FIRE ALARM CONTROL PANEL	72 INCHES TO TOP
13. FIRE ALARM ANNUNCIATOR PANEL	60 INCHES TO TOP
14. DOOR HOLDER	74 INCHES
15. TV OUTLET	72 INCHES OR SAME AS ADJACENT RECEPTACLE
16. COMMUNICATIONS OUTLET	18 INCHES OR SAME AS ADJACENT RECEPTACLE
17. WALL PHONE	52 INCHES
18. MICROPHONE OUTLET	18 INCHES
19. VOLUME CONTROL	42 INCHES
20. SPEAKERS (WALL MOUNT)	94 INCHES OR 12 INCHES BELOW CEILING
21. CARD READER	42 INCHES
22. DOOR SECURITY RELEASE PUSHBUTTON	42 INCHES
23. SECURITY KEYPAD	52 INCHES
24. AUDIO/VIDEO CONTROLLER	52 INCHES
27. AUDIO/VIDEO OUTLET	18 INCHES OR SAME AS ADJACENT RECEPTACLE
28. CHIME	84 INCHES

\* MOUNT AT HEIGHTS INDICATED OR 6 INCHES BELOW CEILING WHICHEVER IS LOWER.

**GENERAL POWER NOTES**

- A. PROVIDE CONDUIT AND WIRING DEVICES FOR ALL SYSTEMS WHICH REQUIRE LINE VOLTAGE POWER AND CONTROL. REFER TO AUDIO VISUAL AND THEATRICAL DRAWINGS FOR ADDITIONAL INFORMATION AND LOCATIONS OF ELECTRICAL WIRING DEVICES AND CONDUIT.
- B. REFER TO ARCHITECTURAL CASEWORK ELEVATIONS FOR ADDITIONAL INFORMATION ON LOCATION OF ELECTRICAL DEVICES MOUNTED IN OR NEAR CASEWORK. COORDINATE MOUNTING HEIGHT AND PLACEMENT OF DEVICES DESIGNATED "AC" (ABOVE COUNTER). MOUNT BOTTOM OF "AC" RECEPTACLE A MINIMUM OF 3" ABOVE TOP OF BACKSPASH/SPOT OF COUNTER. REPORT DISCREPANCIES TO ENGINEER PRIOR TO INSTALLATION.
- C. PROVIDE FIRE RATED SEALS ON PENETRATIONS IN FIRE RATED FLOORS AND WALLS. REFER TO CODE PLANS FOR RATED FLOOR AND WALL LOCATIONS.
- D. PROVIDE ACOUSTICAL SEALANT ON ALL WALL PENETRATIONS. REFER TO ARCHITECTURAL SPECIFICATIONS FOR DETAILS.
- E. ALIGN DEVICES VERTICALLY WHERE DEVICES OF DIFFERENT MOUNTING HEIGHTS ARE INDICATED CLOSE TO OTHER DEVICES.
- F. POWER RECEPTABLES SHALL BE MOUNTED AT THE SAME ELEVATION AND WITHIN 12" OF THE ADJACENT DATA ROUGH-IN. REFER TO TELECOM PLANS FOR LOCATIONS.
- G. PROVIDE INSULATED BUSHINGS OVER CONDUIT ENDS AT ROUGH-IN AND CONDUIT SLEEVE LOCATIONS PRIOR TO INSTALLATION OF ANY CABLING.
- H. BRANCH CIRCUITS LONGER THAN 75' (CONDUCTOR LENGTH SHALL BE A MINIMUM WIRE SIZE OF #10 LINE, NEUTRAL, AND GROUND) THROUGHOUT. REFER TO SPECIFICATIONS FOR ADDITIONAL VOLTAGE DROP REQUIREMENTS.
- I. FEEDER LENGTHS SHOWN ON PANEL SCHEDULES ARE APPROXIMATE AND ARE USED FOR CALCULATIONS ONLY. DO NOT USE FOR BIDDING PURPOSES.
- J. DISCONNECTS AND/OR TOGGLE SWITCHES FOR CEILING MOUNTED EQUIPMENT SHALL NOT BE MOUNTED DIRECTLY TO THE EQUIPMENT. PROVIDE INDEPENDENT SUPPORT.
- K. UNO PROVIDE MINIMUM OF 24-INCHES SEPARATION BETWEEN BOXES LOCATED BACK-TO-BACK AT ALL WALLS. WRAP BOXES WITH FIRE STOP PUTTY AS SPECIFIED IN OTHER ARCHITECTURAL DETAILS.
- L. ENSURE ALL NEW WIRING DEVICES ARE COLOR BLACK WITH BLACK STEEL COVERPLATE.

**GENERAL ELECTRICAL DEMOLITION NOTES**

- A. EXISTING CONDITION DRAWINGS INDICATE CONDITIONS AS THEY WERE PLANNED FOR CONSTRUCTION. ALL DEMOLITION ITEMS SHALL BE SHOWN AND ACTUAL CONDITIONS MAY VARY FROM THE PLANNED CONDITIONS. PROVIDE DETAILED EVALUATION OF BUILDING SYSTEMS PRIOR TO CONSTRUCTION AND REPORT DISCREPANCIES AND DEFICIENCIES TO ENGINEER. SYSTEMS SHALL BE IN SIMILAR OR BETTER CONDITIONS AFTER COMPLETION OF WORK.
- B. TURN OVER ALL EXISTING LED BULBS AND FIXTURES TO OWNER.
- C. ITEMS INDICATED ON DEMOLITION PLANS ARE BASED ON AS-BUILT DRAWINGS AND FIELD OBSERVATIONS AND ARE INTENDED TO GIVE THE BIDDER A GENERAL REPRESENTATION OF EXISTING CONDITIONS. DEMOLISH ADDITIONAL ITEMS WHICH MUST BE REMOVED TO COMPLETE THE PROJECT EVEN IF NOT SHOWN ON DRAWINGS.
- D. DEVICES SHOWN FULL TONE OR NOTED ELSEWHERE IN THE DOCUMENTS TO BE REMOVED OR DEMOLISHED SHALL BE REMOVED AS FOLLOWS: ALL WIRING BACK TO CONTROL DEVICE, PANELBOARD, OR NEAREST J-BOX TO REMAIN. ALL CONDUIT (ABOVE GRADE) BACK TO CONTROL DEVICE OR NEAREST J-BOX TO REMAIN. AT J-BOXES WHERE CONDUIT HAS BEEN REMOVED, PROVIDE KNOCKOUT PLUGS, IF CONDUIT ORIGINATES AT A PANELBOARD, STUB-UP FROM PANELBOARD TO NEAREST COUPLER OR J-BOX AND LABEL CIRCUIT BREAKER AS A SPARE, UNLESS NOTED OTHERWISE.
- E. DEVICES AND LIGHT FIXTURES TO BE REMOVED SHALL BE TURNED OVER TO THE OWNER (AT OWNER'S REQUEST). ALL DEVICES, LIGHT FIXTURES, CONDUIT AND CONDUCTORS NOT REQUESTED TO BE RETAINED BY THE OWNER SHALL BE PROPERLY DISPOSED OF OFF THE SITE.
- F. CONDUITS CONCEALED IN MASONRY WALLS OR UNDER CONCRETE SLABS MAY BE CUT BACK, SEALED AND ABANDONED.
- G. PROVIDE BLANK COVERPLATES ON ALL ABANDONED BOXES TO REMAIN IN EXISTING MASONRY OR STUCCO WALLS. PAINT TO MATCH EXISTING FINISH.
- H. DEVICES SHOWN HALF TONE ARE EXISTING TO REMAIN.
- I. MAINTAIN POWER TO END-OF-LINE OR DOWNSTREAM DEVICES THAT ARE TO REMAIN. PROVIDE RACEWAYS, BOXES, CONDUCTORS AND ALL OTHER NECESSARY MATERIALS AS REQUIRED TO RE-ESTABLISH DAMAGED OR INTERRUPTED FEEDERS AND BRANCH CIRCUITS. INTERCEPT EXISTING FEEDERS OR BRANCH CONDUCTORS AT NEAREST ACCESSIBLE SPACE OR DEVICE AND RECONNECT TO ORIGINAL FEEDER OR BRANCH CIRCUIT SOURCE.
- J. PROVIDE ELECTRICAL DEMOLITION ASSOCIATED WITH MECHANICAL EQUIPMENT TO BE REMOVED. REFER TO MECHANICAL AND ARCHITECTURAL DEMOLITION SHEETS TO DETERMINE EQUIPMENT TO BE REMOVED.
- K. UNLESS OTHERWISE NOTED, MAINTAIN FUNCTIONALITY OF ALL EXISTING LOW VOLTAGE SYSTEMS INCLUDING, BUT NOT LIMITED TO: FIRE ALARM, INTERCOM, TELECOM CABLING NETWORKS, AND SECURITY DURING ALL PHASES OF CONSTRUCTION. PROVIDE TEMPORARY INTERCONNECTIONS AS REQUIRED TO ACCOMMODATE CONSTRUCTION SCHEDULE.
- L. WHERE CEILING ARE REMOVED AND REPLACED, TEMPORARILY AND PROPERLY SUPPORT ELECTRICAL DEVICES TO REMAIN INCLUDING BUT NOT LIMITED TO FIRE ALARM, SPEAKERS, LIGHTS, DISPLAYS, AND SIGNAGE. NOT ALL ELECTRICAL DEVICES MAY BE INDICATED. VERIFY THE EXACT LOCATION OF ELECTRICAL DEVICES. COORDINATE WITH OTHER TRADES.
- M. CUT BACK CONDUITS BELOW GRADE FOR ELECTRICAL DEVICES AT POS ISLANDS OR STAND-ALONE WORKSTATIONS TO BE REMOVED. COORDINATE WITH OTHER TRADES TO PREPARE FOR FLOOR COVERING.
- N. EXISTING CONDUIT MAY REMAIN IF ALL THE FOLLOWING ARE TRUE:
  - A. IT CAN BE REUSED TO FEED DEVICES INSTALLED UNDER THIS CONTRACT.
  - B. DOES NOT INTERFERE WITH OTHER TRADES.
  - C. MEETS PROJECT SPECIFICATIONS.
  - D. WILL NOT BE EXPOSED IN A FINISHED AREA (UNO).

**ELECTRICAL SYMBOLS**

**LIGHTING**

**POWER**

**RECEPTABLES**

**COMMUNICATIONS**

**FIRE ALARM**

**SECURITY**

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ELECTRICAL SYMBOLS AND ABBREVIATIONS  
SRC 2000

E0.0  
22-1742-00  
10/06/17  
Revisions

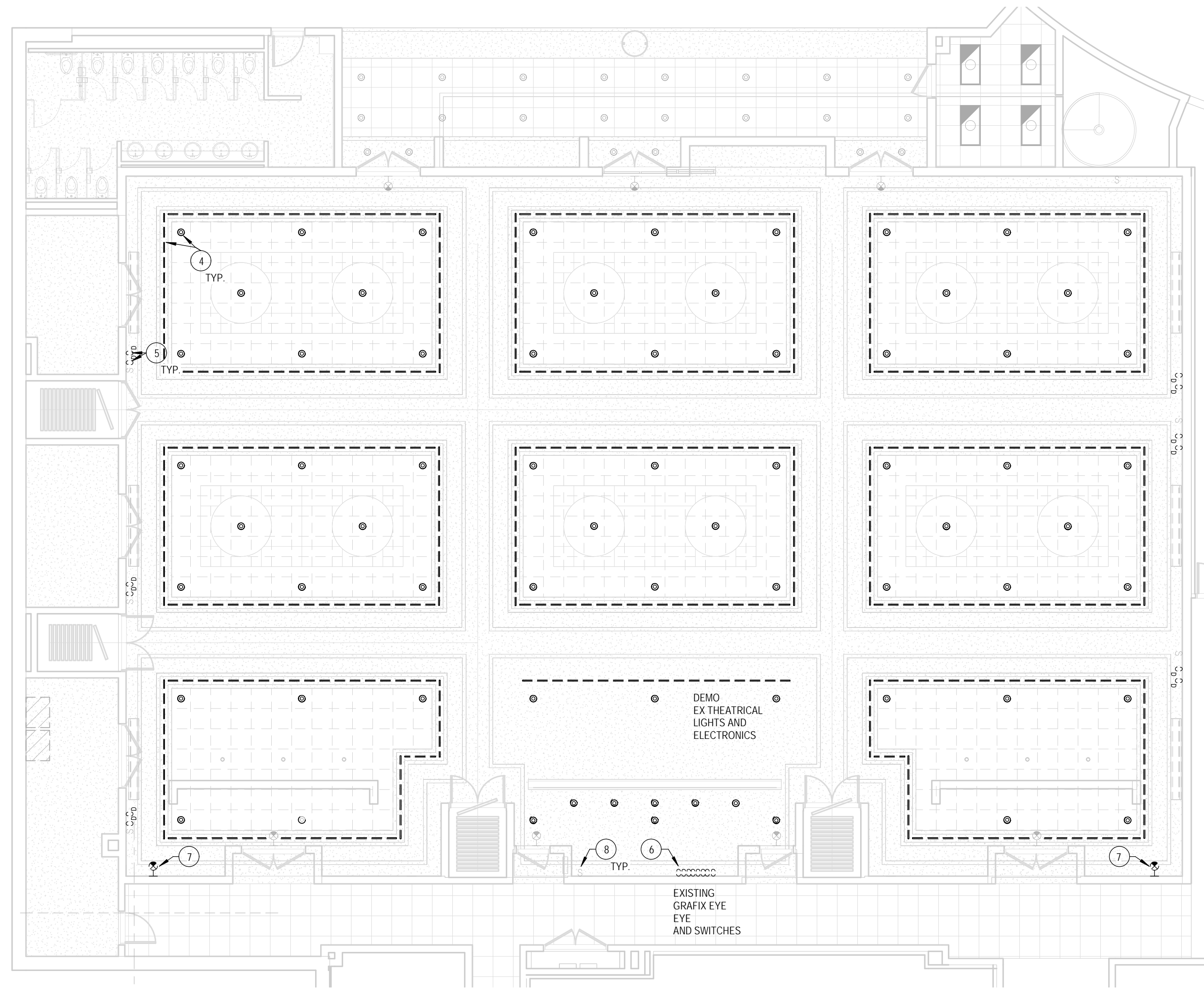
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**LEGEND NOTES**

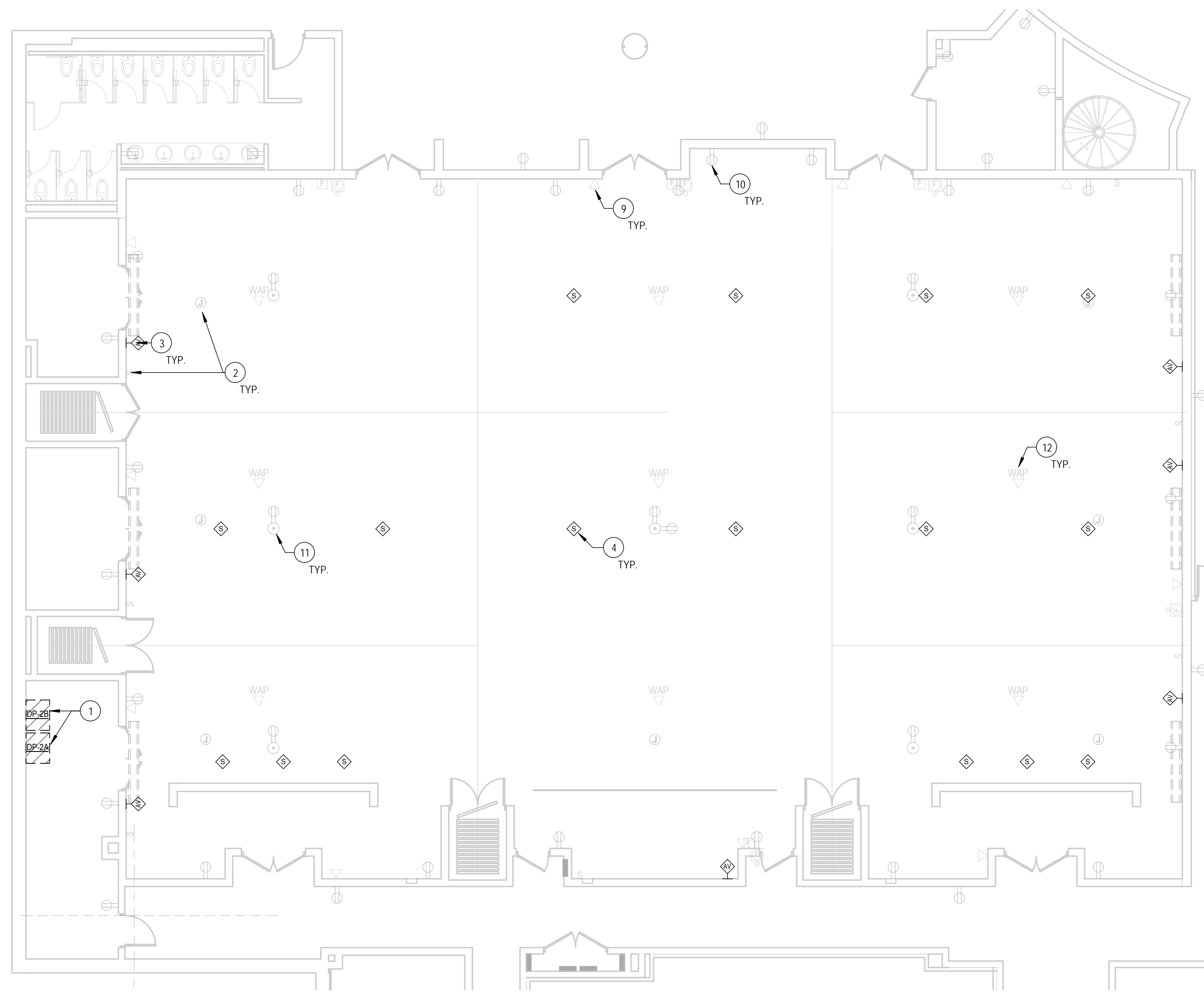
- 1 DEMOLISH EXISTING DIMMER CABINET IN ITS ENTIRETY. REMOVE CONDUIT AND WIRING BACK TO SOURCE PANEL. LABEL BREAKERS AS SPARE.
- 2 DISCONNECT CABLING AND CONDUIT FOR MOTORIZED PROJECTOR SCREENS. EXISTING CIRCUITS TO BE REPURPOSED FOR NEW MOTORIZED PROJECTOR SCREENS. EXTEND CIRCUITING TO NEW FEED POINT.
- 3 DEMOLISH EXISTING AV DEVICES, WALL PLATES, CABLES, AND CONDUITS. CONTRACTOR MAY REPURPOSE CABLES AND CONDUITS FOR NEW AV DEVICES AND WALL PLATES.
- 4 DEMOLISH EXISTING SPEAKERS, CABLES, AND CONDUITS. CONTRACTOR MAY REPURPOSE CABLES AND CONDUITS FOR NEW SPEAKERS.
- 5 DEMOLISH EXISTING DIMMER SWITCHES, CABLES, AND CONDUITS. CONTRACTOR MAY REPURPOSE CABLES AND CONDUITS FOR NEW WALL MOUNTED TOUCH PANEL CONTROLS.
- 6 DEMOLISH EXISTING THEATRICAL LIGHTS (NOT SHOWN), THEATRICAL DIMMER SWITCHES, CABLES, AND CONDUITS. CONTRACTOR MAY REPURPOSE CABLES AND CONDUITS FOR NEW WALL MOUNTED TOUCH PANEL CONTROLS.
- 7 REMOVE AND RELOCATE EXIT SIGN SUCH IT IS VISIBLE TO ENTIRE ROOM AND NOT HIDDEN BEHIND CURTAIN. MODIFY EXISTING CONDUIT AND WIRING TO NEW LOCATION SHOWN LIGHTING PLAN.
- 8 REPLACE ALL SWITCHING TO REMAIN TO BLACK TYPE WITH BLACK STEEL FACEPLATE.
- 9 REMOVE ALL LOW VOLTAGE COMMUNICATIONS FACEPLATES AND REPLACE WITH BLACK STEEL TYPE. EXISTING ACTIVE JACKS SHALL BE UPDATED PER COD CABLEING COLOR AND LABELING STANDARDS.
- 10 REMOVE ALL EXISTING RECEPTACLES AND COVERPLATE AND REPLACE WITH BLACK NEMA 5-20R TYPE WITH BLACK STEEL FACEPLATE.
- 11 REMOVE ALL EXISTING FLUSH FLOORBOX INCLUDING HOUSING, COVER AND TRIM. REPLACE WITH BLACK STEEL FACEPLATE AND TRIM. EXISTING FLOORBOXES ARE HUBBELL S3825. REMOVE AND REINSTALL NEMA 5-20R BLACK RECEPTACLE.
- 12 PROTECT WALL WIFI ACCESS POINTS DURING CONSTRUCTION. REMOVE/REINSTALL AND CLEAN.

**PROJECT SPECIFIC NOTES:**

- A ALL EXISTING VOICE & DATA CABLING, AND TERMINATION POINTS SHALL REMAIN AS IS. JACKS SHALL BE UPDATE PER COD COLOR STANDARDS. WIRELESS ACCESS POINT DEVICES AND TERMINATION POINTS SHALL BE PROTECTED DURING CONSTRUCTION OR REMOVED/REINSTALLED AFTER NEW LIGHTING AND MECHANICAL DIFFUSERS HAVE BEEN INSTALLED.
- B EXISTING BACK-BOXES AND CONDUIT SHALL BE REUSED IF SIZED APPROPRIATE AND ARE INSTALLED PER CURRENT NEC.
- C SEE RAISER DIAGRAM PLANS FOR CONDUITS SIZES AND MOUNTING HEIGHTS OF DEVICES. SEE WIRING DEVICE SCHEDULE FOR BACK BOX DESCRIPTION. ELECTRICAL CONTRACTOR RESPONSIBLE FOR ALL RACEWAY. COORDINATE WITH OTHER TRADES FOR A COMPLETE WORKING SYSTEM.
- D SEE AUDIO VISUAL SYSTEM SCHEDULE OF RESPONSIBILITY FOR ADDITIONAL WORK BY ELECTRICAL CONTRACTOR. COORDINATE RESPONSIBILITIES BETWEEN OTHER CONTRACTORS FOR A COMPLETE WORKING SYSTEM.
- E PROVIDE CONNECTION BETWEEN EXISTING FIRE ALARM CONTROL PANEL AND THEATRICAL RACKS FOR EMERGENCY OVERRIDE.
- F PROVIDE CONNECTION BETWEEN EXISTING FIRE ALARM CONTROL PANEL AND AUDIO VIDEO RACKS FOR EMERGENCY OVERRIDE.



**LIGHTING DEMOLITION PLAN- SECOND FLOOR**  
SCALE: 1/8" = 1'-0"  
NORTH



**POWER & SPECIAL SYSTEMS DEMO PLAN -SECOND FLOOR**  
SCALE: 1/8" = 1'-0"  
NORTH

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**ELECTRICAL DEMOLITION PLAN- SECOND FLOOR**  
**SRC 2000**

**ED1.1**

22-1742-00  
10/06/17  
Revisions

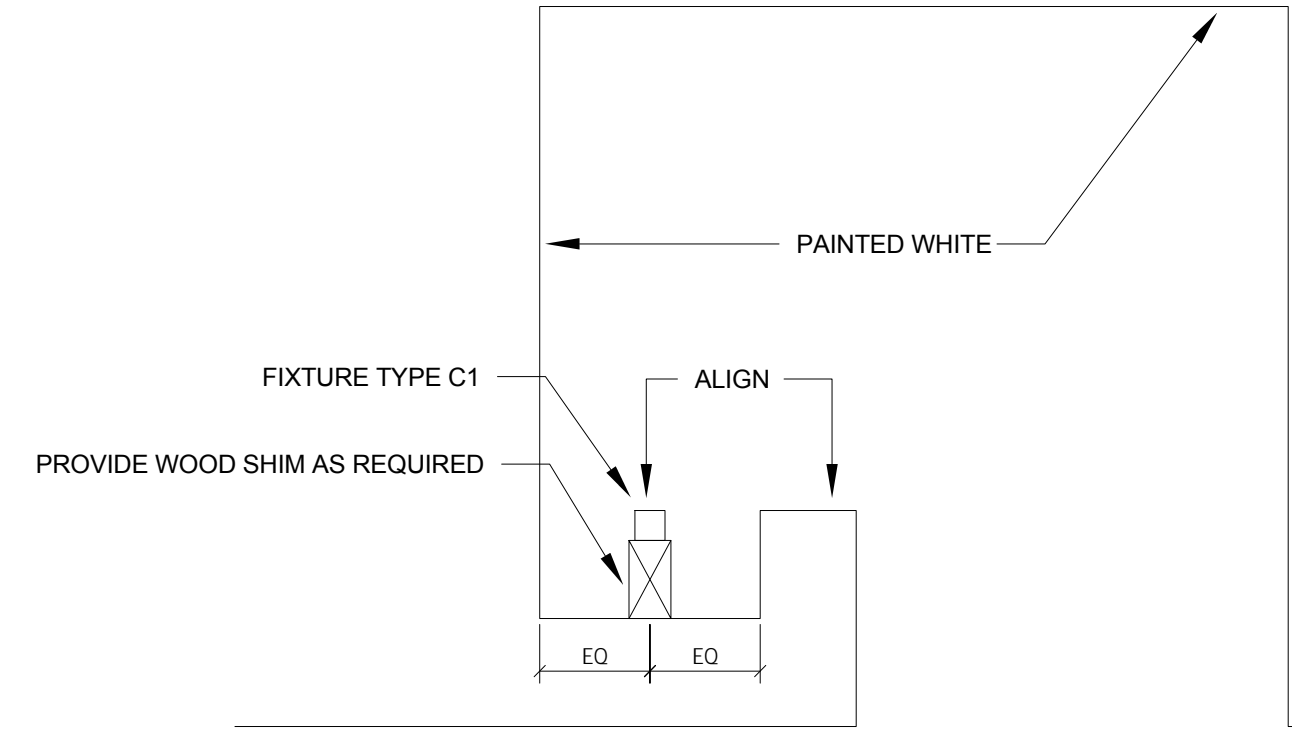
**LEGEND NOTES**

1. PROVIDE CONNECTION VIA NEW LCP. ENSURE EACH CIRCUIT HAS A DEDICATED NEUTRAL. SEE POWER PLANS FOR PANEL SCHEDULES.
2. LOCATE LED FIXTURE IN EXISTING COVES. SEE DETAIL FOR MORE INFORMATION.
3. SEE TA PLANS FOR CONTROLS INFORMATION. EC RESPONSIBLE FOR WIRING A COMPLETE WORKING SYSTEM. REUSE EXISTING BACK-BOXES AND CONDUIT AT DOOR ENTRY STATIONS IF POSSIBLE.
4. NOT USED.
5. PROVIDE EXIT SIGNS WHICH ARE VISIBLE IN FRONT OF CURTAINS.
6. PROVIDE LIGHTING CONTROL PANELS AND NETWORK RACK. SEE POWER PLANS AND QT PLANS FOR MORE INFORMATION.
7. PROVIDE ETC DUAL TECH OCCUPANCY SENSOR FOR LARGE ROOM APPLICATION.
8. RELOCATE BACK MOUNTED EXIT SIGN. PROVIDE BACK PLATE AND SIDE MOUNT BRACKET AND FOR LEFT AND RIGHT INSTALLATIONS. COORDINATE LOCATION WITH PROJECTOR SCREENS.

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**Lighting Fixture Schedule**

Type	Description	Lamp	Wattage	Voltage	Control Means	Manufacturer	Model
C1	Surface mounted continuous run LED cove light. Provide necessary mounting accessories and cables for proper installation. Refer to architectural drawing for actual run length. Refer to below cove detail for fixture mounting. Submit fixture run length at each location as part of submittal review. Fixtures at 90 degree corner shall be no more than 4" away from the corner. Submit (1) 4" working sample with clear lens, removable 88% diffused lens, cord and plug as part of submittal review.	3500K LED	6W/FT	120V	0-10V dimming	Boca Flasher	Nanolume-6W-3500K-120-Voltage-W-Lens
C2A	Recessed LED adjustable downlight with nominal 4.8" diameter aperture. 2200 minimum delivered lumens. 60 degree beam distribution. 360 degree horizontal rotation adjustability and 25 degree tilting angle with tilt increment indicators. Sliding pivot point to minimize light cutoff by fixture aperture. Frosted soft focus lens. Fixture to be installed at new ACT ceiling panel (ACT ceiling panel to be replaced only at fixture location). Fixture to be located in the center of ACT Ceiling panel. C2A, C2B, and C2C shall use the same LED module for color matching purpose. Submit (1) working sample as part of fixture submittal.	3500K LED	31W	120V	0-10V dddLED 0% dimming driver	Lucifer	F4RMS-1-WH-WH-80C-30A-3-4-N-1-EA1-NCM-F4R-01
C2B	Similar to C2A except for fixture installed ceiling type - Fixture to be installed at existing ACT ceiling.	3500K LED	31W	120V	0-10V dddLED 0% dimming driver	Lucifer	Same as C2A
C2C	Retrofit recessed LED adjustable downlight with nominal 4.8" diameter aperture. 2200 minimum delivered lumens. 60 degree beam distribution. 360 degree horizontal rotation adjustability and 25 degree tilting angle with tilt increment indicators. Sliding pivot point to minimize light cutoff by fixture aperture. Frosted soft focus lens. Fixture to be installed at existing GYP ceiling.	3500K LED	31W	120V	0-10V dddLED 0% dimming driver	Lucifer	F4RMS-1-WH-WH-80C-30A-3-4-R-1-EA1



2 COVE LIGHTING DETAIL  
E1.1 SCALE: 1/12" = 1'-0"

**PANEL: LCP1**

LOCATION: BUS RATING: 225 A MAIN BREAKER: 100A VOLTS: 120/208 Wye PHASES: 3 WIRES: 4 MOUNTING: SURFACE FED FROM: SCCR:

NOTES: Type 1

CKT	CIRCUIT DESCRIPTION	BKR TRIP	POLES	A	B	C	POLES	BKR TRIP	CIRCUIT DESCRIPTION	CKT
1	PRESENTER LIGHTS A	20 A	1	93 VA	186 VA			1	20 A HOUSE LIGHT ZONE A	2
3	SCREEN A	20 A	1		93 VA	93 VA		1	20 A PRESENTER LIGHTS B	4
5	HOUSE LIGHT ZONE B	20 A	1		186 VA	93 VA		1	20 A SCREEN B	6
7	HOUSE LIGHT ZONE C	20 A	1	93 VA	186 VA			1	20 A HOUSE LIGHT ZONE C	8
9	SCREEN C	20 A	1		93 VA	93 VA		1	20 A PRESENTER LIGHTS D	10
11	HOUSE LIGHT ZONE D	20 A	1		186 VA	93 VA		1	20 A SCREEN D	12
13	PRESENTER LIGHTS E	20 A	1	93 VA	186 VA			1	20 A HOUSE LIGHT ZONE E	14
15	SCREEN E	20 A	1		93 VA	93 VA		1	20 A PRESENTER LIGHTS F	16
17	GENERAL DOWNLIGHT ZONE F	20 A	1		186 VA	93 VA		1	20 A SCREEN F	18
19	PRESENTER LIGHTS G	20 A	1	124 VA	372 VA			1	20 A HOUSE LIGHT ZONE G	20
21	HOUSE LIGHT ZONE G	20 A	1		248 VA	248 VA		1	20 A HOUSE LIGHT ZONE G	22
23	HOUSE LIGHT ZONE G	20 A	1		124 VA			1	20 A HOUSE LIGHT ZONE G	24
<b>TOTAL LOAD:</b>				1302 VA	1054 VA	124 VA				
<b>TOTAL AMPS:</b>				11 A	9 A	8 A				

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS
L	3286 VA	100.00%	3286 VA	<b>CONNECTED LOAD:</b> 3286 VA <b>ESTIMATED DEMAND:</b> 3286 VA <b>CONNECTED CURRENT:</b> 9 A <b>EMD CURRENT:</b> 9 A

**PANEL: LCP2**

LOCATION: BUS RATING: 225 A MAIN BREAKER: 100A VOLTS: 120/208 Wye PHASES: 3 WIRES: 4 MOUNTING: SURFACE FED FROM: SCCR:

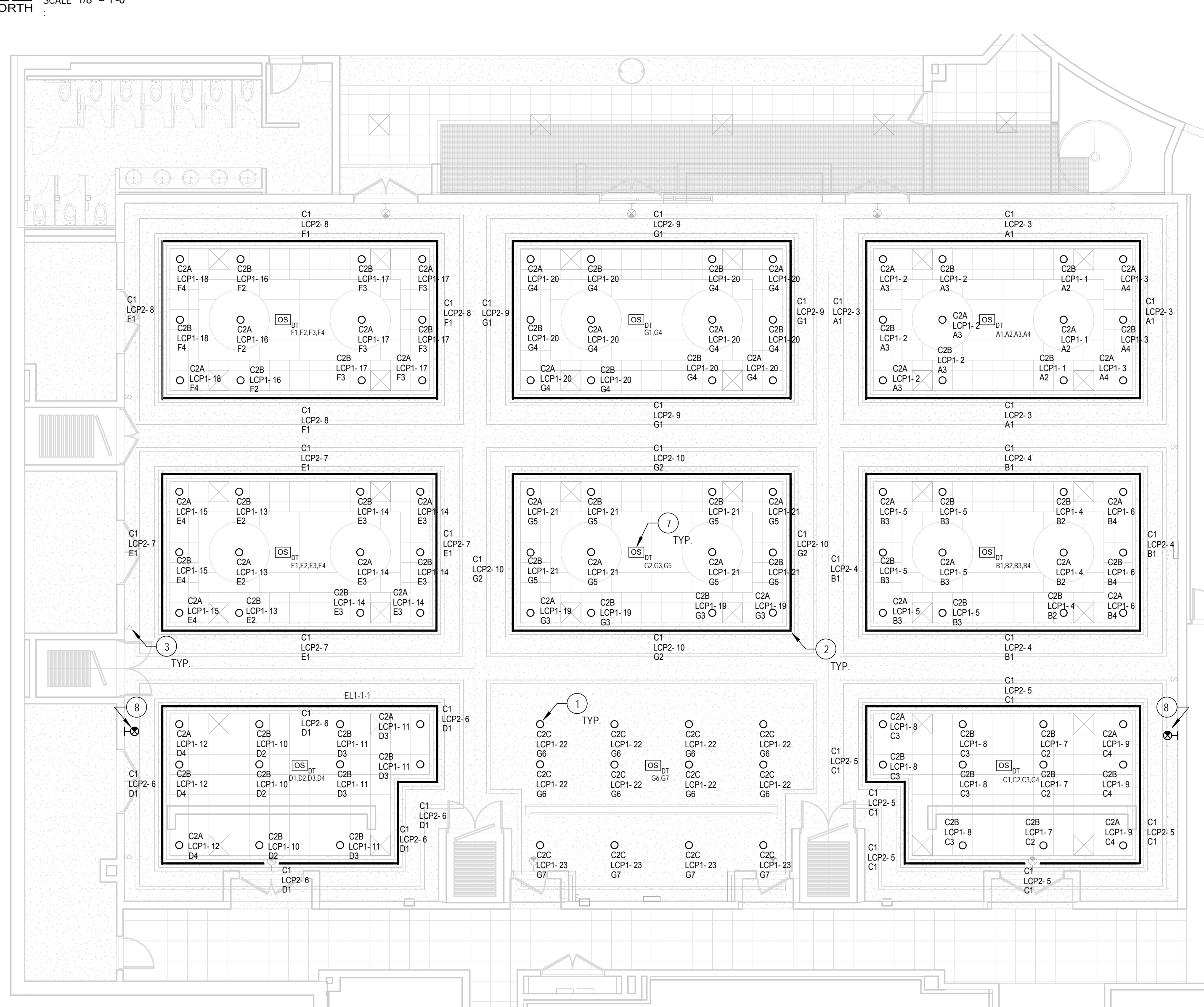
NOTES: Type 1

CKT	CIRCUIT DESCRIPTION	BKR TRIP	POLES	A	B	C	POLES	BKR TRIP	CIRCUIT DESCRIPTION	CKT
1	SPARE	20 A	1	0 VA	0 VA			1	20 A SPARE	2
3	SOFFIT LTG ZONE A	20 A	1		555 VA	554 VA		1	20 A SOFFIT LTG ZONE B	4
5	SOFFIT LTG ZONE C	20 A	1		555 VA	557 VA		1	20 A SOFFIT LTG ZONE D	6
7	SOFFIT LTG ZONE E	20 A	1	555 VA	659 VA			1	20 A SOFFIT LTG ZONE F	8
9	SOFFIT LTG ZONE G	20 A	1		561 VA	559 VA		1	20 A SOFFIT LTG ZONE G	10
11	RECEPT - WD-1	20 A	1		1000...	1000...		1	20 A RECEPT - WD-2	12
13	RECEPT - WD-3	20 A	1	1000...	1000...			1	20 A RECEPT - WD-4	14
15	RECEPT - WD-5	20 A	1		180 VA	1800...		1	20 A RECEPT - WD-6 LIGHT PIPE	16
17	RECEPT - WD-7 LIGHT PIPE	20 A	1		1800...	1800...		1	20 A RECEPT - WD-8 LIGHT PIPE	18
19	RECEPT - WD-8 LIGHT PIPE	20 A	1	1800...	1800...			1	20 A RECEPT - WD-9 LIGHT PIPE	20
21	RECEPT - WD-10 LIGHT PIPE	20 A	1		1800...	1800...		1	20 A RECEPT - WD-11 LIGHT PIPE	22
23	RECEPT - WD-12 LIGHT PIPE	20 A	1		1800...	1800...		1	20 A RECEPT - WD-13 LIGHT PIPE	24
<b>TOTAL LOAD:</b>				6814 VA	7809 VA	10312 VA				
<b>TOTAL AMPS:</b>				57 A	66 A	87 A				

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS
Other	6355 VA	100.00%	6355 VA	<b>CONNECTED LOAD:</b> 24935 VA <b>ESTIMATED DEMAND:</b> 20645 VA <b>CONNECTED CURRENT:</b> 69 A <b>EMD CURRENT:</b> 57 A
R	18580 VA	76.91%	14290 VA	

1. ALL RECEPTACLES TIED INTO LCP2 SHALL UTILIZE #10AWG & #10G IN 1/2" CONDUITS.

**LIGHTING PLAN - THIRD FLOOR CONTROL BOOTH**



**LIGHTING PLAN, SECOND FLOOR**



**PROJECT SPECIFIC NOTES:**

- A. ALL EXISTING VOICE & DATA CABLING, AND TERMINATION POINTS SHALL REMAIN AS IS. JACKS SHALL BE UPDATED PER COD COLOR STANDARDS. WIRELESS ACCESS POINT DEVICES AND TERMINATION POINTS SHALL BE PROTECTED DURING CONSTRUCTION OR REMOVED/REINSTALLED AFTER NEW LIGHTING AND MECHANICAL DIFFUSERS HAVE BEEN INSTALLED.
- B. EXISTING BACK-BOXES AND CONDUIT SHALL BE REUSED IF SIZED APPROPRIATE AND ARE INSTALLED PER CURRENT NEC.
- C. SEE TA-RISER DIAGRAM PLANS FOR CONDUITS SIZES AND MOUNTING HEIGHTS OF DEVICES. SEE WIRING DEVICE SCHEDULE FOR BACK BOX DESCRIPTION. ELECTRICAL CONTRACTOR RESPONSIBLE FOR ALL BACKWAY. COORDINATE WITH OTHER TRADES FOR A COMPLETE WORKING SYSTEM.
- D. SEE AUDIO VISUAL SYSTEM SCHEDULE OF RESPONSIBILITY FOR ADDITIONAL WORK BY ELECTRICAL CONTRACTOR. COORDINATE RESPONSIBILITIES BETWEEN OTHER CONTRACTORS FOR A COMPLETE WORKING SYSTEM.
- E. PROVIDE CONNECTION BETWEEN EXISTING FIRE ALARM CONTROL PANEL AND THEATRICAL RACKS FOR EMERGENCY OVERRIDE.
- F. PROVIDE CONNECTION BETWEEN EXISTING FIRE ALARM CONTROL PANEL AND AUDIO VIDEO RACKS FOR EMERGENCY OVERRIDE.

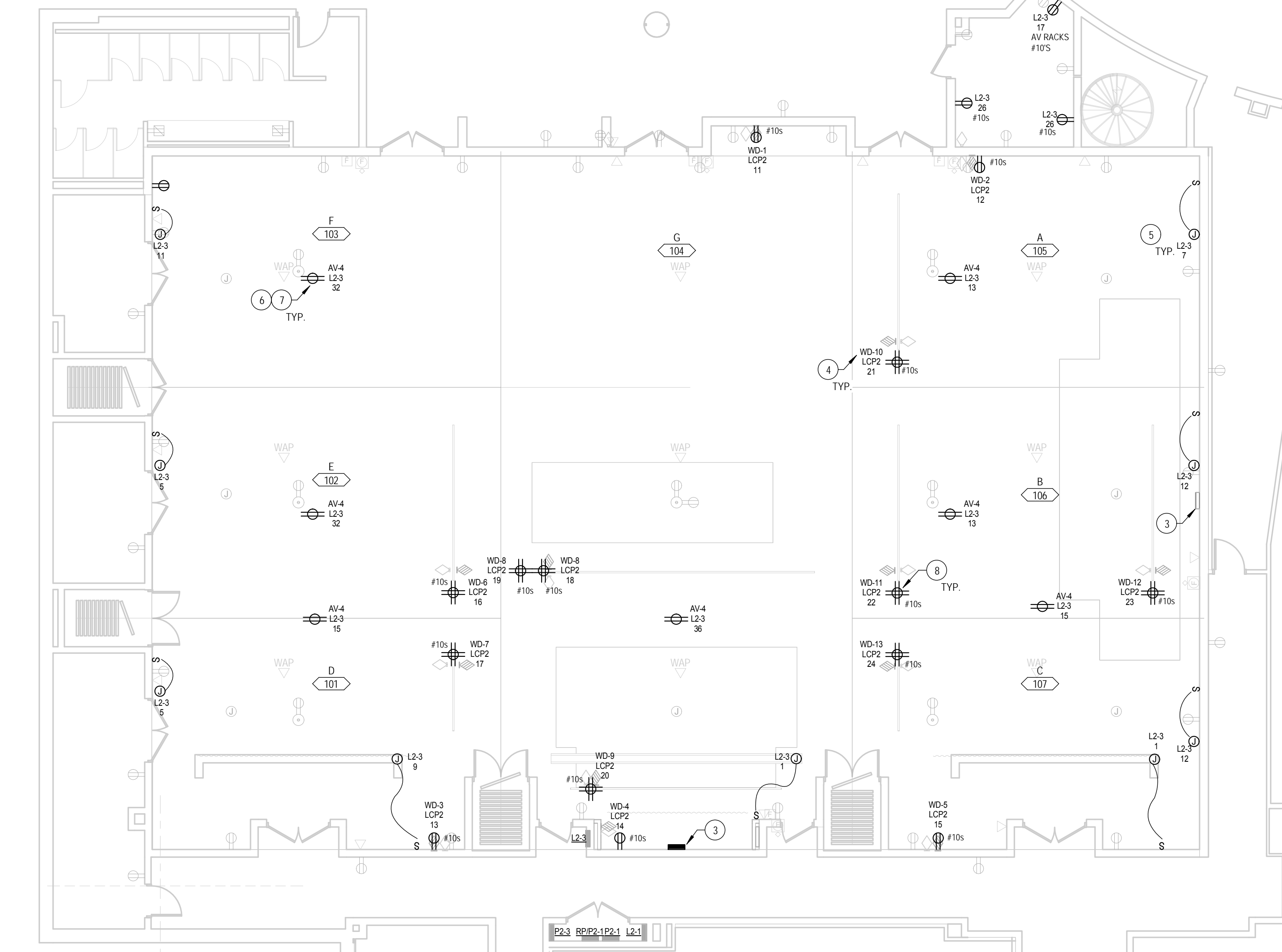
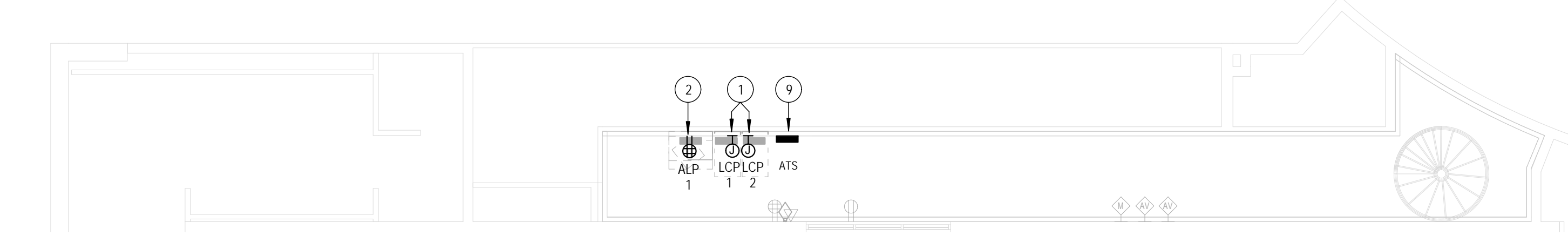
LIGHTING PLAN, SECOND FLOOR  
SRC 2000

E1.1  
22-1742-00  
10/06/17  
REVISED

EXISTING PANEL: L2-3														
LOCATION: BUS RATING: 225 A MAIN BREAKER: MLO			VOLTS: 120/208 Wye PHASES: 3 WIRES: 4 SCOR:			MOUNTING: FLUSH FED FROM: INTEGRAL SPD: Type 1 LUG ACCESSORIES:								
CKT	CIRCUIT DESCRIPTION	BKR TRIP	P	BKR TYPE	LOAD TYPE	PHASE A (VA)	PHASE B (VA)	PHASE C (VA)	LOAD TYPE	BKR TYPE	P	BKR TRIP	CIRCUIT DESCRIPTION	CKT
1	MOTORIZED PROJECTOR SCREEN G104	20	1		M	2,352								2
3														4
5	MOTORIZED PROJECTOR SCREEN E102	20	1		M			2,352						6
7	MOTORIZED PROJECTOR SCREEN A105	20	1		M	1,176								8
9	MOTORIZED PROJECTOR SCREEN D101	20	1		M		1,176							10
11	MOTORIZED PROJECTOR SCREEN F103	20	1		M		1,176	2,352	M		1	20	MOTORIZED PROJECTOR SCREEN B106	12
13	PROJECTORS A105, B106	20	1		R	360								14
15	PROJECTORS D101, C107	20	1		R		360							16
17	AV RACK	20	1		R			1,000						18
19														20
21														22
23														24
25														26
27						2,000			R		1	20	RECEPTS, AV CONTROL ROOM	28
29														30
31						360			R		1	20	PROJECTORS E102, F103	32
33														34
35								180	R		1	20	PROJECTOR G104	36
37														38
39														40
41														42
<b>TOTAL LOAD:</b>						6248 VA	1536 VA	7060 VA						
<b>TOTAL AMPS:</b>						58 A	13 A	65 A						
LOAD TYPE	LOAD DESCRIPTION	CONNECTED LOAD (VA)	DEMAND D	ESTIMATED DEMAND (VA)	DEMAND FACTOR NOTES	BKR TYPE	PANEL TOTALS							
L	LIGHTING	0 VA	0.00%	0 VA	CONTINUOUS LOAD @ 125%	G = GFCI (5mA)	CONNECTED LOAD: 15 kVA							
R	RECEPTACLES	4260 VA	100.00%	4260 VA	FIRST 10kVA @ 100%, REMAINDER @ 50%	GP = GFCI (50mA)								
K	KITCHEN	0 VA	0.00%	0 VA	NON-DWELLING KITCHEN LOADS, NEC ART. 220	ST = SHUNT TRIP	ESTIMATED DEMAND: 15 kVA							
LM	LARGEST MOTOR	0 VA	0.00%	0 VA	LARGEST MOTOR, NEC ART. 430	LO = LOCK OUT	CONNECTED CURRENT: 41 A							
M	MOTOR	10584 VA	100.00%	10584 VA			END CURRENT: 41 A							
C	COOLING	0 VA	0.00%	0 VA										
H	HEATING	0 VA	0.00%	0 VA										
O	OTHER	0 VA	0.00%	0 VA										
Spare	SPARE	0 VA	0.00%	0 VA										

NOTES:  
PANELBOARD IS EXISTING TO REMAIN WITH (3) 20A/1P AND (2) 3P BREAKERS - EC TO UTILIZE UNUSED SPARE 20A/1P BREAKERS. CIRCUITS SHOWN AS BLANK ARE BREAKERS WITH HOT AND NEUTRAL CONNECTION. COORDINATE WITH OWNER IF SPARES SHALL REMAIN AS IS.

**POWER & SPECIAL SYSTEMS PLAN -THIRD FLOOR CONTROL BOOTH**  
SCALE 1/8" = 1'-0"



**POWER & SPECIAL SYSTEMS PLAN -SECOND FLOOR**  
SCALE 1/8" = 1'-0"

**LEGEND NOTES**

- LEGEND NOTES ARE COMMON TO ALL SHEETS UNLESS OTHERWISE NOTED. SOME NOTES MAY NOT APPLY TO THIS SHEET.
- 1 PROVIDE CONNECTION TO LIGHTING CONTROL PANEL. UTILIZED #10AWG & #10G IN 3/4" C.
  - 2 PROVIDE CONNECTION TO LIGHTING PROCESSOR AND NETWORK RACK. UTILIZED #10AWG & #10G IN 3/4" C.
  - 3 PROVIDE 100A 3P 120/208V COMPANY SWITCH WITH CAM LOCK TYPE CONNECTIONS. SEE ONE LINE FOR FEEDER INFORMATION. ROUTE CONDUIT DOWN EXISTING WALL. COORDINATE WORK WITH OTHER TRADES.
  - 4 SEE OT SHEETS FOR WIRING DEVICE SCHEDULE FOR MORE INFORMATION REGARDING THEATRICAL "WD" RECEPTACLES AND FACEPLATE AND BACKBOX TYPE.
  - 5 PROVIDE 120V CONNECTION TO MOTORIZED PROJECTOR SCREEN. INSTALL MANUAL CONTROL SWITCH AT WALL. PROVIDE RS32 CONNECTION TO INTERFACE WITH AV ROOM CONTROLLER. COORDINATE WITH AV INSTALLER.
  - 6 PROVIDE 120V CONNECTION TO PROJECTOR. PROVIDE RS32 CONNECTION TO INTERFACE WITH AV ROOM CONTROLLER. COORDINATE WITH AV INSTALLER.
  - 7 SEE TA PLANS FOR "AV" TYPE RECEPTACLE MOUNTING HEIGHT.
  - 8 PROVIDE CEILING MOUNTED RECEPTACLES USING #10AWG & #12G CONDUCTORS IN 1/2" AT LIGHT BAR ROUTE TO CONTROL BOOTH LIGHTING CONTROL PANEL. REFER TO WIRING DEVICE SCHEDULE ON OT SHEETS FOR CIRCUIT. COORDINATE FINAL LOCATION WITH BAR INSTALLATION.
  - 9 PROVIDE 60A AUTOMATIC TRANSFER SWITCH FOR NORMAL AND EMERGENCY POWER TO LCP1. SEE ONELINE AND SPECIFICATIONS FOR MORE INFORMATION.

**PROJECT SPECIFIC NOTES:**

- A ALL EXISTING VOICE & DATA CABLING, AND TERMINATION POINTS SHALL REMAIN AS IS. JACKS SHALL BE UPDATED PER COD COLOR STANDARDS. WIRELESS ACCESS POINT DEVICES AND TERMINATION POINTS SHALL BE PROTECTED DURING CONSTRUCTION OR REMOVED/REINSTALLED AFTER NEW LIGHTING AND MECHANICAL DIFFUSERS HAVE BEEN INSTALLED.
- B EXISTING BACK-BOXES AND CONDUIT SHALL BE REUSED IF SIZED APPROPRIATE AND ARE INSTALLED PER CURRENT NEC.
- C SEE TA-RISER DIAGRAM PLANS FOR CONDUITS SIZES AND MOUNTING HEIGHTS OF DEVICES. SEE WIRING DEVICE SCHEDULE FOR BACK BOX DESCRIPTION. ELECTRICAL CONTRACTOR RESPONSIBLE FOR ALL BACKWAY. COORDINATE WITH OTHER TRADES FOR A COMPLETE WORKING SYSTEM.
- D SEE AUDIO VISUAL SYSTEM SCHEDULE OF RESPONSIBILITY FOR ADDITIONAL WORK BY ELECTRICAL CONTRACTOR. COORDINATE RESPONSIBILITIES BETWEEN OTHER CONTRACTORS FOR A COMPLETE WORKING SYSTEM.
- E PROVIDE CONNECTION BETWEEN EXISTING FIRE ALARM CONTROL PANEL AND THEATRICAL RACKS FOR EMERGENCY OVERRIDE.
- F PROVIDE CONNECTION BETWEEN EXISTING FIRE ALARM CONTROL PANEL AND AUDIO VIDEO RACKS FOR EMERGENCY OVERRIDE.

100% CD  
Community College District 502  
SRC 2000  
Renovation  
425 Fawell Blvd.  
Glenn Ellyn, Illinois 60137

**POWER & SPECIAL SYSTEMS PLAN -SECOND FLOOR**  
**SRC 2000**

**E2.1**  
22-1742-00  
10/06/17  
Revisions

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LEGEND NOTES

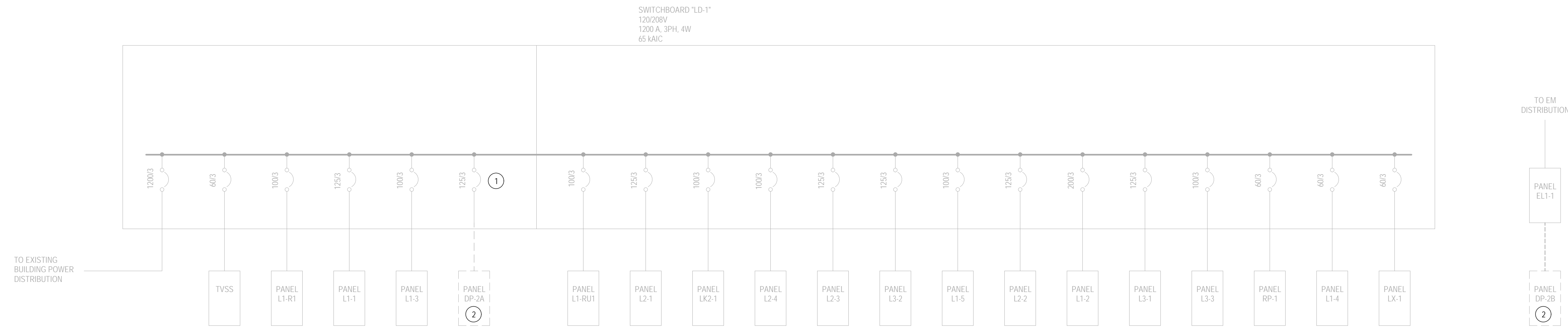
- 1 CONTRACTOR TO TURN OVER EXISTING BREAKER TO THE OWNER AFTER DEMO WORK.
- 2 CONTRACTOR TO DEMOLISH EXISTING CABINET, CABLES, AND CONDUITS, AS NECESSARY.
- 3 CONTRACTOR TO FURNISH AND INSTALL NEW SQUARE D 3-POLE FN BREAKERS (OR EQUIVALENT), SIZE AS NOTED.
- 4 PROVIDE CONNECTION FROM LIFE SAFETY PANEL FOR EMERGENCY LIGHTING. PROVIDE (1) SET #6AWG & #10GND IN 3/4". FROM EMERGENCY PANEL "EL-1" LOCATED IN MAIN ELECTRICAL ROOM. PROVIDE 600P BREAKER. RECONFIGURE EXISTING BREAKERS IF NECESSARY. FOR BIDDING PURPOSES ESTIMATE A RUN OF 200F.
- 5 FEEDERS SIZED FOR VOLTAGE DROP.
- 6 PROVIDE (1) SET #10AWG & #6GND IN 1 1/2". FROM SWITCHBOARD "LD-1" LOCATED IN MAIN ELECTRICAL ROOM. FOR BIDDING PURPOSES ESTIMATE A RUN OF 200F.
- 7 PROVIDE (1) SET #6AWG & #10GND IN 1 1/4". FROM SWITCHBOARD "LD-1" LOCATED IN MAIN ELECTRICAL ROOM. FOR BIDDING PURPOSES ESTIMATE A RUN OF 200F.
- 8 PROVIDE 4-POLE CLOSED TRANSITION SWITCHED 600P AUTOMATIC TRANSFER SWITCH FOR TRANSITION FROM NORMAL POWER TO LIFE SAFETY POWER.
- 9 PROVIDE 150% SIZED NEUTRALS FOR THEATRICAL LIGHTING CONTROL PANELS.

100% CD

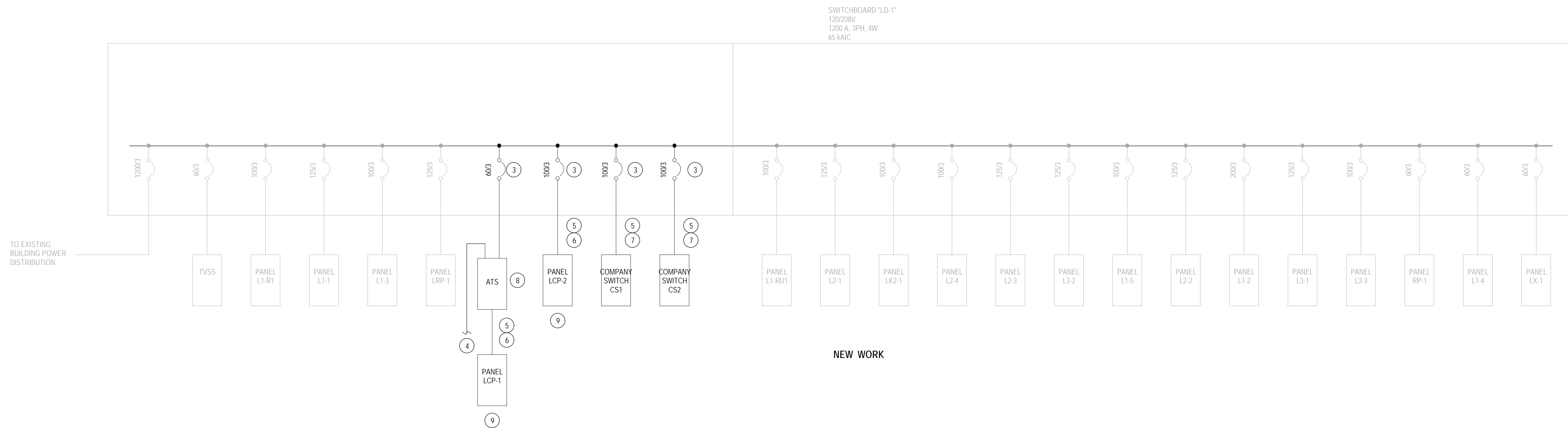
Community College District 502  
SRC 2000  
Renovation  
425 Fawell Blvd.  
Glen Ellyn, Illinois 60137

ELECTRICAL ONE-LINE DIAGRAMS  
SRC 2000

E3.1  
22-1742-00  
10/06/17  
Revisions



DEMO WORK



NEW WORK

30 COPPER FEEDER SCHEDULE

MARK (AMP/KV)	FEEDER 4W				FEEDER 3W				FEEDER K					
	# SETS	Ø & N	ØND	C	# SETS	Ø	ØND	C	# SETS	Ø	#N/SET	N	ØND	C
15	1	12	12	3/4"	1	12	12	3/4"	1	12	1	10	12	3/4"
20	1	12	12	3/4"	1	12	12	3/4"	1	12	1	8	12	3/4"
30	1	10	10	3/4"	1	10	10	3/4"	1	8	1	6	10	3/4"
40	1	8	10	3/4"	1	8	10	3/4"	1	8	1	3	10	1"
50	1	8	10	3/4"	1	8	10	3/4"	1	6	1	2	10	1"
60	1	6	10	1"	1	6	10	3/4"	1	4	1	1	10	1-1/4"
70	1	4	8	1-1/4"	1	3	8	1"	1	3	1	20	8	1-1/2"
80	1	4	8	1-1/4"	1	4	8	1"	1	3	1	20	8	1-1/2"
90	1	3	8	1-1/4"	1	3	8	1-1/4"	1	2	1	30	8	1-1/2"
100	1	3	8	1-1/4"	1	3	8	1-1/4"	1	1	1	40	8	2"
110	1	2	6	1-1/2"	1	2	6	1-1/4"	1	10	1	250	6	2"
125	1	1	6	1-1/2"	1	1	6	1-1/2"	1	20	1	300	6	2"
150	1	10	6	2"	1	10	6	1-1/2"	1	30	1	400	6	2-1/2"
175	1	20	6	2"	1	20	6	2"	1	40	1	500	6	2-1/2"
200	1	30	6	2"	1	30	6	2"	1	250	2	40	6	3"
225	1	40	4	2-1/2"	1	40	4	2"	1	300	2	250	4	3"
250	1	250	4	2-1/2"	1	250	4	2-1/2"	1	400	2	300	4	3-1/2"
300	1	350	4	3"	1	350	4	2-1/2"	1	500	2	400	4	3-1/2"
350	1	500	3	3-1/2"	1	500	3	3"	2	40	1	500	3	2-1/2"
400	2	30	3	2"	2	30	3	2"	2	250	2	40	3	3"
450	2	40	2	2-1/2"	2	40	2	2"	2	300	2	250	2	3"
500	2	250	2	2-1/2"	2	250	2	2-1/2"	2	400	2	300	2	3-1/2"
550	2	300	1	3"	2	300	1	2-1/2"	2	500	2	350	1	3-1/2"
600	2	350	1	3"	2	350	1	2-1/2"	2	500	2	400	1	3-1/2"
650	2	400	10	3"	2	400	10	2"	-	-	-	-	-	-
750	2	500	10	3-1/2"	2	500	10	2"	-	-	-	-	-	-
800	3	300	10	3"	3	300	10	2-1/2"	-	-	-	-	-	-
900	3	350	20	3"	3	350	20	3"	-	-	-	-	-	-
1000	3	400	20	3"	3	400	20	3"	-	-	-	-	-	-
1100	3	500	30	3-1/2"	3	500	30	3"	-	-	-	-	-	-
1200	4	350	30	3"	4	350	30	3"	-	-	-	-	-	-

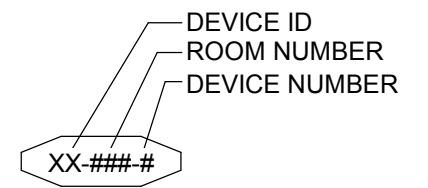
FEEDER SIZING NOTES:  
1. FEEDERS SHALL BE 4 WIRE (4W), ABCNG, UNLESS DENOTED WITH:  
"3W" WHICH SHALL BE 3 WIRE (3W), ABCG  
"X" WHICH SHALL BE 4 WIRE, ABCNG, WITH OVERSIZE NEUTRAL  
2. ALL FEEDERS SHALL HAVE EQUIPMENT GROUND  
3. NOT ALL SIZES USED

**LEGEND NOTES**

LEGEND NOTES ARE COMMON TO ALL SHEETS UNLESS NOTED OTHERWISE.  
SOME NOTES MAY NOT APPLY TO THIS SHEET

**AUDIOVISUAL SYMBOL LEGEND**

**AUDIOVISUAL SYMBOL**



**AUDIOVISUAL SYMBOL ID KEY**

AV	AUDIOVISUAL TERMINATION
ANT	ANTENNA TERMINATION
AVR	AUDIOVISUAL EQUIPMENT RACK
CAM	CAMERA TERMINATION
FB	FLOORBOX TERMINATION
IC	INTERCOM TERMINATION
LT	LOUDSPEAKER TERMINATION
SW	SUBWOOFER TERMINATION
VT	VIDEO TERMINATION
LM	LIVE MICROPHONE TERMINATION
WAP	WIRELESS ACCESS POINT TERMINATION

**POWER SYMBOLS**

- ⊕ 20A, 125V, 2 POLE, 3 WIRE, GROUNDING TYPE, NEMA 5-20 DUPLEX RECEPTACLE CONTAINED IN AUDIOVISUAL WIRING DEVICE PLATE (+18" AFF. UON).
- ⊕ QUADRUPLEX RECEPTACLE - TWO (2) 20A, 125V, 2 POLE, 3 WIRE, GROUNDING TYPE, DUPLEX RECEPTACLES CONTAINED IN AUDIOVISUAL WIRING DEVICE PLATE (+18" AFF. UON).
- ⊕ CONCEALED CEILING MOUNTED QUADRUPLEX RECEPTACLE - TWO (2) 20A, 125V, 2 POLE, 3 WIRE, GROUNDING TYPE CONTAINED IN AUDIOVISUAL WIRING DEVICE (CEILING UON).
- ⊕ CONCEALED SERVICE, STEEL FLOOR BOX COMPLETE WITH A QUADRUPLEX RECEPTACLE - TWO (2) 20A, 125V, 2 POLE, 3 WIRE, GROUNDING TYPE RECEPTACLES. PROVIDE CAST-IRON BOX IN SLABS THAT ARE IN DIRECT CONTACT WITH EARTH IN AV WIRING DEVICE.
- ⊕ JUNCTION BOX.

**DATA SYMBOLS**

- ⊕ WALL MOUNTED DATA RECEPTACLE FOR BUILDING WIDE LAN CONTAINED IN AUDIOVISUAL WIRING DEVICE PLATE (+18" AFF. UON).
- ⊕ WALL MOUNTED DATA RECEPTACLE FOR BUILDING WIDE LAN, NOT CONTAINED IN AUDIOVISUAL WIRING DEVICE PLATE - FOR REFERENCE ONLY.

**Keynote Legend**

Key Value	Keynote Text
1B	PROJECTION SCREEN - 87.5"x140" REFER TO SPECIFICATION SECTION 274116 FOR BASIS OF DESIGN REQUIREMENTS AND QUANTITY
1C	PROJECTION SCREEN - 120"x192" REFER TO SPECIFICATION SECTION 274116 FOR BASIS OF DESIGN REQUIREMENTS AND QUANTITY
2C	OWNER PROVIDED PROJECTOR & MOUNT
4D	FLUSH WALL-MOUNT AV CONTROL INTERFACE - REFER TO SPECIFICATION SECTION 274116 FOR BASIS OF DESIGN REQUIREMENTS AND QUANTITY
5A	CEILING MOUNTED LOUDSPEAKER - REFER TO SPECIFICATION SECTION 274116 FOR BASIS OF DESIGN REQUIREMENTS AND QUANTITY
6A	AV EQUIPMENT RACK - REFER TO SPECIFICATION SECTION 274116 FOR BASIS OF DESIGN REQUIREMENTS AND QUANTITY

Sheet List	
WT	Sheet Name
28-Audiovisual	
TA-001	AV GENERAL NOTES
TA-102	AUDIOVISUAL PLAN - SECOND FLOOR
TA-202	RCP WIRING DEVICE PLAN - SECOND FLOOR
TA-212	RCP EQUIPMENT PLAN - SECOND FLOOR
TA-520	AUDIOVISUAL RACK ELEVATIONS
TA-521	AUDIOVISUAL RACK ELEVATIONS
TA-550	AUDIOVISUAL RACK PANEL DETAILS
TA-551	AUDIOVISUAL RACK PANEL DETAILS
TA-552	AUDIOVISUAL RACK PANEL DETAILS
TA-601	AUDIOVISUAL WIRING DEVICE DETAILS
TA-610	AUDIO BLOCK DIAGRAM
TA-611	VIDEO BLOCK DIAGRAM
TA-612	VIDEO BLOCK DIAGRAM
TA-613	CONTROL SYSTEM BLOCK DIAGRAM
TA-630	AUDIOVISUAL WIRING DEVICE DETAILS
TA-640	CONDUIT RISER DIAGRAM
TA-650	WIRING DEVICE SCHEDULE
TA-660	NEW CONTROL ROOM SKETCH

**GENERAL AUDIOVISUAL NOTES**

- SEE AUDIOVISUAL SYSTEM WRITTEN SPECIFICATIONS FOR WORK SCOPE DETAILS.
- HIGH VOLTAGE RECEPTACLES SHOWN IN AV WIRING DEVICES ARE PROVIDED BY THE AUDIOVISUAL CONTRACTOR AND WIRED BY THE ELECTRICAL CONTRACTOR.
- RECEPTACLES AND WIRING ARE TO BE PHYSICALLY SEPARATED FROM ALL LOW VOLTAGE WIRING BY MEANS OF A 1/16" THICK METALLIC BARRIER. RESIZE BACK BOX ACCORDINGLY IF BARRIER CANNOT BE ACCOMMODATED.
- WIRING DEVICE PLATES TO BE MANUFACTURED USING 11 GAUGE STEEL OR 1/8" ALUMINUM WITH MINIMUM THICKNESS.
- PLATES FOR RECESSED BACK BOXES TO CONTAIN A 1/2" LIP ON ALL SIDES TO CONCEAL INSTALLATION CUTS.
- REINFORCE ALL CUSTOM PLATES OR PANELS AS REQUIRED FOR LESS THAN 1/8" DEFLECTION AT MIDPOINT.
- PROJECT OUTLET HEIGHT IS 18" UON. PROJECT SWITCH HEIGHT WILL VARY BETWEEN 40-48". VERIFY PRIOR TO INSTALLATION.
- WIRING DEVICE FACEPLATES TO BE FLAT BLACK UON.
- FACEPLATE NOMENCLATURE IS TO BE UPPER CASE, 14 POINT, HELVETICA LIGHT. WHERE SPACING IS CRITICAL, 12 POINT MAY BE USED.
- PIPE MOUNTED BACK BOXES NEED TO INCLUDE U-BRACKET HARDWARE TO HANG THE BOXES.
- ALL NUMBERING AND LABELS SHALL BE LOCATED ABOVE THE RESPECTIVE CONNECTOR, CONTROL, ETC SUCH THAT IT IS READABLE WHEN A CABLE IS PLUGGED IN.
- FINAL CONNECTOR NUMBERS TO BE DETERMINED DURING SHOP DRAWINGS.
- ALL CONNECTORS ARE TO BE MOUNTED USING 4-40 FLAT COUNTERSUNK HEAD MACHINE SCREW, FLAT WASHER, AND NYLON INSERT LOCKNUT. THEADSBERT OR MANUFACTURER RECOMMENDED FASTENER. POP RIVETING CONNECTORS ARE NOT ALLOWED.
- ALL CONNECTORS, CONTROLS, ETC. ARE TO BE POSITIONED SUCH TO ALLOW REQUIRED CLEARANCES WITHIN BACK BOX DIMENSIONS AND PANEL MOUNT POINTS.
- ALL CABLE LENGTHS SHALL HAVE A 5'-0" SERVICES LOOP AT EACH NON-ENCLOSED TERMINATIONS AND A 15'-0" LOOP AT THE AUDIOVISUAL RACK LOCATIONS.

**AUDIOVISUAL ABBREVIATIONS**

ACT	ACOUSTIC CEILING TILE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GROUND
ALS	ASSISTED LISTENING SYSTEM
AWG	AMERICAN WIRE GAUGE
BRI	BASIC RATE INTERFACE
BTU	BRITISH THERMAL UNITS
C	CONDUIT
CATV	COMMUNITY ANTENNA TELEVISION
CCTV	CLOSED CIRCUIT TELEVISION
CKT	CIRCUIT
CL	CENTERLINE
CM	CONSTRUCTION MANAGER
DWG	DRAWING
EC	ELECTRICAL CONTRACTOR
EMT	ELECTRICAL METALLIC TUBING
FB	FLOOR BOX
FBO	FURNISHED BY OTHERS
FFE	FURNITURE FIXTURES & EQUIPMENT
FIB	FIBER
FLT	FUTURE
GC	GENERAL CONTRACTOR
HC	HVAC CONTRACTOR
HD	HIGH DEFINITION
HV	HIGH VOLTAGE
IG	ISOLATED GROUND
IMC	INTERMEDIATE METAL CONDUIT
IR	INFRARED
ISDN	INTEGRATED SERVICES DIGITAL NETWORK
JB	JUNCTION BOX
LAN	LARGE AREA NETWORK
LV	LOW VOLTAGE
LV	MASTER ANTENNA TELEVISION
MATV	MICROPHONE
MIC	MONITOR
MON	NOT IN CONTRACT
NIC	NOMINAL
NOM	NOT TO SCALE
NTS	ON CENTER
OD	OUTSIDE DIAMETER
OFE	OWNER FURNISHED EQUIPMENT
OI	OWNER INSTALLED
PB	PULL BOX
PC	PLUMBING CONTRACTOR
POTS	PLAIN OLD TELEPHONE SERVICE
PRI	PRIMARY RATE INTERFACE
PWR	POWER
RSC	RIGID STEEL CONDUIT
SATV	SATELLITE TELEVISION
SCRN	PROJECTION SCREEN
SPKR	SPEAKER
TBD	TO BE DETERMINED
TYP	TYPICAL
UA	USING AGENCY
UON	UNLESS OTHERWISE NOTED
V	VOLTS
VIF	VERIFY IN FIELD
VTC	VIDEO TELECONFERENCING
WAN	WIDE AREA NETWORK

**AUDIOVISUAL CONDUIT SEPARATION DETAILS**

SEE WRITTEN SPECIFICATIONS FOR DETAILS. AUDIOVISUAL SYSTEM WIRING GROUPS ARE COMPRISED ACCORDING TO THEIR NOMINAL VOLTAGE LEVELS (REFER TO TERMINATION SCHEDULE).  
**NEVER INTERMIX GROUPS WITHIN A GIVEN CONDUIT!**

GROUP A	KEY									
	GROUP B		GROUP C		GROUP D		GROUP E		GROUP F	
GROUP A	0mV-100mV (MIC LEVEL)									
GROUP B	100mV-10V (LINE LEVEL)									
GROUP C	10V-70V (LOUDSPEAKER LEVEL AND CONTROL WIRING)									
GROUP D	TELEPHONE, VIDEO, DATA, AND DIGITAL CIRCUITS									
GROUP E	FIBER OPTIC CABLE									
GROUP FWR	HIGH VOLTAGE POWER CABLE									

MINIMUM CONDUIT SEPARATION BETWEEN CONDUITS CARRYING WIRING OF DIFFERENT GROUPS IS AS FOLLOWS: (90 DEG. CROSSINGS ARE ACCEPTABLE)

GROUP A	GROUP B	GROUP C	GROUP D	GROUP E	KEY		
					EMT/ER	RR	
ADJACENT	6" 3"	11.5" 12"	6" 3"	12" 6"	3"	ADJACENT	
-	-	ADJACENT	12" 6"	3"	6"	3"	11.5" ADJACENT
-	-	-	ADJACENT	6" 3"	11.5" ADJACENT	-	-
-	-	-	-	ADJACENT	ADJACENT	ADJACENT	-

MINIMUM CONDUIT SEPARATION BETWEEN CONDUITS CARRYING WIRING OF DIFFERENT GROUPS AND OTHER ELECTRICAL SERVICES AS FOLLOWS:

	GROUP A	GROUP B	GROUP C	GROUP D	GROUP E
DIMMER CONTROLLED LIGHTING FIXTURE	24" 12"	6" 12"	6" 12"	6" 3"	1.5" 12"
SCR CONTROLLED SERVICES	24" 12"	6" 12"	6" 3"	6" 3"	1.5" 12"
208/480 CIRCUITS	24" 12"	6" 12"	6" 3"	6" 3"	1.5" 12"
ALL OTHER SERVICES	12" 6"	3" 3"	6" 3"	1.5" ADJACENT	ADJACENT
TRANSFORMERS, MOTORS	50"	25"	15"	15"	ADJACENT
EXCLUDES AV ISOLATED TRANSFORMER					

- WHEN IT IS NECESSARY TO DEVIATE FROM THE SPECIFIED CONDUIT/CABLE RUN DUE TO UNFORSEEN FIELD CONDITIONS, MAINTAIN GROUP SEPARATIONS USING THE EMT-EMT DISTANCES AS SPECIFIED ABOVE WITH PLENUM RATED CABLE. PROVIDE IN WRITING THE ALTERNATE TRANSMISSION METHOD AND CABLE SPECIFICATIONS FOR APPROVAL BY THE ARCHITECT.
- TERMINATIONS OF SHIELDS SHALL BE AS FOLLOWS:
  - TERMINATE THE SINGLE POINT GROUNDING END OF A SHIELD CABLE WITH AN INSULATING SLEEVE OVER THE JACKET TERMINATION AND A PIECE OF TUBING OVER THE DRAIN WIRE.
  - NEVER TERMINATE THE SHIELD OF A BALANCED AUDIO LINE AT BOTH ENDS. ALWAYS LIFT THE LOAD SIDE.
  - THE SHIELD MUST BE COMPLETELY INSULATED AND NOT BECOME GROUNDED OR SHORTED TO ANOTHER CABLE.
  - FOR CABLE RUNS OVER 1000'-0" OR IN HIGH EMI AREAS (+10mg), IT IS ACCEPTABLE TO EITHER BREAK THE SHIELD TO REDUCE ITS LENGTH OR PROVIDE A CAPACITOR AT ONE END.
  - WHEN TERMINATING SHIELDED CABLE ALWAYS KEEP THE UNSHIELDED PORTION 1" OR LESS.
  - ALWAYS MAINTAIN SHIELD CONTINUITY AND ISOLATION FROM GROUND THROUGH ALL BOXES OR MULTI-PIN CONNECTORS UON.
- CONDUIT SIZING ON TA-626 SERIES DRAWINGS ARE NOMINAL, AND MUST BE VERIFIED BASED ON FIELD CONDITIONS.
- AV LOW-VOLTAGE CONDUITS TO BE RUN PER REQUIREMENTS IN DIVISION 26 SPECIFICATIONS.

**FOR CONDUIT FILL REFER TO THE MOST RECENT VERSION OF NEC AS APPLICABLE**

- 40% FILL FOR 3+ CABLES
- 31% FILL FOR 2 CABLES
- 53% FILL FOR A SINGLE CABLE

JAM RATIO SHALL BE CALCULATED USING THE CONDUIT ID/CABLE OD METHOD AND SHALL NOT FALL BETWEEN 2.8-3.2

**AUDIOVISUAL SYSTEM SCHEDULE OF RESPONSIBILITY**

ITEMS TO BE FURNISHED AND INSTALLED	ELECTRICAL CONTRACTOR		AUDIOVISUAL CONTRACTOR		GENERAL CONTRACTOR		OWNER	
	FURNISH	INSTALL*	FURNISH	INSTALL	FURNISH	INSTALL	FURNISH	INSTALL
MAIN POWER SERVICE PANEL BOARDS AND CIRCUIT BREAKERS	X	X						
MAIN POWER SERVICE CONDUIT AND CONDUCTORS	X	X						
MAIN POWER SERVICE TERMINATIONS	X	X						
AV AND AVIG STANDARD LOAD CENTERS AND CIRCUIT BREAKERS	X	X						
AV AND AVIG STANDARD LOAD CENTER CONDUIT AND CONDUCTORS	X	X						
AV AND AVIG STANDARD LOAD CENTER TERMINATIONS	X	X						
AV AND AVIG BRANCH CIRCUIT CONDUIT AND CONDUCTORS	X	X						
AV AND AVIG BRANCH CIRCUIT RECEPTACLES AND TERMINATION	X	X						
AV AND AVIG RACK MOUNT POWER DISTRIBUTION DEVICES (EG POWER STRIP, UPS)			X	X				
AV AND AVIG HARD-WIRED RACK MOUNT TERMINATIONS	X	X						
AV AND AVIG EQUIPMENT RACK TROUGHS AND BACKBOXES	X	X						
AV AND AVIG OUTLET DEVICE STANDARD BACK BOXES AND ENCLOSURES	X	X						
AV AND AVIG OUTLET DEVICE CUSTOM BACK BOXES AND ENCLOSURES	X	X						
AV AND AVIG OUTLET DEVICE CUSTOM WALL PLATES			X	X				
STRUCTURAL SUPPORTS FOR CEILING PROJECTION SCREENS AND PROJECTORS					X	X		
AUDIOVISUAL PROJECTION SCREENS AND PROJECTOR LIFTS			X	X				
AUDIOVISUAL LV/MV CONTROL INTERFACES			X	X				
AUDIOVISUAL SYSTEM FLOORPOCKET BACKBOXES (FLOORBOX)	X	X						
AUDIOVISUAL SYSTEM FLOORBOX COVERS AND CUSTOM PLATES			X	X				
AUDIOVISUAL SYSTEM WALLBOX	X	X						
AUDIOVISUAL SYSTEM WALLBOX COVERS AND CUSTOM PLATES			X	X				
CONDUIT, JUNCTION BOXES, AND RACEWAY FOR LOW VOLTAGE AUDIOVISUAL CABLE	X	X						
AUDIOVISUAL SYSTEM CONDUIT RISER DIAGRAM (SHOP DRAWINGS)	X							
LOW VOLTAGE AUDIOVISUAL CABLE AND CONNECTORS			X	X				
LOW VOLTAGE AUDIOVISUAL TERMINATIONS			X	X				
AUDIOVISUAL CABLE ROUTING DIAGRAM (SHOP DRAWINGS)			X					

- \*ELECTRICAL CONTRACTOR TO OBTAIN INSTALLATION CRITERIA FROM ARCHITECT AND/OR AUDIOVISUAL CONTRACTOR PRIOR TO INSTALLATION
- NOTES**
- ELECTRICAL CONTRACTOR TO FURNISH CONDUIT TO LOCATION OF FUTURE AUDIOVISUAL EQUIPMENT OR JUNCTION BOX INDICATED ON DRAWINGS.
  - FURNISH PULL STRINGS IN EVERY CONDUIT FOR FUTURE CABLING. FURNISH JUNCTION BOXES, STUB-UPS, MOUNTING HARDWARE, ETC. AS REQUIRED.
  - POWER RECEPTACLE TO BE FURNISHED AND TERMINATED BY ELECTRICAL CONTRACTOR.
  - ITV/OIC/DATA FACEPLATE AND TERMINATIONS TO BE FURNISHED BY LOW VOLTAGE CONTRACTOR.
  - ELECTRICAL CONTRACTOR TO TERMINATE HIGH VOLTAGE SIDE OF INTERFACE. AUDIOVISUAL CONTRACTOR TO TERMINATE LOW VOLTAGE SIDE OF INTERFACE.
  - GENERAL CONTRACTOR SHALL COORDINATE WITH OWNER TO VERIFY OWNER FURNISHED LOUDSPEAKER RIGGING REQUIREMENTS.

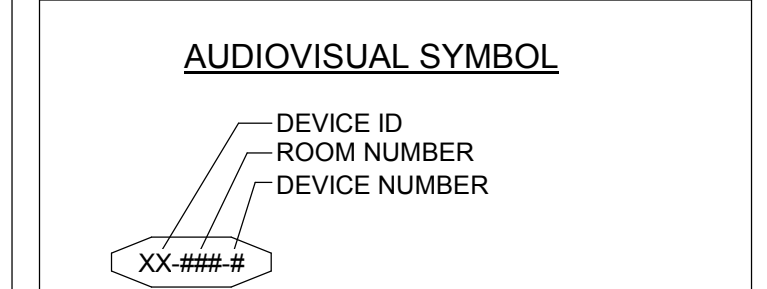
**AUDIOVISUAL CABLE (DIMENSIONS IN INCHES)**

NAME	TYPE	DESCRIPTION	MFR	PART #	GROUP	O.D. [in]	AREA [sq. in]
ANTENNA	ANTENNA CABLE	16 AWG RG-8U 50 OHM CABLE	BELDEN	9914	D	0.403	0.128
AUDIO	LINE LEVEL AUDIO	18 AWG SHIELDED TWISTED PAIR	BELDEN	9460	B	0.230	0.042
DATA	CATS UTP	23 AWG CATEGORY 6	PANDUIT	PUP604BU-W	D	0.236	0.040
DATA-S	CATS STP	23 AWG STRANDED 5 SHIELDED	PANDUIT	PUP6X04BU-WG	D	0.295	0.066
CONTROL	RS-232 SERIAL COMM/RELAY	20 AWG STRANDED 5 CONDUCTOR, SHIELDED	BELDEN	9445	D	0.239	0.045
SM-FIBER	6-STRAND SINGLE MODE FIBER	OS2 SINGLE-MODE CABLING ASSEMBLY	BELDEN	FSDP906Y	E	---	---
MM-FIBER	6-STRAND MULTI MODE FIBER	OM4 MULTI-MODE CABLING ASSEMBLY	BELDEN	FODP206Y	E	---	---
HDMI	DVI/HDMI VIDEO	HDMI CABLE ASSEMBLY	EXTRON	28-614-XX	D		
HDMI OPT	HDMI OVER OPTICAL CABLE	HDMI FIBER OPTIC CABLE ASSEMBLY	MONOPRICE	#143XX	E		
IR	22 AWG 2 CONDUCTOR SHIELDED	IR CONTROL	BELDEN	5500FE	D	0.121	0.011
INTERCOM	INTERCOM WIRING	22 AWG SHIELDED TWISTED PAIR	BELDEN	6521FE	B	0.129	0.013
MIC	MICROPHONE LEVEL AUDIO	22 AWG SHIELDED TWISTED PAIR	BELDEN	9451	A	0.135	0.014
SDI	DIGITAL COAX	18 AWG RG6 COAX	BELDEN	1694A	D	0.274	0.059
SPKR18	SPEAKER CABLE 18 AWG	STRANDED UNSHIELDED TWISTED PAIR	BELDEN	6300UE	D	0.154	0.019
SPKR18-4	SPEAKER CABLE 18 AWG	STRANDED UNSHIELDED TWISTED PAIR	BELDEN	9418	C	0.245	0.043
SPKR16	SPEAKER CABLE 16 AWG	STRANDED UNSHIELDED TWISTED PAIR	BELDEN	6200UE	C	0.176	0.025
SPKR14	SPEAKER CABLE 14 AWG	STRANDED UNSHIELDED TWISTED PAIR	BELDEN	8473	C	0.340	0.091
SPKR12	SPEAKER CABLE 12 AWG	STRANDED UNSHIELDED TWISTED PAIR	BELDEN	8477	C	0.386	0.117
VGA	HD15 ANALOG CABLE ASSEMBLY	VGA CABLE ASSEMBLY	EXTRON	28-567-XX	D		
XTP	HD15 ANALOG CABLE ASSEMBLY	Shielded Twisted Pair Cable for XTP Systems and DTP Systems	EXTRON	22-236-03	D		
120V	POWER CABLE BY EC						

\*\*FIBER ASSEMBLY MAY VARY IN SIZE. REFER TO MANUFACTURER'S SPECIFICATIONS FOR EXACT SIZE PER REQUIRED FIBER COUNT

**LEGEND NOTES**  
LEGEND NOTES ARE COMMON TO ALL SHEETS  
SOME NOTES MAY NOT APPLY TO THIS SHEET

**AUDIOVISUAL SYMBOL LEGEND**



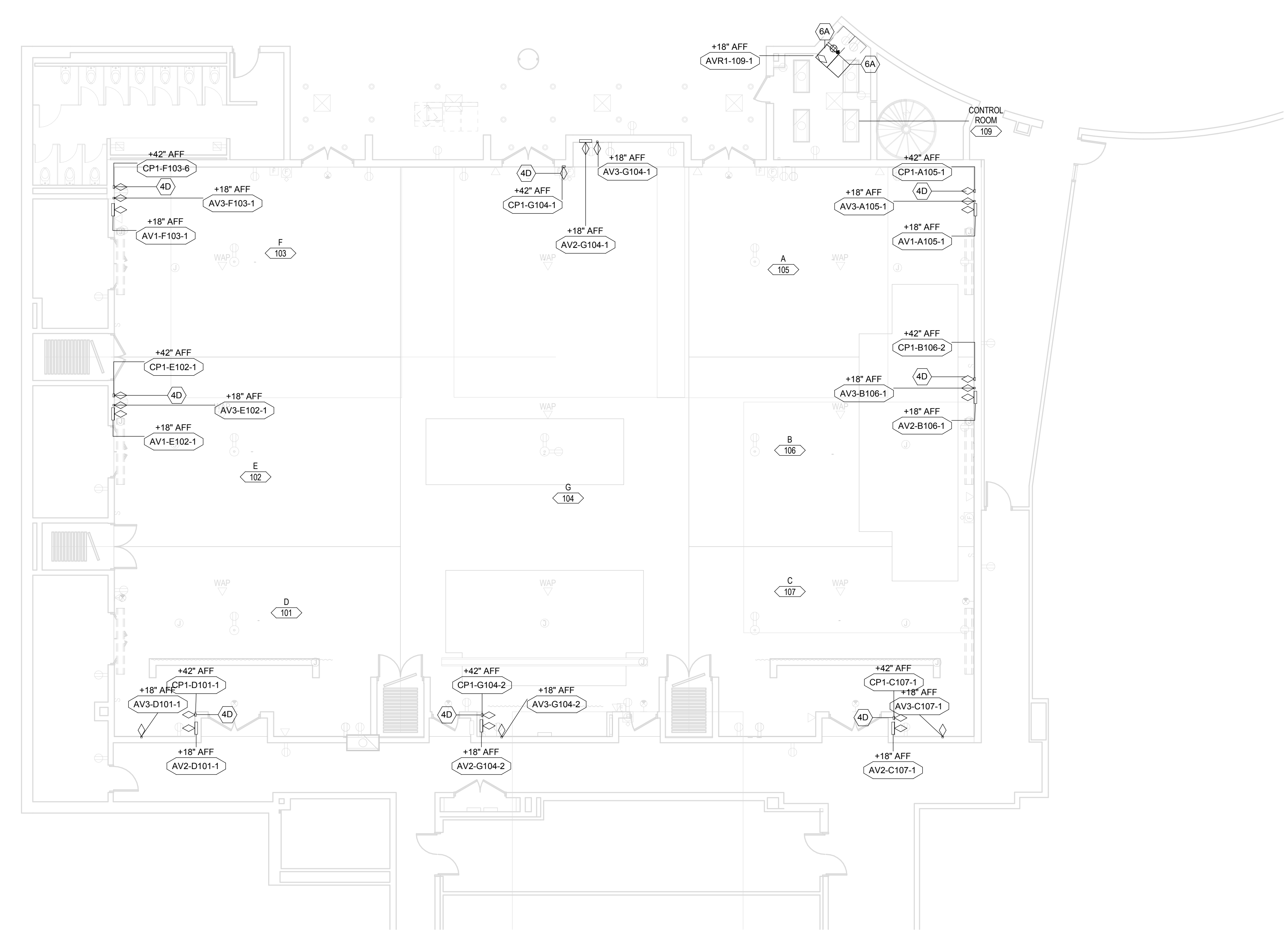
**AUDIOVISUAL SYMBOL ID KEY**

AV	AUDIOVISUAL TERMINATION
ANT	ANTENNA TERMINATION
AVR	AUDIOVISUAL EQUIPMENT RACK
CAM	CAMERA TERMINATION
FB	FLOORBOX TERMINATION
IC	INTERCOM TERMINATION
LT	LOUDSPEAKER TERMINATION
SW	SUBWOOFER TERMINATION
VT	VIDEO TERMINATION
LM	LIVE MICROPHONE TERMINATION
WAP	WIRELESS ACCESS POINT TERMINATION

**Keynote Legend**

Key Value	Keynote Text
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1B	PROJECTION SCREEN - 87.5"x140" REFER TO SPECIFICATION SECTION 274116 FOR BASIS OF DESIGN REQUIREMENTS AND QUANTITY
1C	PROJECTION SCREEN - 120"x192" REFER TO SPECIFICATION SECTION 274116 FOR BASIS OF DESIGN REQUIREMENTS AND QUANTITY
2C	OWNER PROVIDED PROJECTOR & MOUNT
4D	FLUSH WALL-MOUNT AV CONTROL INTERFACE - REFER TO SPECIFICATION SECTION 274116 FOR BASIS OF DESIGN REQUIREMENTS AND QUANTITY
5A	CEILING MOUNTED LOUDSPEAKER - REFER TO SPECIFICATION SECTION 274116 FOR BASIS OF DESIGN REQUIREMENTS AND QUANTITY
6A	AV EQUIPMENT RACK - REFER TO SPECIFICATION SECTION 274116 FOR BASIS OF DESIGN REQUIREMENTS AND QUANTITY



**1 LEVEL 02**  
1/8" = 1'-0"

NOT FOR CONSTRUCTION

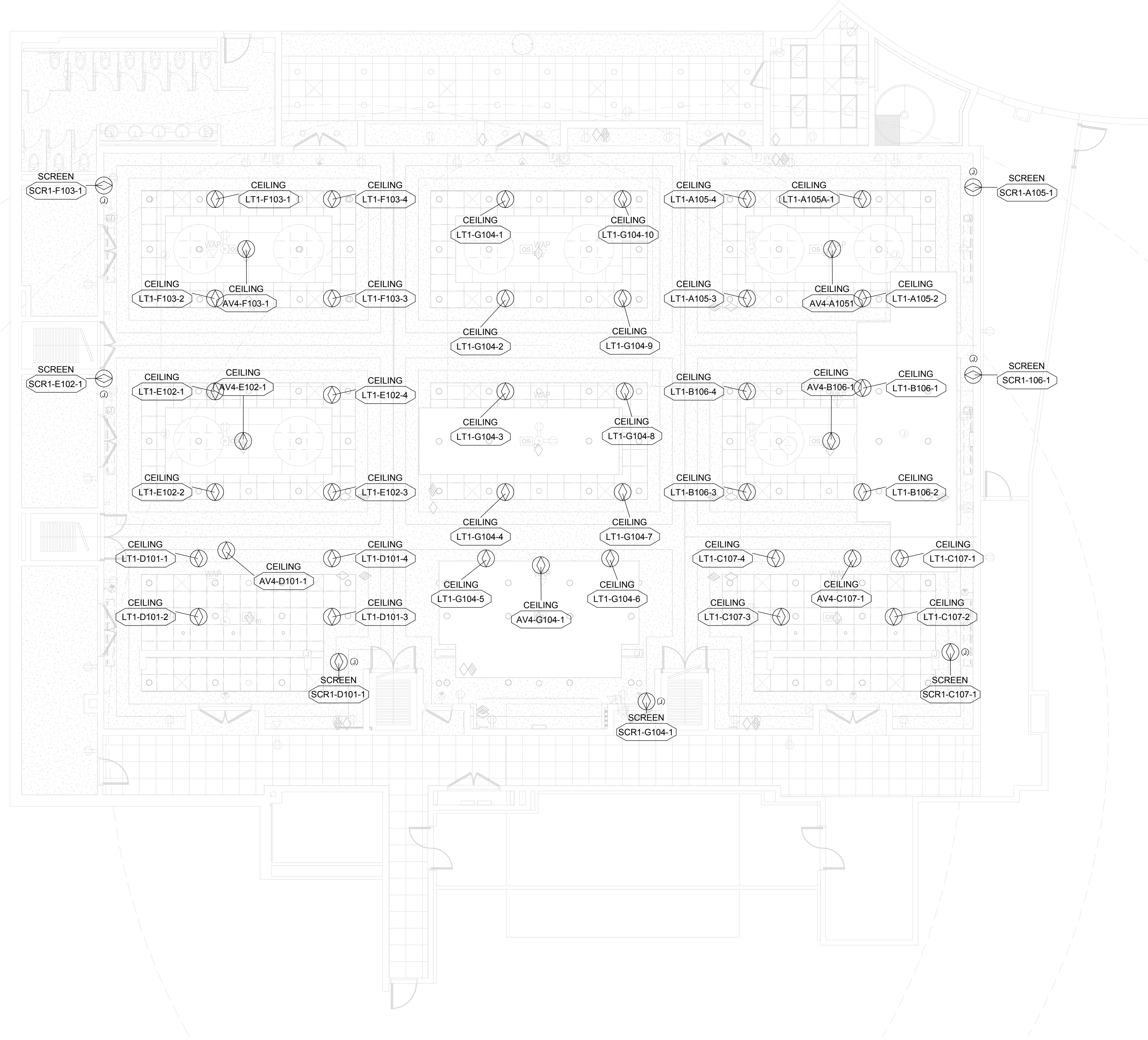
**AUDIOVISUAL PLAN - SECOND FLOOR  
COLLEGE OF DUPAGE SRC2000 RENNOVATION**

**TA-102**  
22-1742-00  
ISSUE DATE  
Revisions



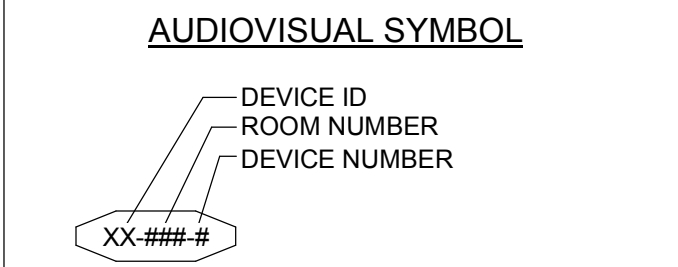
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1 Level 2  
1/8" = 1'-0"



**LEGEND NOTES**  
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**AUDIOVISUAL SYMBOL LEGEND**



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LM	LIVE MICROPHONE TERMINATION
WAP	WIRELESS ACCESS POINT TERMINATION

**POWER SYMBOLS**

- ⊕ 20A, 125V, 2 POLE, 3 WIRE, GROUNDING TYPE, NEMA 5-20 DUPLEX RECEPTACLE CONTAINED IN AUDIOVISUAL WIRING DEVICE PLATE (+18" AFF. UON).
- ⊕ QUADRUPLEX RECEPTACLE - TWO (2) 20A, 125V, 2 POLE, 3 WIRE, GROUNDING TYPE, DUPLEX RECEPTACLES CONTAINED IN AUDIOVISUAL WIRING DEVICE PLATE (+18" AFF. UON).
- ⊕ CONCEALED CEILING MOUNTED QUADRUPLEX RECEPTACLE - TWO (2) 20A, 125V, 2 POLE, 3 WIRE, GROUNDING TYPE CONTAINED IN AUDIOVISUAL WIRING DEVICE (CEILING UON).
- ⊕ CONCEALED SERVICE, STEEL FLOOR BOX COMPLETE WITH A QUADRUPLEX RECEPTACLE - TWO (2) 20A, 125V, 2 POLE, 3 WIRE, GROUNDING TYPE RECEPTACLES. PROVIDE CAST-IRON BOX IN SLABS THAT ARE IN DIRECT CONTACT WITH EARTH IN AV WIRING DEVICE.
- ⊕ JUNCTION BOX.

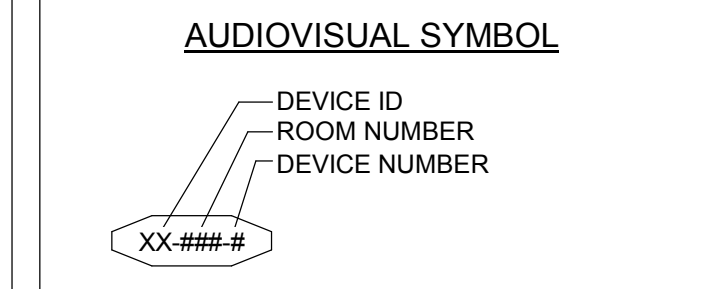
**DATA SYMBOLS**

- ⊕ WALL MOUNTED DATA RECEPTACLE FOR BUILDING WIDE LAN CONTAINED IN AUDIOVISUAL WIRING DEVICE PLATE (+18" AFF. UON).
- ⊕ WALL MOUNTED DATA RECEPTACLE FOR BUILDING WIDE LAN, NOT CONTAINED IN AUDIOVISUAL WIRING DEVICE PLATE - FOR REFERENCE ONLY.

### LEGEND NOTES

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#### AUDIOVISUAL SYMBOL LEGEND



- AV AUDIOVISUAL TERMINATION
- ANT ANTENNA TERMINATION
- AVR AUDIOVISUAL EQUIPMENT RACK
- CAM CAMERA TERMINATION
- FB FLOORBOX TERMINATION
- IC INTERCOM TERMINATION
- LT LOUDSPEAKER TERMINATION
- SW SUBWOOFER TERMINATION
- VT VIDEO TERMINATION
- LM LIVE MICROPHONE TERMINATION
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#### POWER SYMBOLS

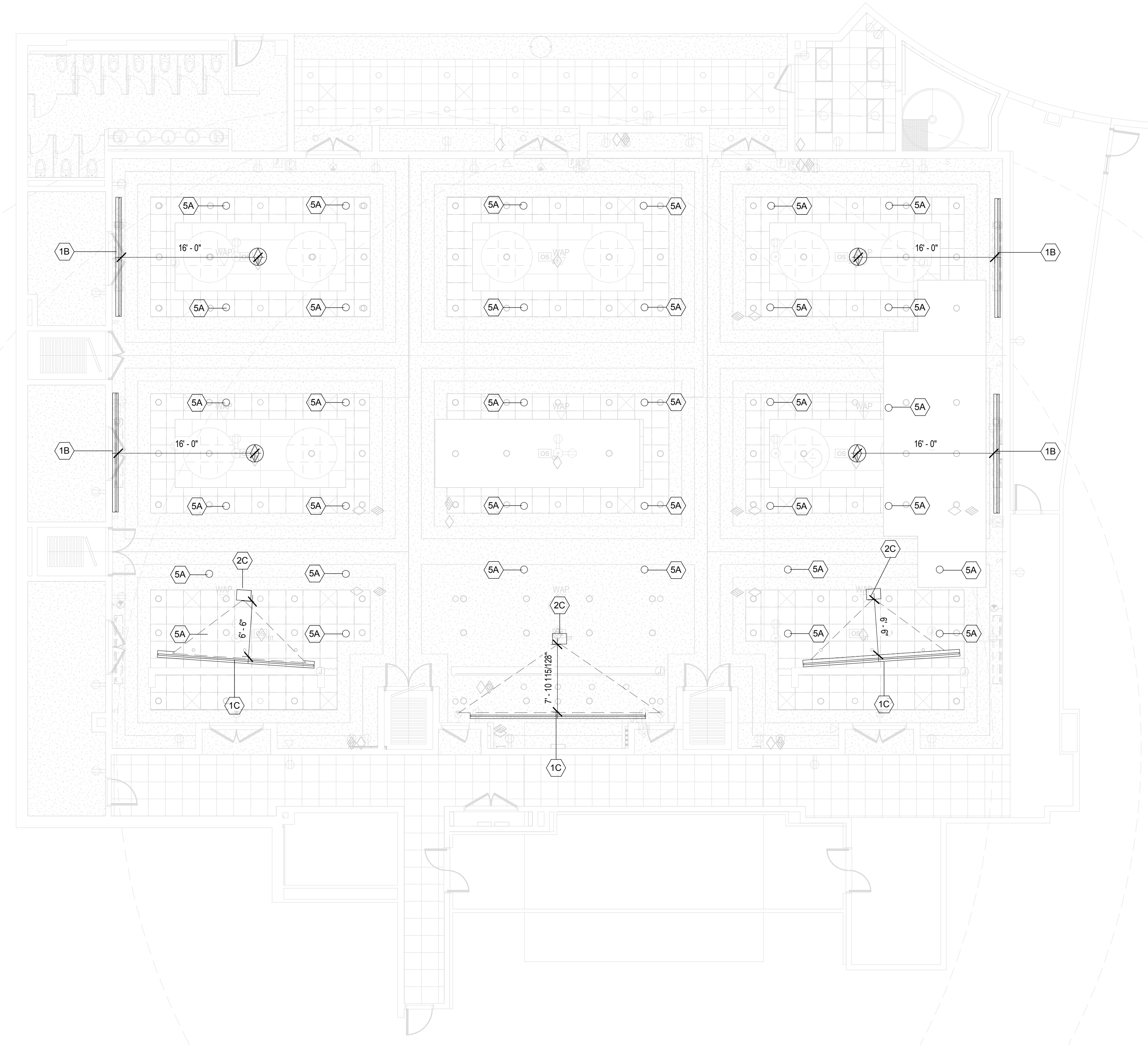
- ⊕ 20A, 125V, 2-POLE, 3 WIRE, GROUNDING TYPE, NEMA 5-20 DUPLEX RECEPTACLE CONTAINED IN AUDIOVISUAL WIRING DEVICE PLATE (+18" AFF. UON).
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#### DATA SYMBOLS

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#### Keynote Legend

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**1 LEVEL 02 EQ.P**  
1/8" = 1'-0"

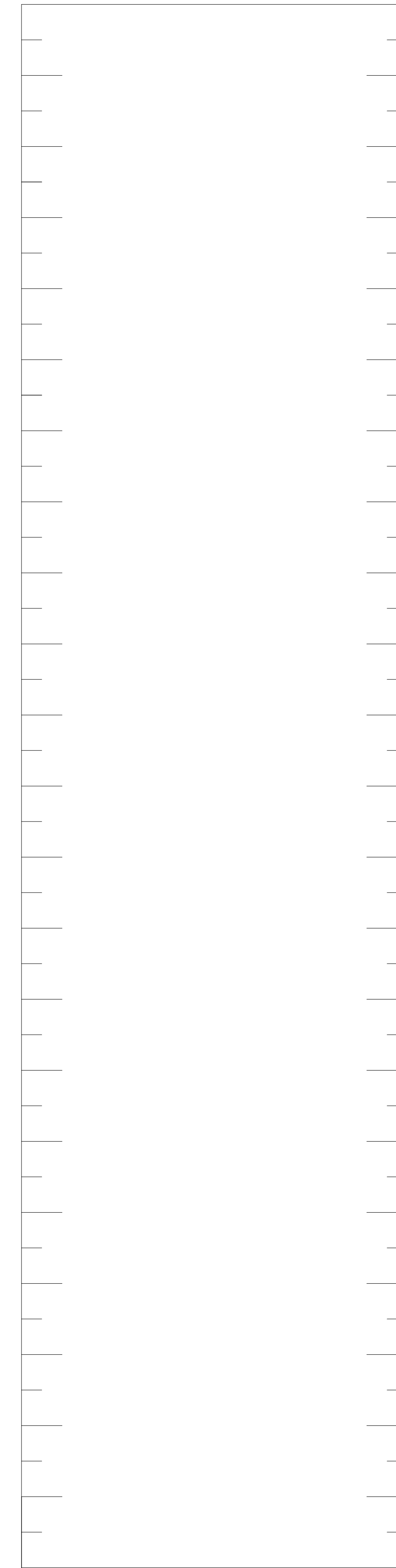
NOT FOR CONSTRUCTION

RCP EQUIPMENT PLAN - SECOND FLOOR  
COLLEGE OF DUPAGE SRC2000 RENNOVATION

**TA-212**  
22-1742-00  
ISSUE DATE  
Revisions

44	77.00	
43	75.25	RACK LIGHT
42	73.50	BLANK
41	71.75	
40	70.00	
39	68.25	
38	66.50	BLANK
37	64.75	
36	63.00	
35	61.25	
34	59.50	XLR WP 1 & WP 2 PATCH PANEL
33	57.75	
32	56.00	XLR WP3 & WP4 PATCH PANEL
31	54.25	
30	52.50	XLR WP5 & WP6 PATCH PANEL
29	50.75	
28	49.00	XLR WP7 & WP8 PATCH PANEL
27	47.25	
26	45.50	MTXS-D INPUT PATCH PANEL
25	43.75	BLANK
24	42.00	DANTE PATCH PANEL
23	40.25	
22	38.50	CISCO SG300-28P
21	36.75	
20	35.00	BLANK
19	33.25	
18	31.50	
17	29.75	RACK DRAWER
16	28.00	
15	26.25	BLANK
14	24.50	YAMAHA MTXS-D
13	22.75	
12	21.00	BLANK
11	19.25	YAMAHA XMV9280-D
10	17.50	
9	15.75	BLANK
8	14.00	
7	12.25	
6	10.50	
5	8.75	
4	7.00	
3	5.25	
2	3.50	APC SMX2000LV BATTERY BACK UP
1	1.75	

AVR-XXX-X  
FRONT

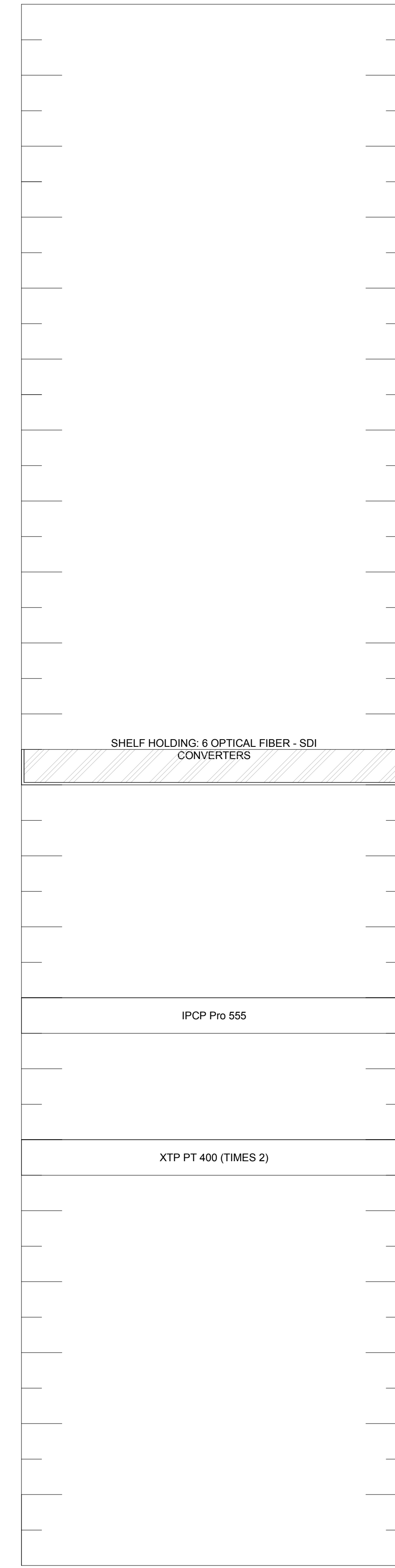


AVR-XXX-X  
REAR

1 RACK - ELEVATION  
3" = 1'-0"

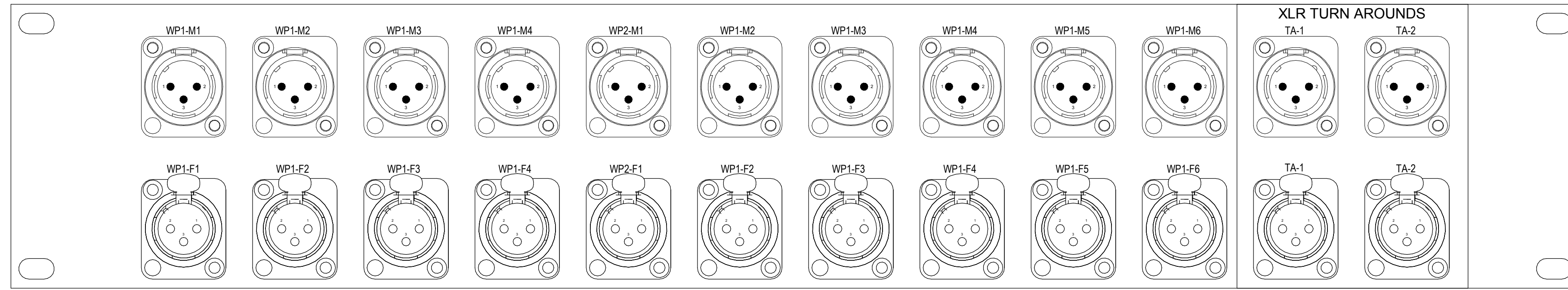
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41	71.75	
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37	64.75	
36	63.00	
35	61.25	
34	59.50	
33	57.75	
32	56.00	BLANK
31	54.25	
30	52.50	
29	50.75	
28	49.00	2X12 SDI PATCH PANEL WP1-WP4
27	47.25	
26	45.50	2X12 SDI PATCH PANEL WP5-WP8
25	43.75	
24	42.00	1X12 SDI & GENLOCK PATCH PANEL
23	40.25	
22	38.50	2X12 SDI D.A. PATCH PANEL
21	36.75	1X12 BNC OPTICAL - SDI OUT OUT
20	35.00	1X12 BNC SDI - OPTICAL INPUT
19	33.25	
18	31.50	
17	29.75	CCH-04U
16	28.00	
15	26.25	
14	24.50	CISCO SG300-28P
13	22.75	
12	21.00	BLANK
11	19.25	
10	17.50	
9	15.75	
8	14.00	EXTRON XRP 16X16 MATRIX
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2	3.50	
1	1.75	

AVR-XXX-X  
FRONT

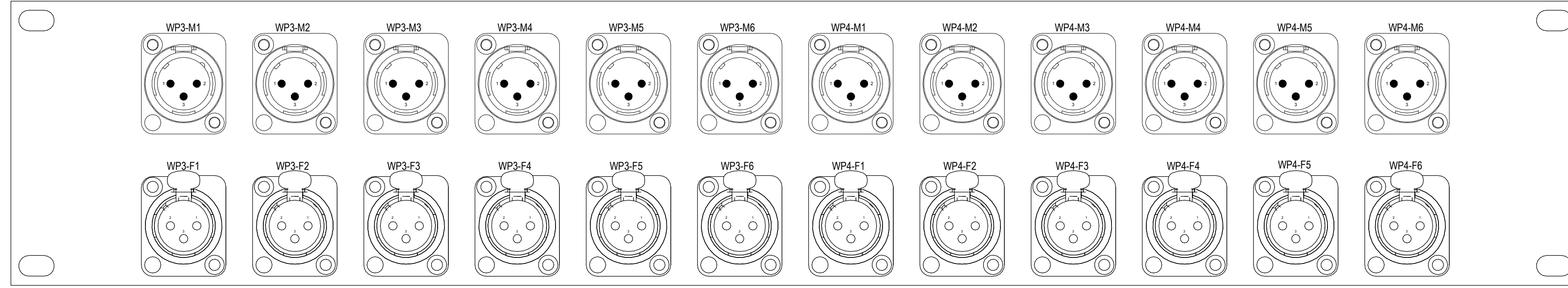


AVR-XXX-X  
REAR

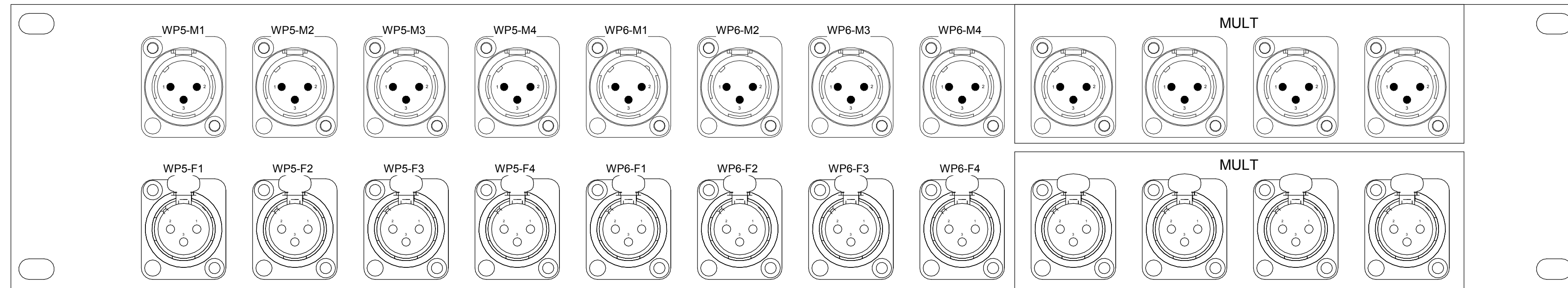
1 RACK - ELEVATION 2  
3" = 1'-0"



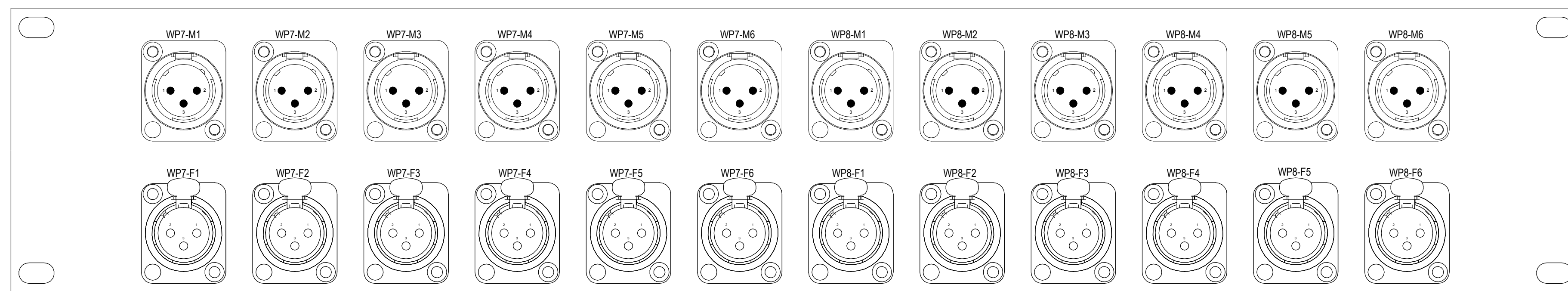
2 RACK PANEL DETAIL - 2X12 XLR PATCH PANEL - WP1 & WP2  
12" = 1'-0"



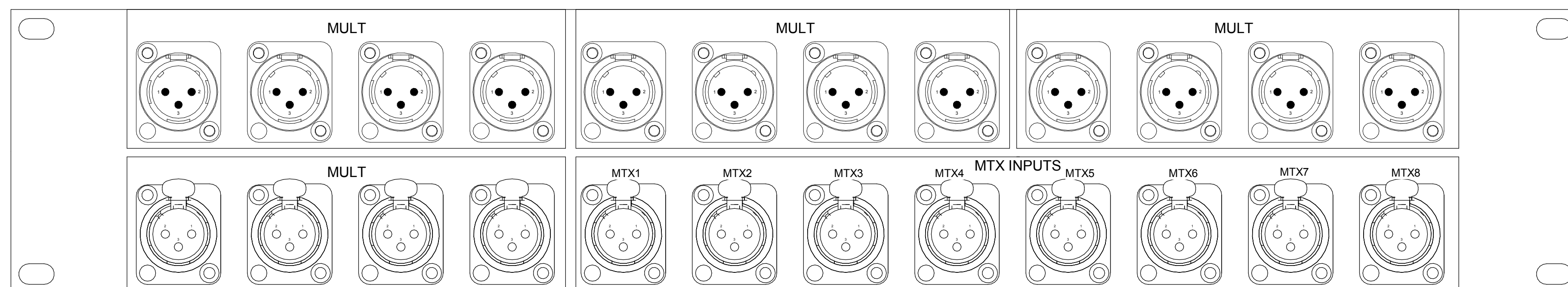
3 RACK PANEL DETAIL - 2X12 XLR PATCH PANEL - WP3 & WP4  
12" = 1'-0"



4 RACK PANEL DETAIL - 2X12 XLR PATCH PANEL - WP5 & WP6  
12" = 1'-0"



5 RACK PANEL DETAIL - 2X2 XLR PATCH PANEL - WP7 & WP8  
12" = 1'-0"



1 RACK PANEL DETAIL - 2X12 XLR PATCH PANEL - MULT  
12" = 1'-0"

**LEGEND NOTES**

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AUDIOVISUAL CONNECTOR KEY	
CONNECTOR	DESCRIPTION
	RJ45 - PUNCHDOWN CONNECTOR, CAT6
	FEMALE 3-PIN XLR CONNECTOR - NEUTRIK NC3FP
	MALE 3-PIN XLR CONNECTOR - NEUTRIK NC3MP
	NEUTRIK NL4 SPEAKON CONNECTOR
	HDMI CONNECTOR
	ANTENNA 'F' CONNECTOR
	'F' STYLE CATV CONNECTOR
	BNC CONNECTOR
	120V 20A DUPLEX RECEPTACLE
	FEMALE 4-PIN XLR CONNECTOR
	DB9 - RS232 CONNECTOR
	DUPLEX MULTIMODE FIBER-LC CONNECTOR
	DUPLEX SINGLE MODE FIBER-LC CONNECTOR

NOT FOR CONSTRUCTION

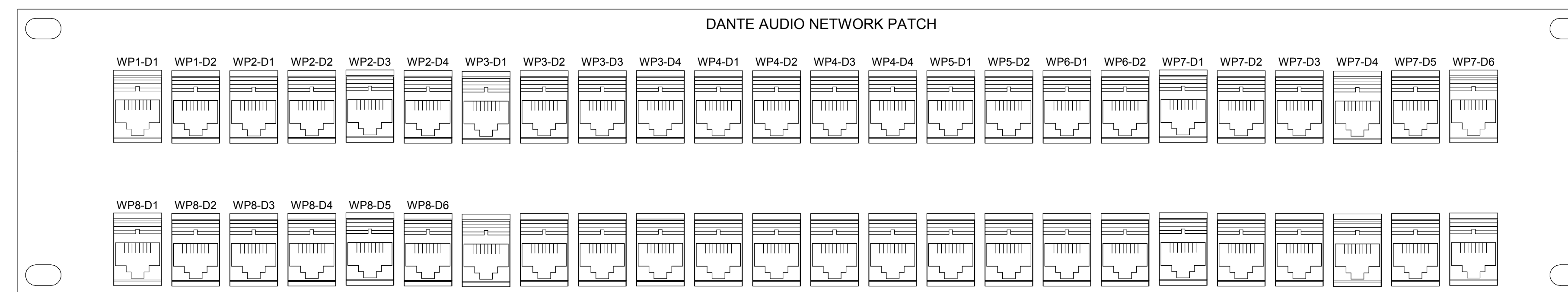
AUDIOVISUAL RACK PANEL DETAILS  
COLLEGE OF DUPAGE SRC2000 RENNOVATION

TA-550  
22-1742-00  
ISSUE DATE  
Revisions

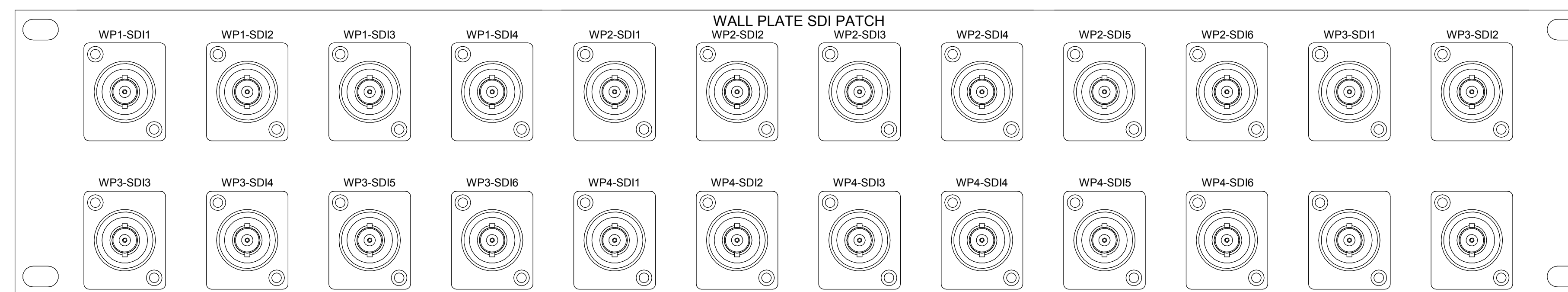
**LEGEND NOTES**

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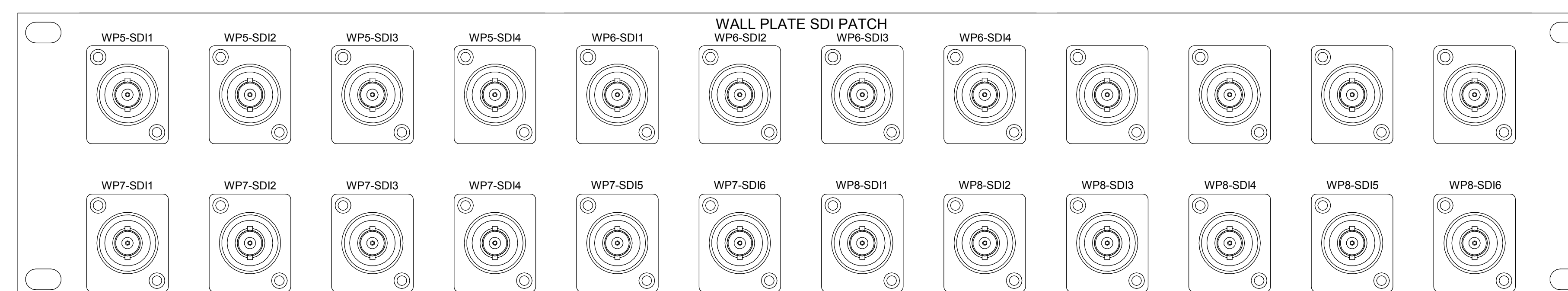
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	DUPLEX MULTIMODE FIBER-LC CONNECTOR
	DUPLEX SINGLE MODE FIBER-LC CONNECTOR



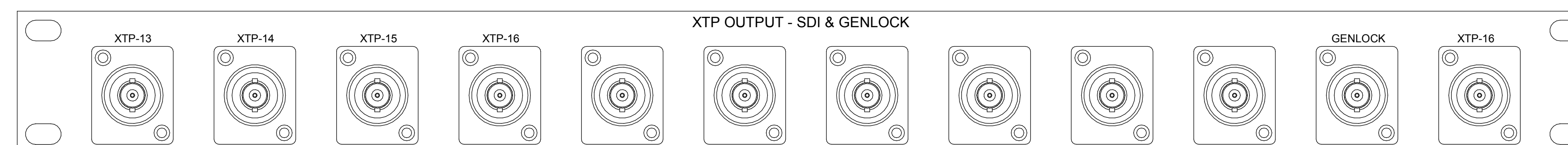
**1 RACK PANEL DETAILS - AUDIO NETWORK**  
12" x 1'-0"



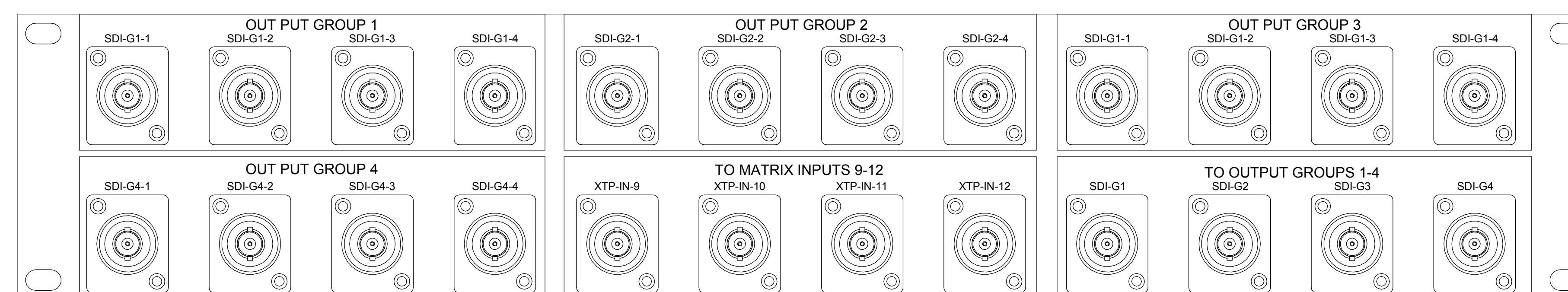
**2 RACK PANEL DETAIL - 2X12 SDI PATCH PANEL WP1-WP4**  
12" x 1'-0"



**3 RACK PANEL DETAIL - 2X12 SDI PATCH PANEL WP5-WP8**  
12" x 1'-0"



**4 RACK PANEL DETAIL - 1X12 SDI & GENLOCK PATCH**  
12" x 1'-0"



**5 RACK PANEL DETAIL - 2X12 SDI DISTRIBUTION**  
12" x 1'-0"

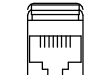
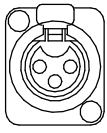
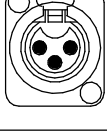
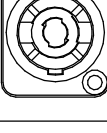
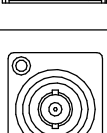
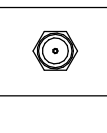
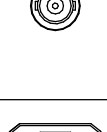
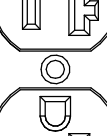
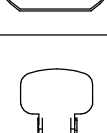

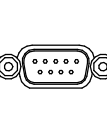
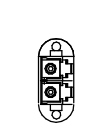
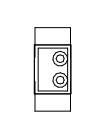
NOT FOR CONSTRUCTION

AUDIOVISUAL RACK PANEL DETAILS  
COLLEGE OF DUPAGE SRC2000 RENNOVATION

TA-551  
22-1742-00  
ISSUE DATE  
Revisions

**LEGEND NOTES**

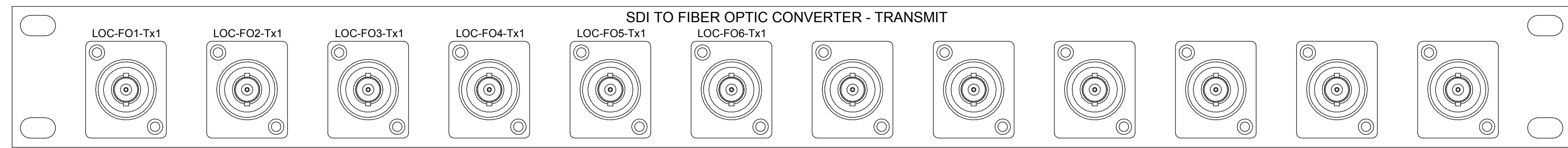
LEGEND NOTES ARE COMMON TO ALL SHEETS  
SOME NOTES MAY NOT APPLY TO THIS SHEET

AUDIOVISUAL CONNECTOR KEY	
CONNECTOR	DESCRIPTION
	RJ45 - PUNCHDOWN CONNECTOR, CAT6
	FEMALE 3-PIN XLR CONNECTOR - NEUTRIK NC3FP
	MALE 3-PIN XLR CONNECTOR - NEUTRIK NC3MP
	NEUTRIK NL4 SPEAKON CONNECTOR
	HDMI CONNECTOR
	ANTENNA 'F' CONNECTOR
	'F' STYLE CATV CONNECTOR
	BNC CONNECTOR
	120V 20A DUPLEX RECEPTACLE
	FEMALE 4-PIN XLR CONNECTOR
	DB9 - RS232 CONNECTOR
	DUPLEX MULTIMODE FIBER-LC CONNECTOR
	DUPLEX SINGLE MODE FIBER-LC CONNECTOR

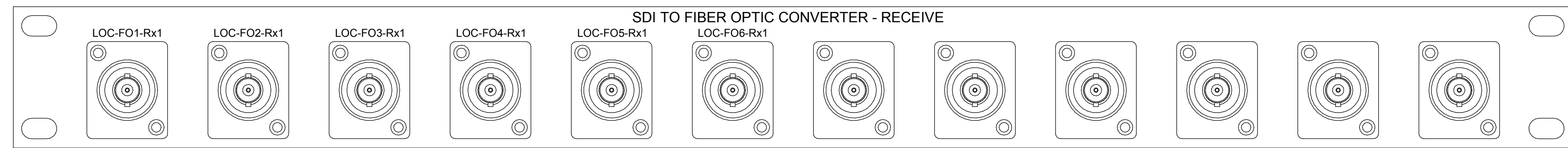
NOT FOR CONSTRUCTION

AUDIOVISUAL RACK PANEL DETAILS  
COLLEGE OF DUPAGE SRC2000 RENNOVATION

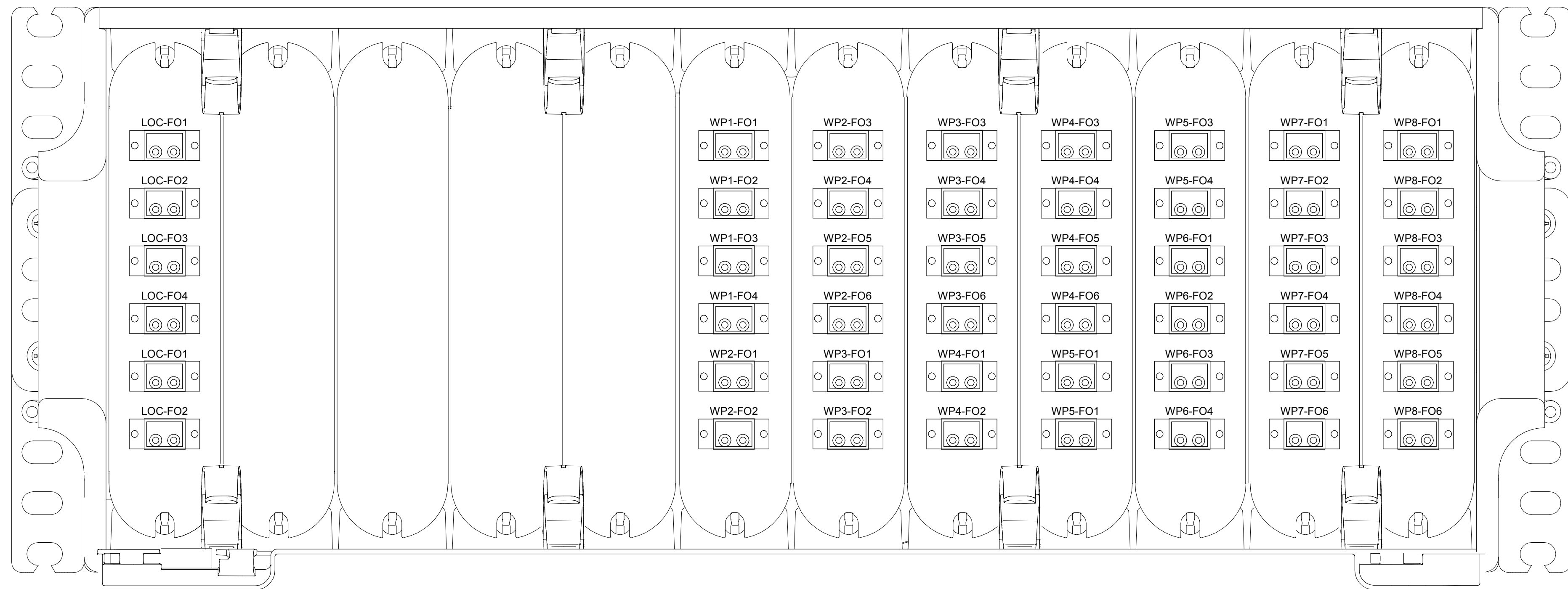
TA-552  
22-1742-00  
ISSUE DATE  
Revisions



2 RACK PANEL DETAIL - 1x12 SDI FIBER CONVERT - Tx  
12" = 1'-0"



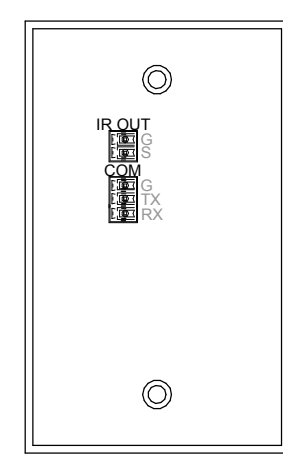
1 RACK PANEL DETAIL - 1x12 SDI FIBER CONVERT - Rx  
12" = 1'-0"



5 RACK PANEL DETAIL - CCH04u  
12" = 1'-0"

WIRING DEVICE DETAILS

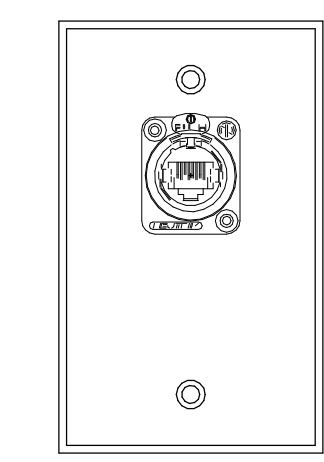
DESCRIPTION:	AUDIOVISUAL WIRING DEVICE
BACKBOX DESCRIPTION:	1 GANG CEILING MOUNT
MOUNTING HEIGHT (UON):	CEILING
CONDUIT GROUP TYPE:	WIRE TYPE:
A	N/A
B	N/A
C	N/A
D	(1) CONTROL
E	N/A
PWR	N/A



7 WIRING DEVICE - SCR1  
6" = 1'-0"

WIRING DEVICE DETAILS

DESCRIPTION:	AUDIOVISUAL WIRING DEVICE
BACKBOX DESCRIPTION:	1 GANG CEILING MOUNT
MOUNTING HEIGHT (UON):	CEILING
CONDUIT GROUP TYPE:	WIRE TYPE:
A	N/A
B	N/A
C	N/A
D	(1) DATA-S
E	N/A
PWR	N/A



6 WIRING DEVICE - AV4  
6" = 1'-0"

WIRING DEVICE DETAILS

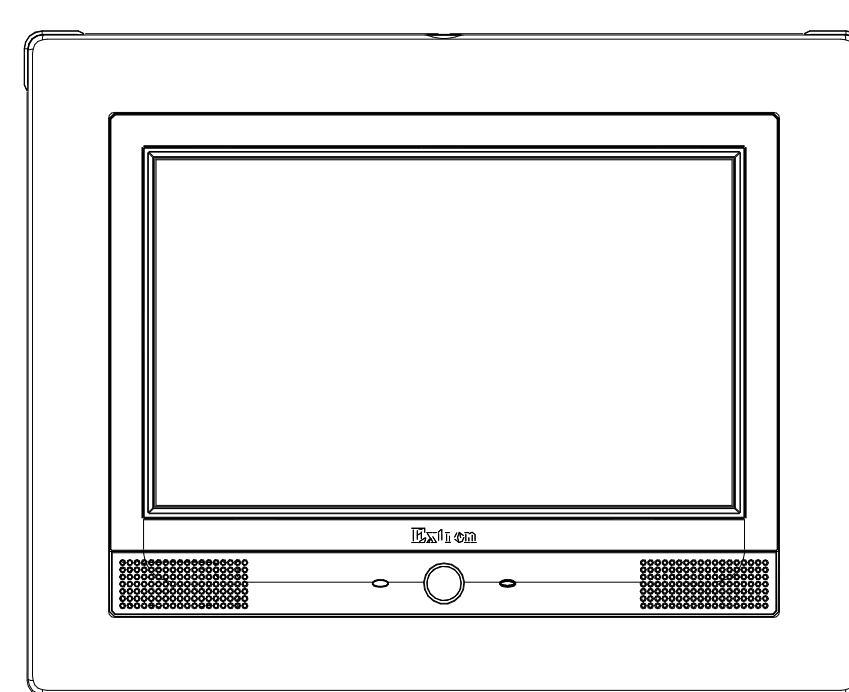
DESCRIPTION:	AUDIOVISUAL WIRING DEVICE
BACKBOX DESCRIPTION:	
MOUNTING HEIGHT (UON):	CEILING
CONDUIT GROUP TYPE:	WIRE TYPE:
A	N/A
B	N/A
C	(1) SPKR18-2
D	N/A
E	N/A
PWR	N/A

CABLING FOR CEILING MOUNTED SPEAKER WILL BE TERMINATED DIRECTLY TO THE SPEAKER. REFER TO SHEET TA-630 FOR CEILING SPEAKER MOUNTING DETAIL.

5 WIRING DEVICE DETAIL - LT1  
12" = 1'-0"

WIRING DEVICE DETAILS

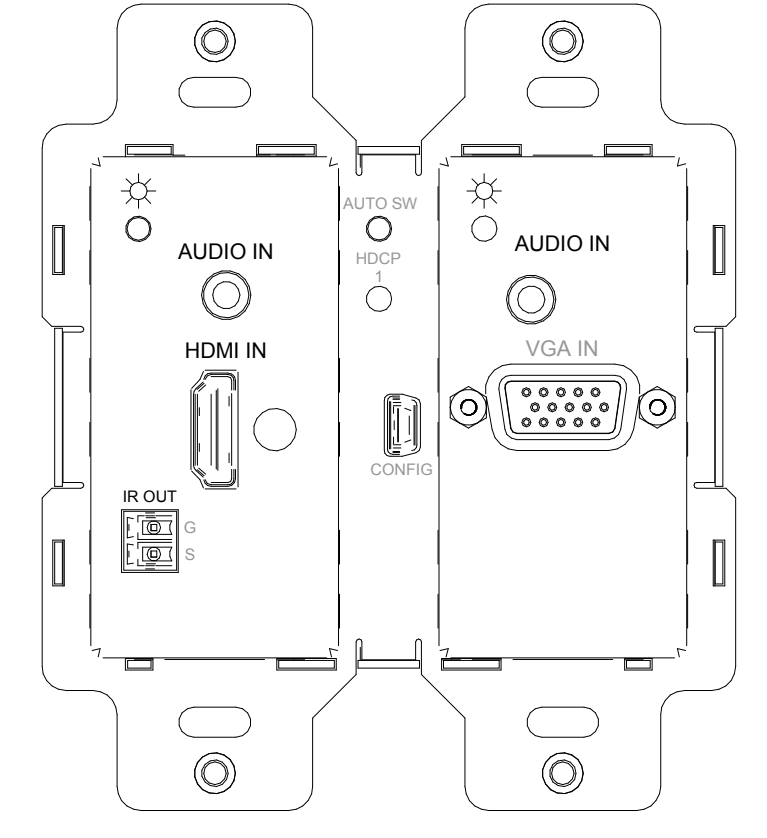
DESCRIPTION:	AUDIOVISUAL WIRING DEVICE
BACKBOX DESCRIPTION:	BB 710 (2 GANG)
MOUNTING HEIGHT (UON):	+0' 18" AFF
CONDUIT GROUP TYPE:	WIRE TYPE:
A	N/A
B	N/A
C	N/A
D	(1) DATA-S
E	N/A
PWR	N/A



4 TLP PRO 720M - CP1  
6" = 1'-0"

WIRING DEVICE DETAILS

DESCRIPTION:	AUDIOVISUAL WIRING DEVICE
BACKBOX DESCRIPTION:	2 GANG FLUSH MOUNT
MOUNTING HEIGHT (UON):	+0' 18" AFF
CONDUIT GROUP TYPE:	WIRE TYPE:
A	N/A
B	N/A
C	N/A
D	(1) DATA-S
E	N/A
PWR	N/A

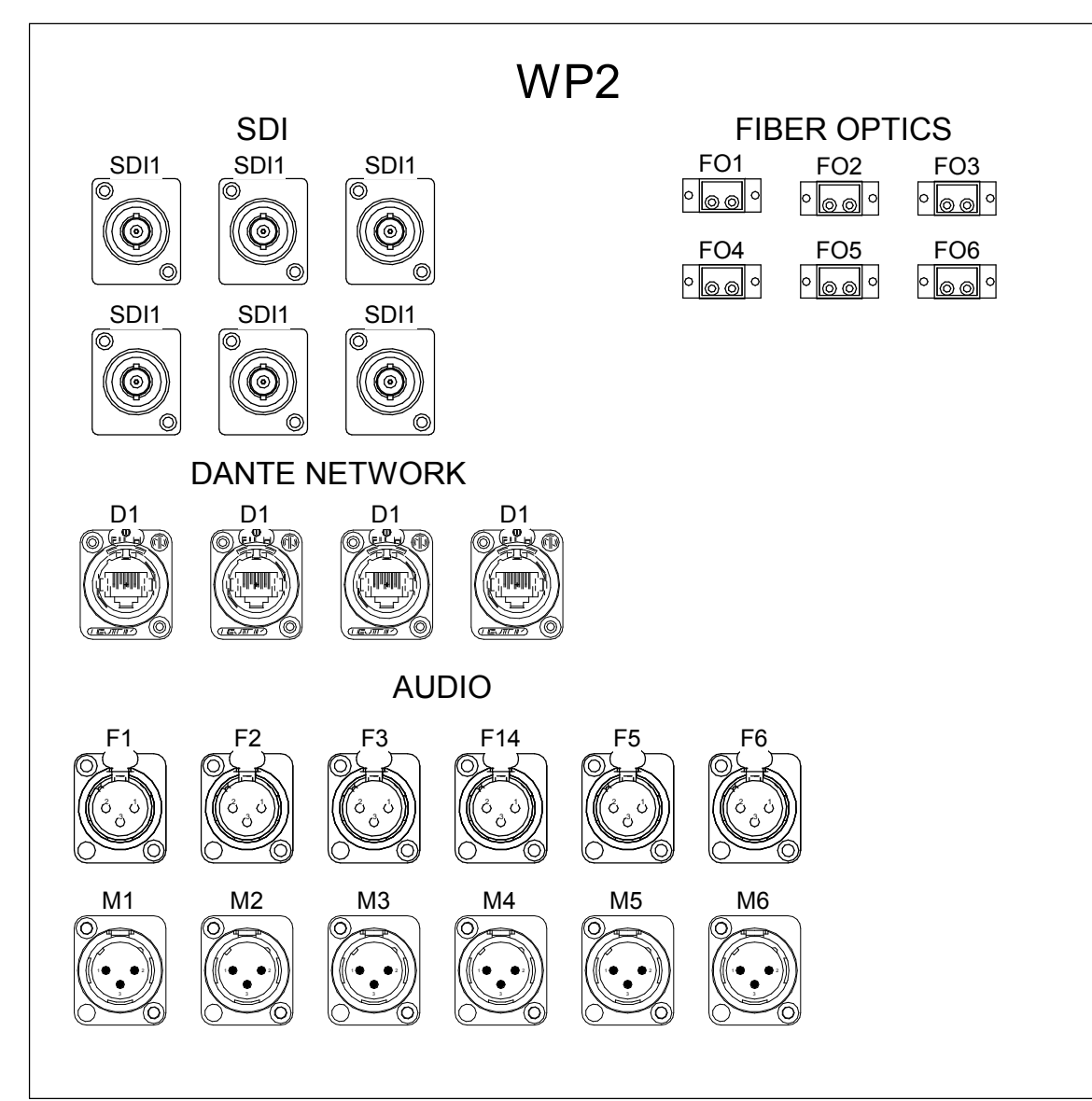


EXTRON WIRING DEVICE IS SHOWN WITH OUT FACE PLATE.

3 WIRING DEVICE - AV3  
12" = 1'-0"

WIRING DEVICE DETAILS

DESCRIPTION:	AUDIOVISUAL WIRING DEVICE
BACKBOX DESCRIPTION:	18"X18" HOFFMAN BOX
MOUNTING HEIGHT (UON):	+0' 18" AFF
CONDUIT GROUP TYPE:	WIRE TYPE:
A	N/A
B	(12) AUDIO
C	N/A
D	(8) SDI (4) DATA-S
E	(6) FIBER
PWR	N/A



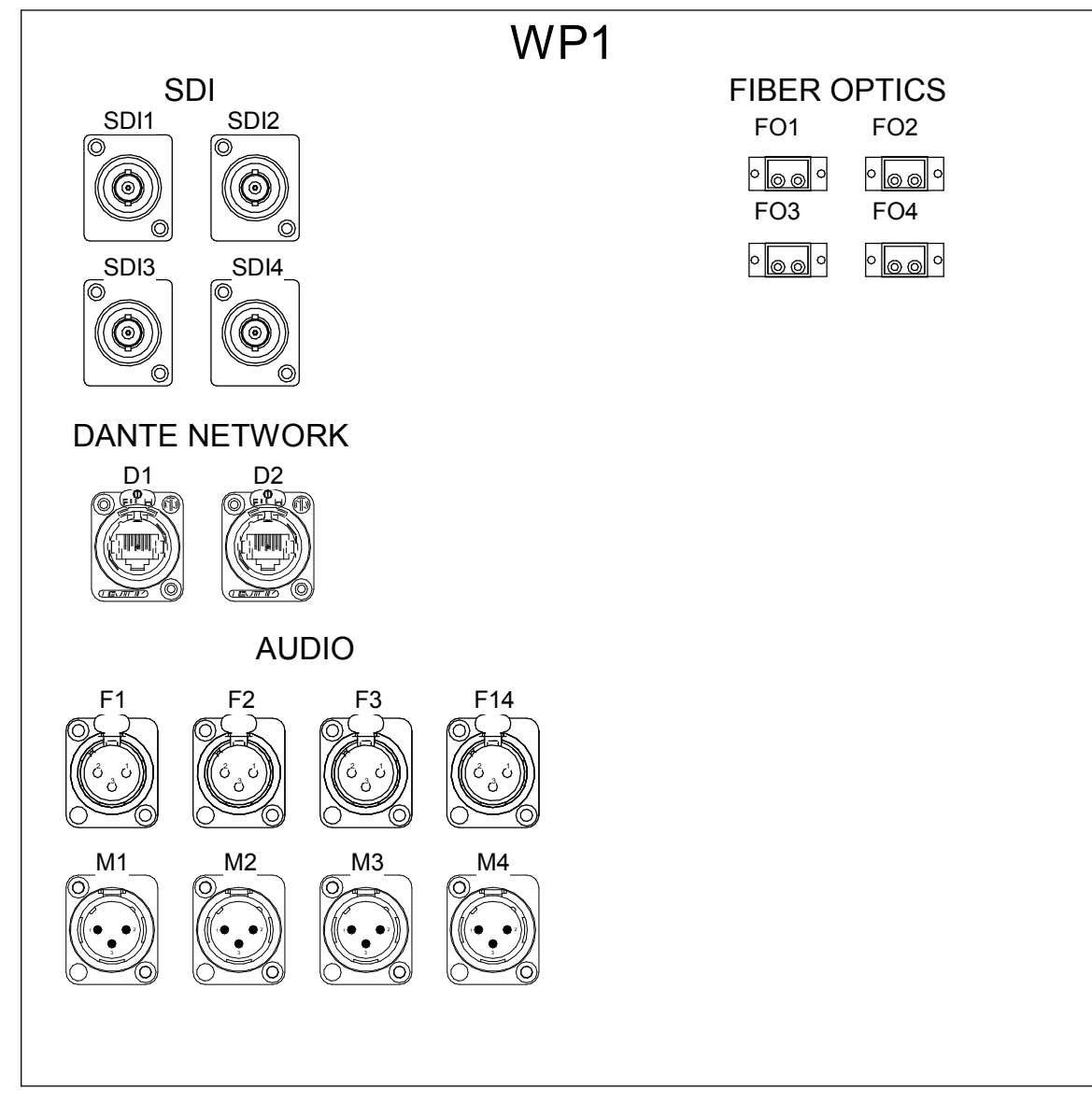
ALL AV2 WIRING DEVICES SHALL HAVE UNIQUE "WP" LABEL.

- AV2-B106-1 = WP2
- AV2-C107-1 = WP3
- AV2-D101-1 = WP4
- AV2-G104-1 = WP7
- AV2-G104-2 = WP8

2 WIRING DEVICE - AV2  
6" = 1'-0"

WIRING DEVICE DETAILS

DESCRIPTION:	AUDIOVISUAL WIRING DEVICE
BACKBOX DESCRIPTION:	18"X18" HOFFMAN BOX
MOUNTING HEIGHT (UON):	+0' 18" AFF
CONDUIT GROUP TYPE:	WIRE TYPE:
A	N/A
B	(8) AUDIO
C	N/A
D	(4) SDI (2) DATA-S
E	(4) FIBER
PWR	N/A



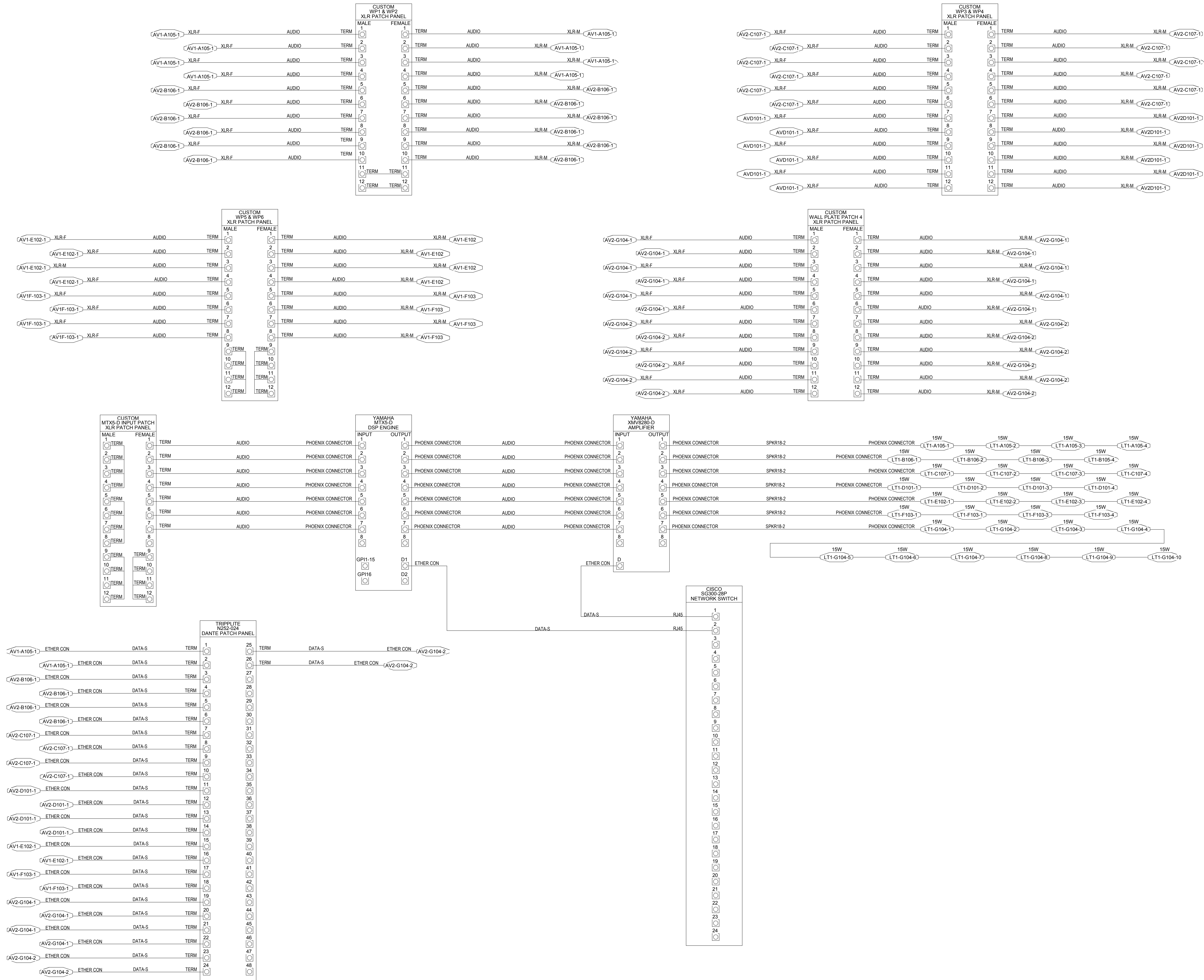
ALL AV1 WIRING DEVICES SHALL HAVE UNIQUE "WP" LABEL.

- AV1-A105-1 = WP1
- AV1-E102-1 = WP5
- AV1-F103-1 = WP6

1 WIRING DEVICE - AV1  
6" = 1'-0"



1 BLOCK DIAGRAM - AUDIO  
TA-610 SCALE 12" = 1'-0"

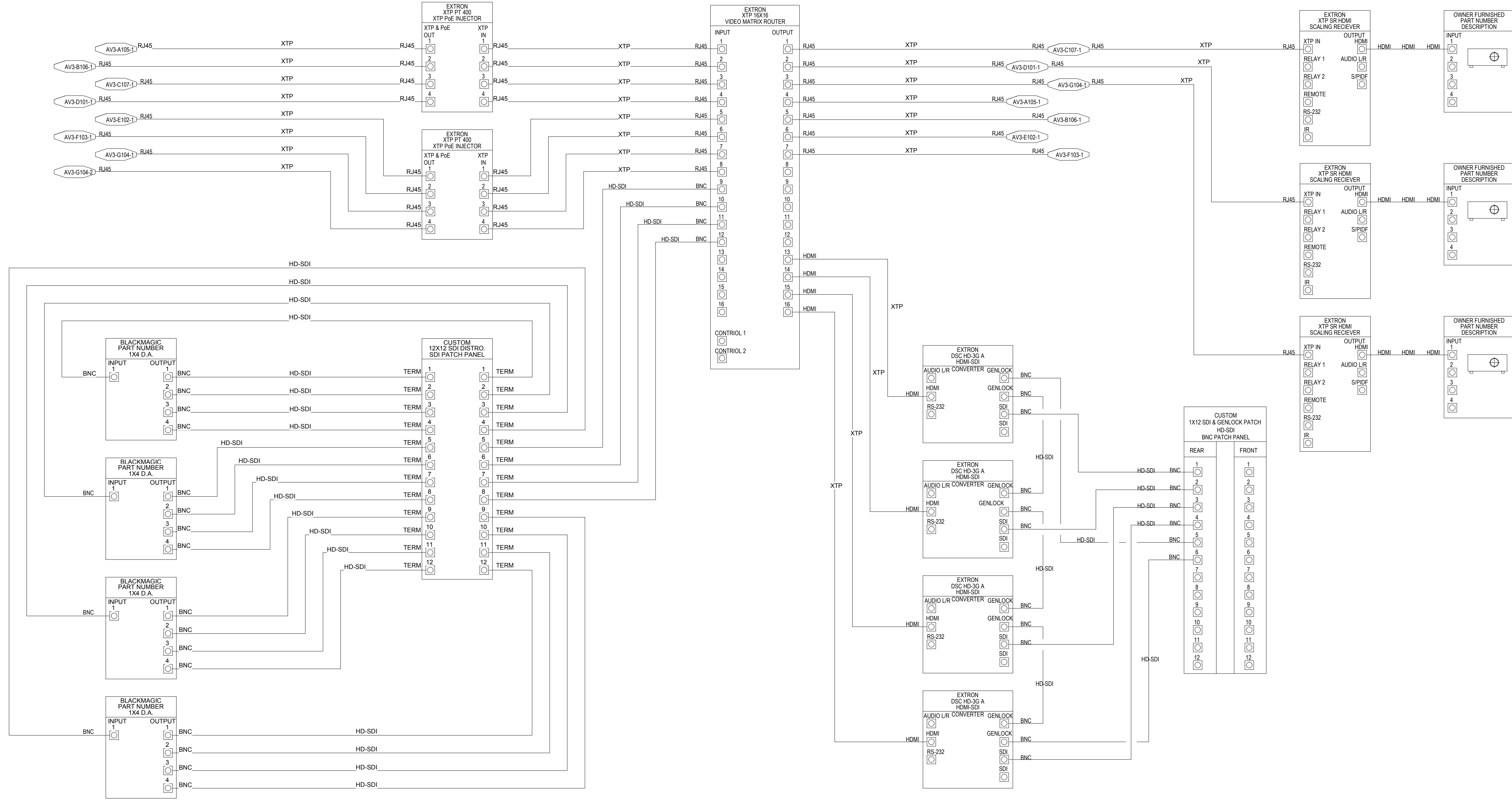


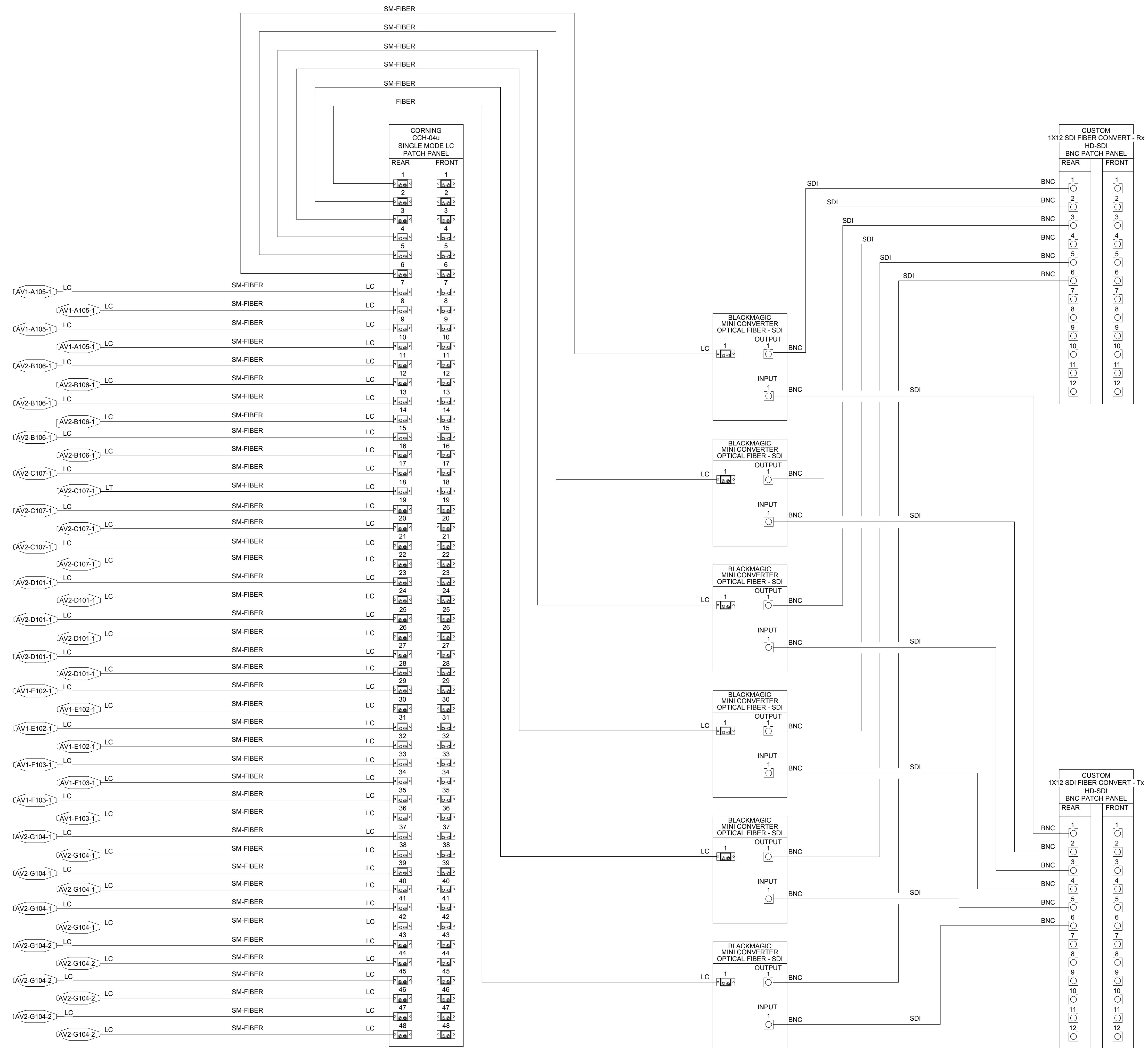
NOT FOR CONSTRUCTION

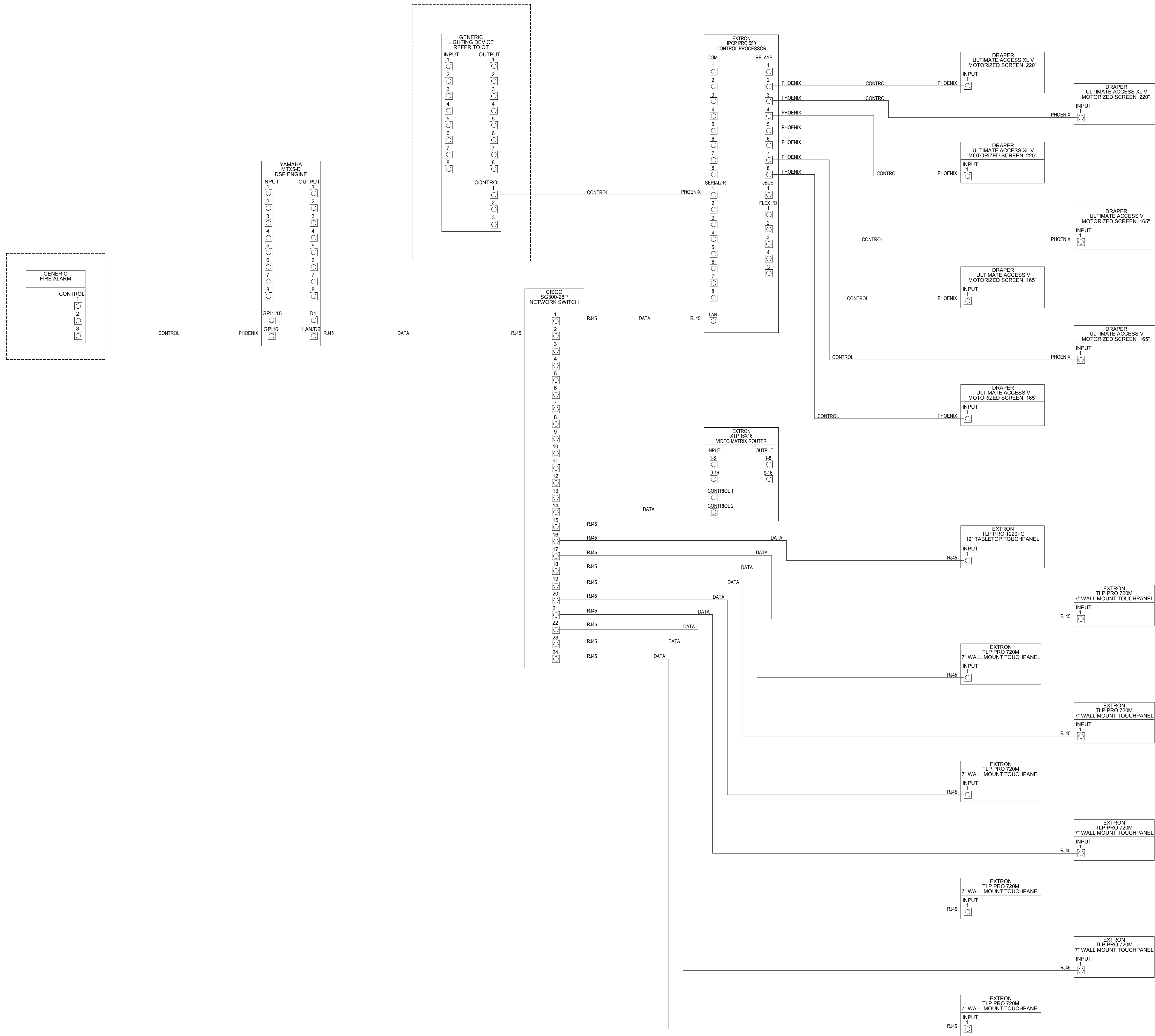
AUDIO BLOCK DIAGRAM  
COLLEGE OF DUPAGE SRC2000 RENNOVATION

TA-610  
22-1742-00  
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1 BLOCK DIAGRAM - VIDEO - EXTRON  
12" = 1'-0"







1 BLOCK DIAGRAM - AV CONTROL  
12" = 1"0"

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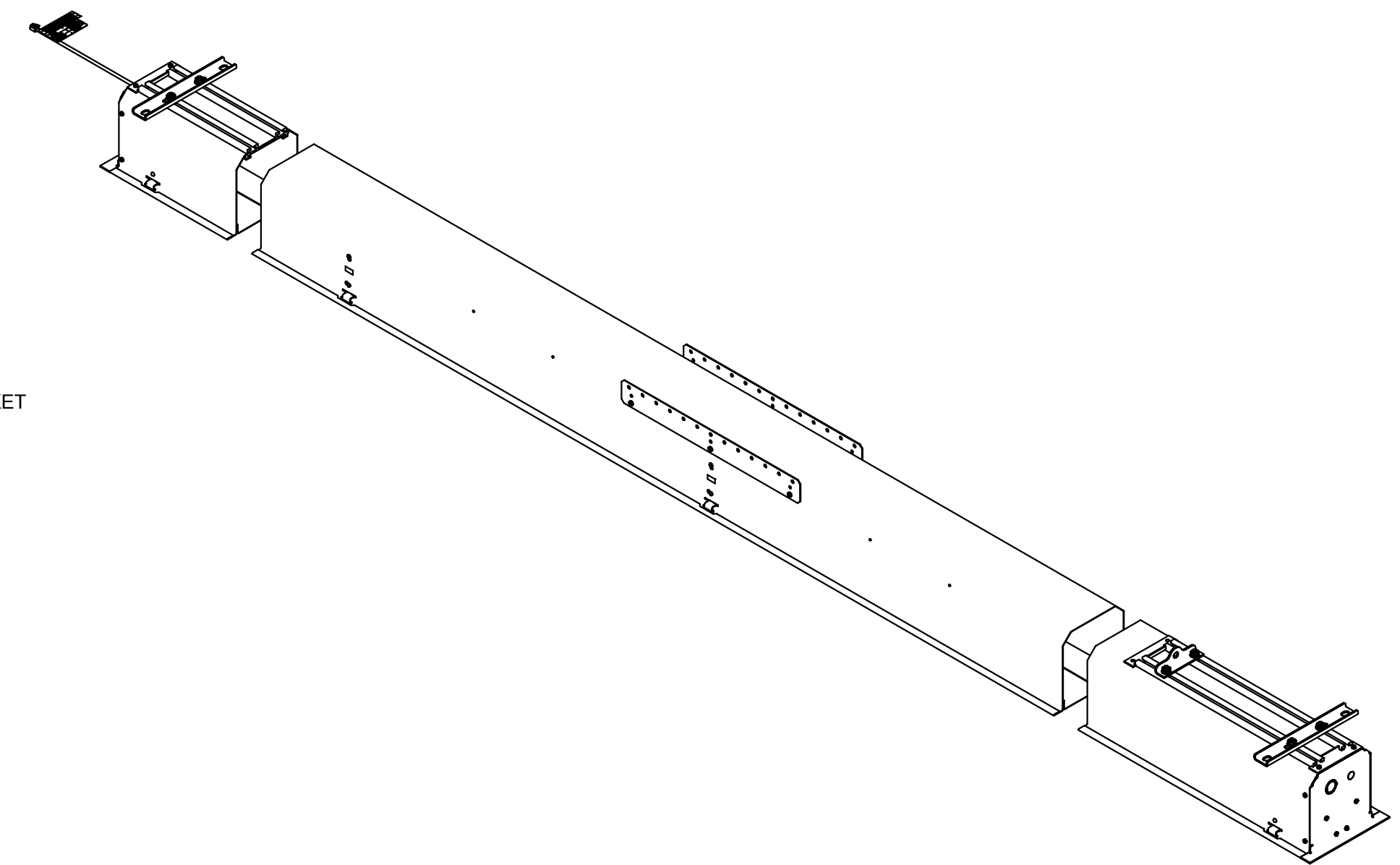
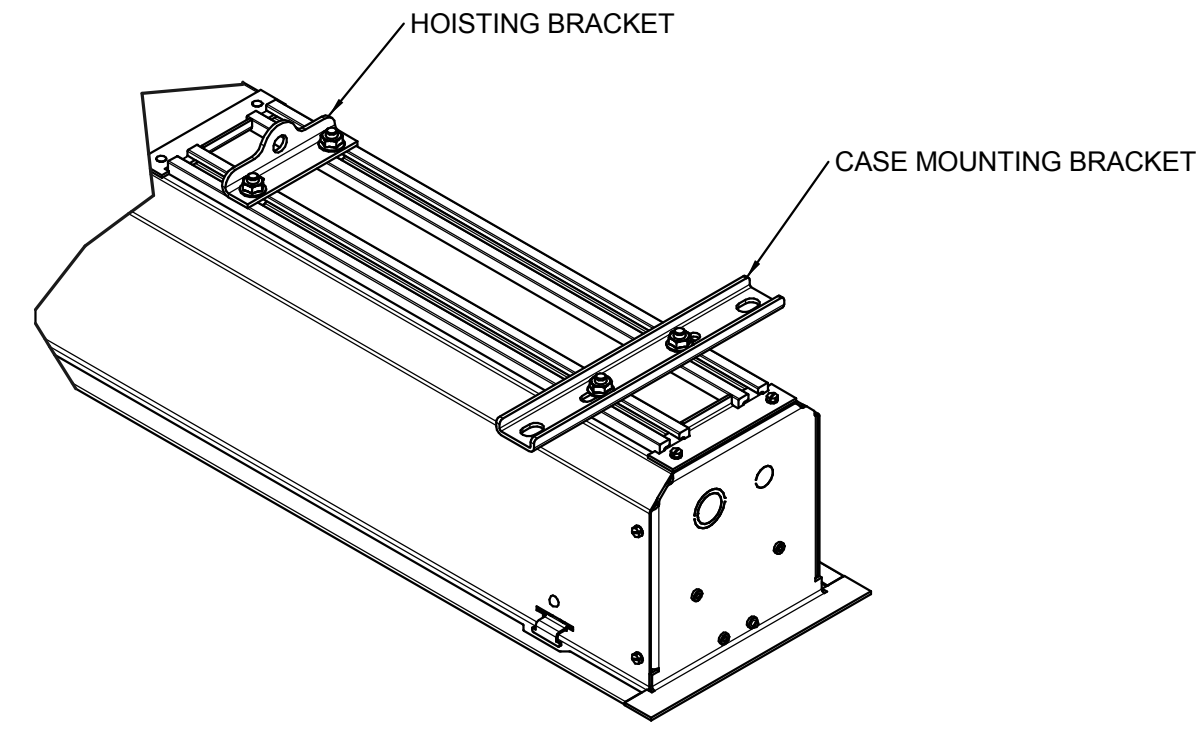
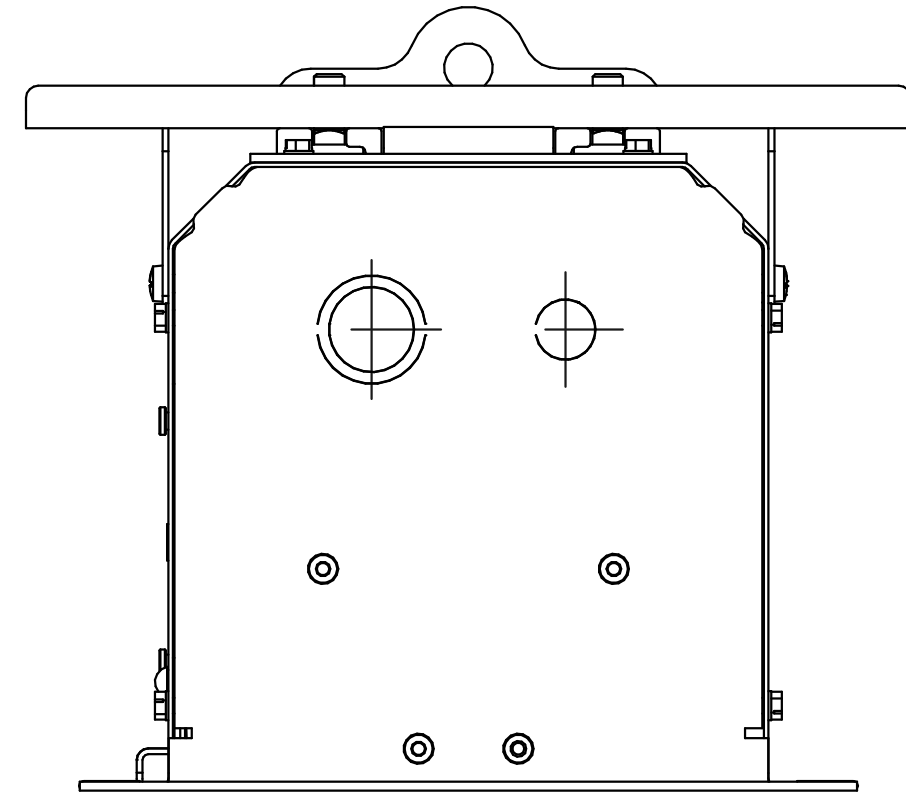
NOT FOR CONSTRUCTION

CONTROL SYSTEM BLOCK DIAGRAM  
COLLEGE OF DUPAGE SRC2000 RENNOVATION

TA-613  
22-1742-00  
ISSUE DATE  
Revisions

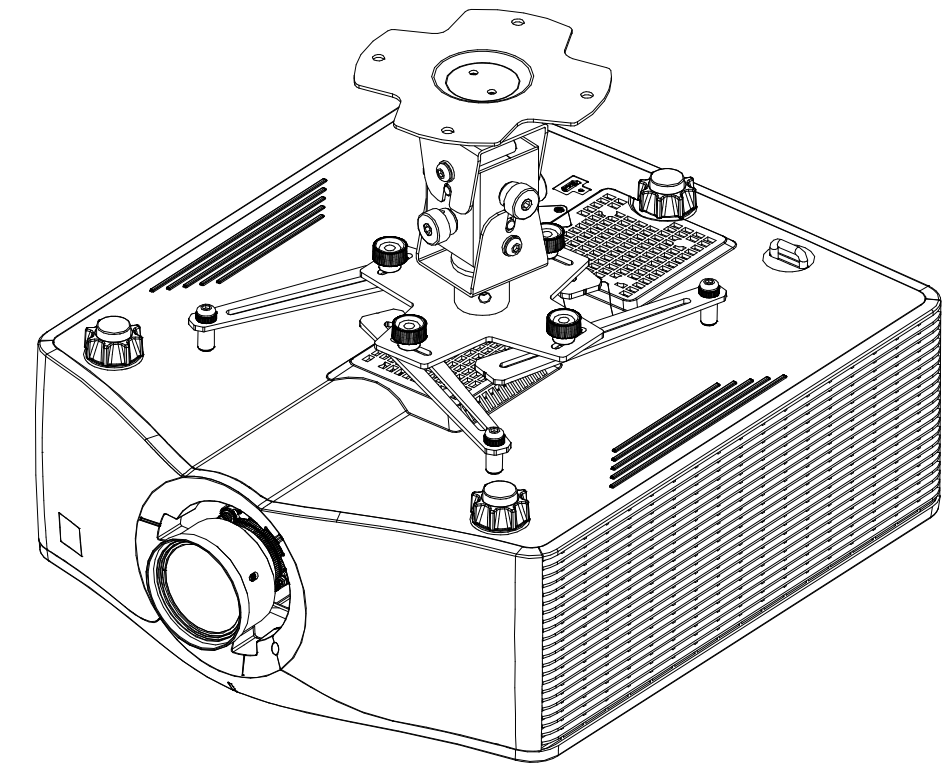
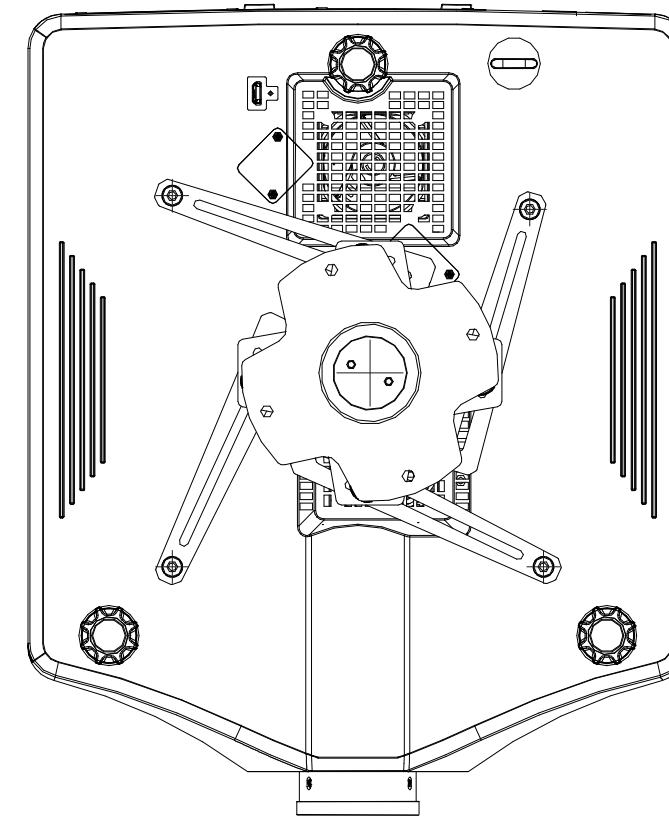
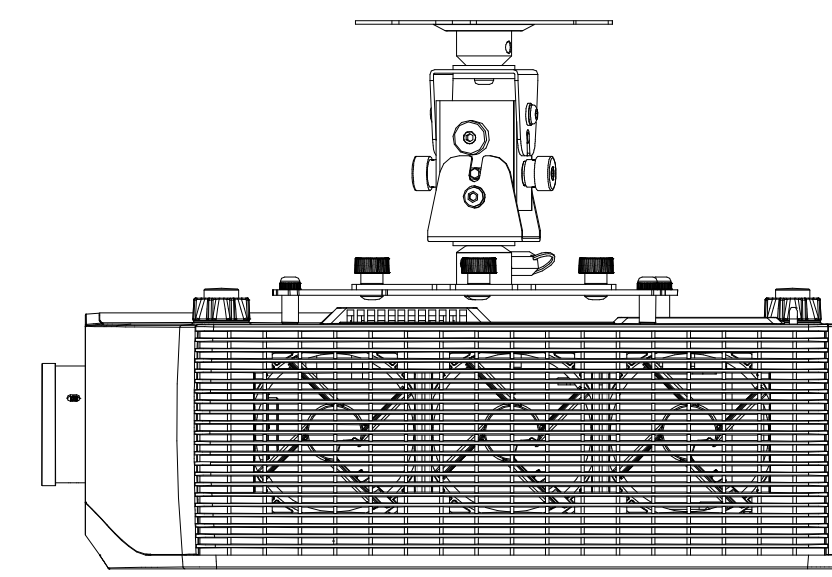
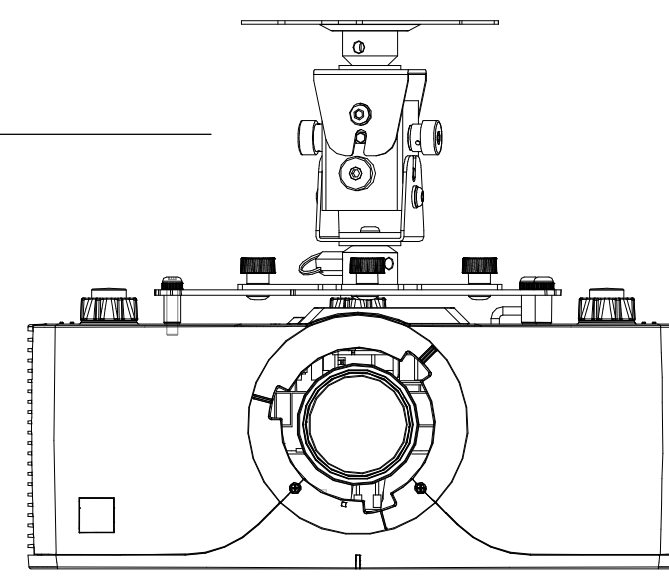
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1 MOUNTING DETAIL - CEILING SCREEN  
TA-630 NO SCALE

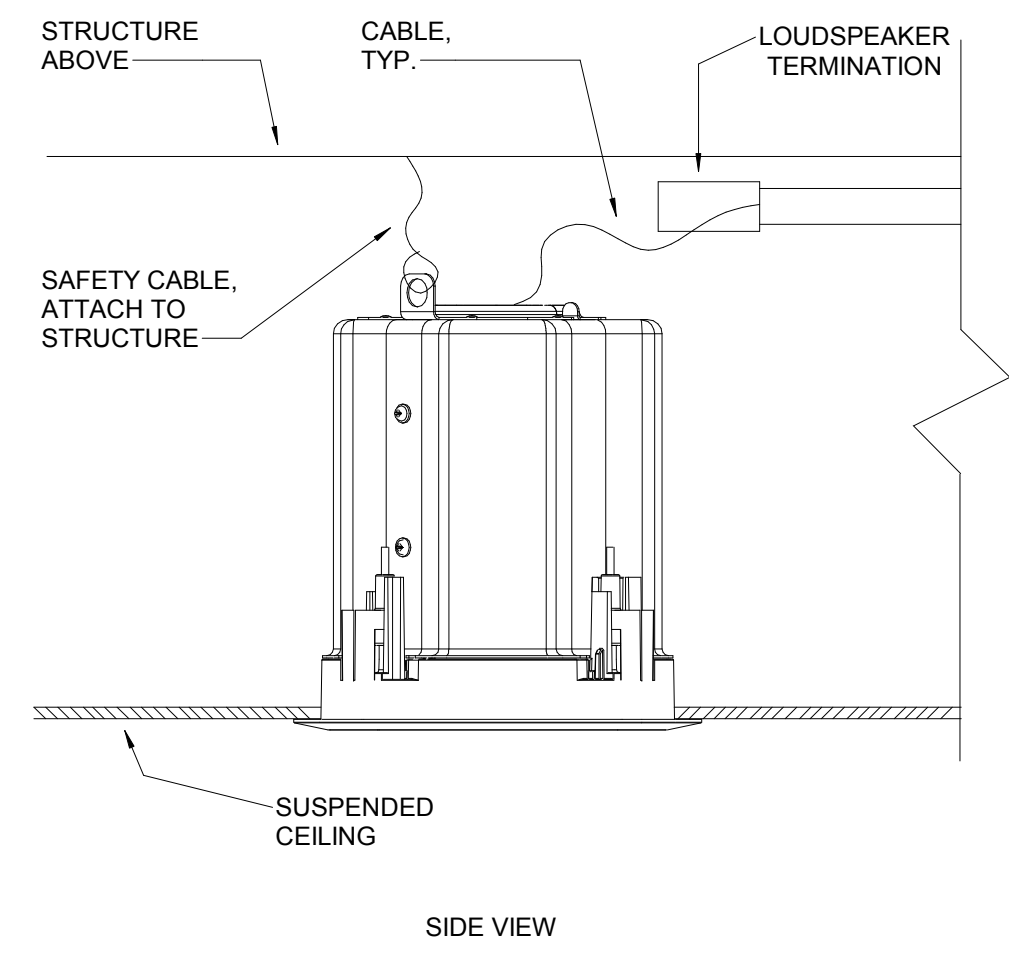
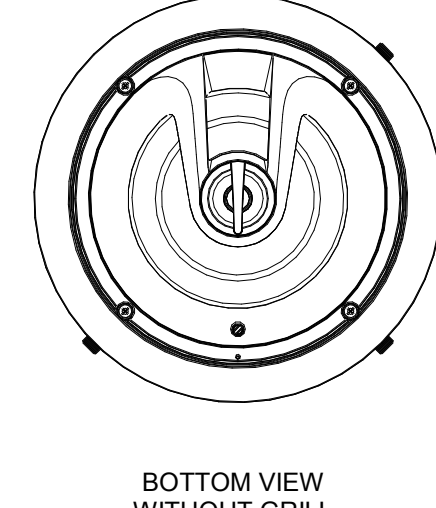
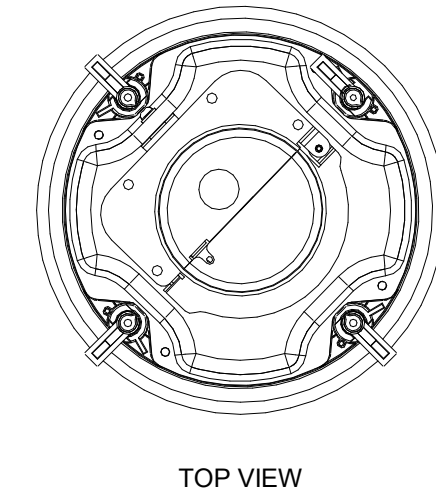


2 MOUNTING DETAIL - CEILING PROJECTOR  
TA-630 NO SCALE

EXTENTION PIPE IS FOR  
REFERANCE ONLY.  
REFER TO  
SPECIFICATION FOR  
DETAILS



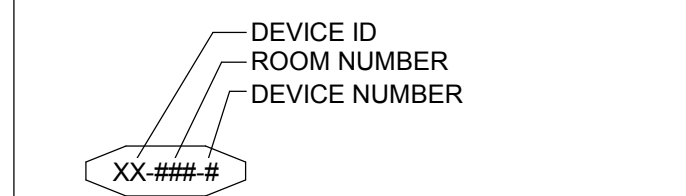
3 MOUNTING DETAIL - CEILING SPEAKER  
3" = 1'-0"



**LEGEND NOTES**  
LEGEND NOTES APPLY TO ALL SHEETS UNLESS OTHERWISE NOTED.  
SOME NOTES MAY NOT APPLY TO THIS SHEET

**AUDIOVISUAL SYMBOL LEGEND**

**AUDIOVISUAL SYMBOL**



**AUDIOVISUAL SYMBOL ID KEY**

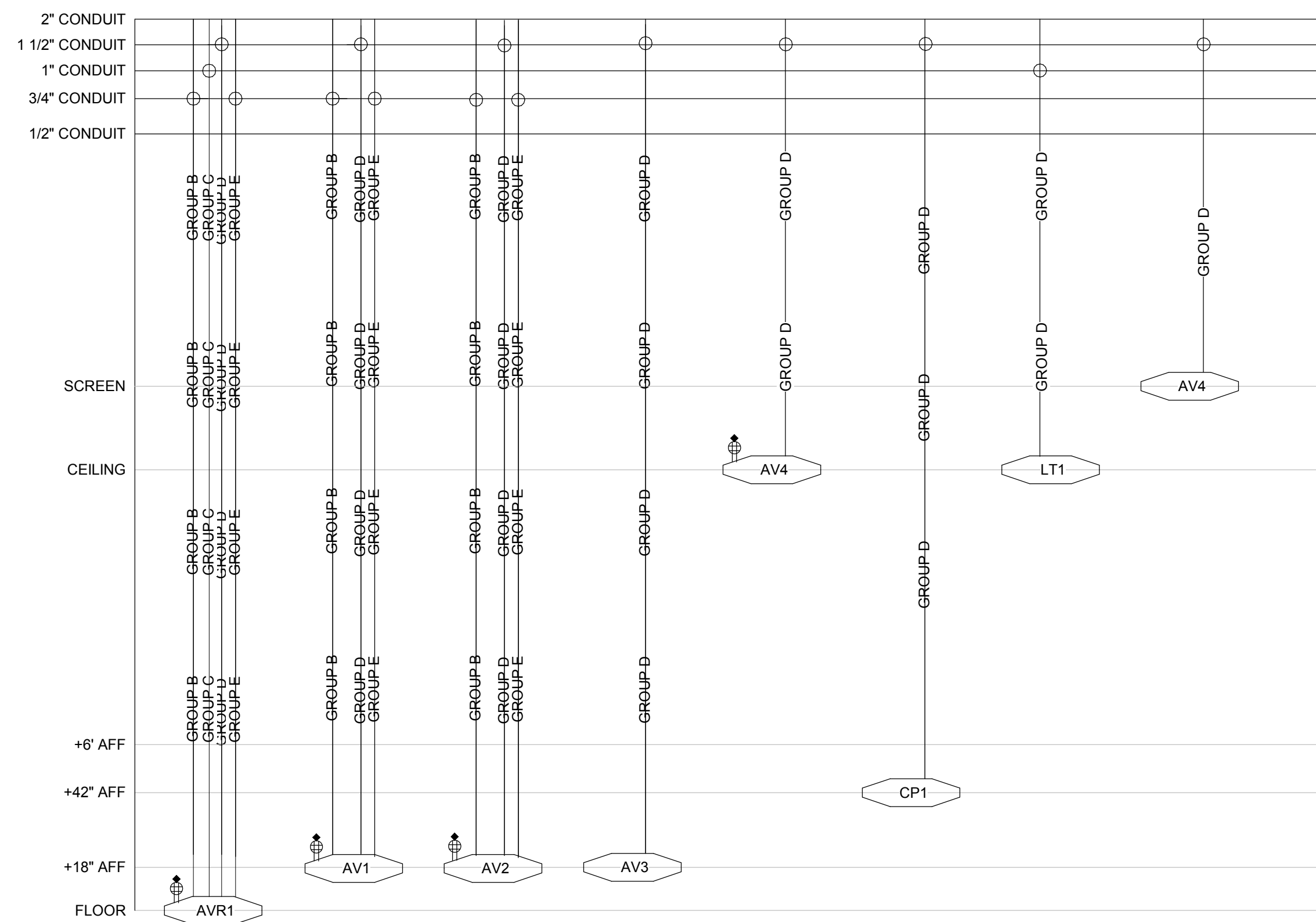
- AV AUDIOVISUAL TERMINATION
- ANT ANTENNA TERMINATION
- AVR AUDIOVISUAL EQUIPMENT RACK
- CAM CAMERA TERMINATION
- FB FLOORBOX TERMINATION
- IC INTERCOM TERMINATION
- LT LOUDSPEAKER TERMINATION
- SW SUBWOOFER TERMINATION
- VT VIDEO TERMINATION
- LM LIVE MICROPHONE TERMINATION
- WAP WIRELESS ACCESS POINT TERMINATION

**POWER SYMBOLS**

- ⊕ 20A, 125V, 2 POLE, 3 WIRE, GROUNDING TYPE, NEMA 5-20 DUPLEX RECEPTACLE CONTAINED IN AUDIOVISUAL WIRING DEVICE PLATE (+18" AFF. UON).
- ⊕ QUADRUPLEX RECEPTACLE - TWO (2) 20A, 125V, 2 POLE, 3 WIRE, GROUNDING TYPE, DUPLEX RECEPTACLES CONTAINED IN AUDIOVISUAL WIRING DEVICE PLATE (+18" AFF. UON).
- ⊕ CONCEALED CEILING MOUNTED QUADRUPLEX RECEPTACLE - TWO (2) 20A, 125V, 2 POLE, 3 WIRE, GROUNDING TYPE CONTAINED IN AUDIOVISUAL WIRING DEVICE (CEILING UON).
- ⊕ CONCEALED SERVICE, STEEL FLOOR BOX COMPLETE WITH A QUADRUPLEX RECEPTACLE - TWO (2) 20A, 125V, 2 POLE, 3 WIRE, GROUNDING TYPE RECEPTACLES. PROVIDE CAST-IRON BOX IN SLABS THAT ARE IN DIRECT CONTACT WITH EARTH IN AV WIRING DEVICE.
- ⊕ JUNCTION BOX.

**DATA SYMBOLS**

- ⊕ WALL MOUNTED DATA RECEPTACLE FOR BUILDING WIDE LAN CONTAINED IN AUDIOVISUAL WIRING DEVICE PLATE (+18" AFF. UON).
- ⊕ WALL MOUNTED DATA RECEPTACLE FOR BUILDING WIDE LAN, NOT CONTAINED IN AUDIOVISUAL WIRING DEVICE PLATE - FOR REFERENCE ONLY.



**AV TYPICAL CONDUIT RISER DIAGRAM AND WIRING SCHEDULE**

- NOTES:
1. DEVICES ARE SHOWN AT TYPICAL HEIGHT. REFER TO PLAN DRAWINGS FOR EXACT WIRING DEVICE HEIGHT REQUIREMENTS.
  2. EC SHALL FURNISH AND INSTALL PULL BOXES AS REQUIRED PER NEC.
  3. THE INTENT OF THE AV CONDUIT RISER DIAGRAM IS TO SHOW CONDUIT SEPARATION AND SIZING REQUIREMENTS FOR CABLING REQUIRED FOR THE DEVICE SHOWN.
  4. THE INTENT OF THE AV WIRING SCHEDULE IS TO SHOW ROUTING OF CABLING FROM EACH SPECIFIC WIRING DEVICE LOCATION TO ITS DESTINATION AND THE REQUIRED CONDUIT SEPARATION FOR EACH SIGNAL CABLE TYPE.
  5. AVR TYPE DEVICES ON PLANS ARE SHOWN AS A REFERENCE POINT TO DESIGNATE THE LOCATION WHERE CABLING FROM WIRING DEVICES IS ROUTED TO THE AV EQUIPMENT TO BE TERMINATED AS CALLED OUT IN THE AV WIRING SCHEDULE. CONDUIT, BACKBOXES AND OPENINGS FOR PASS THROUGH OF AV CABLING SHALL BE SIZED TO ACCOMMODATE UP TO 10% ADDITIONAL OVERALL CABLING DIAMETER FOR FUTURE GROWTH.
  6. CONDUIT RUNS FROM WIRING DEVICES MAY BE COMBINED AS THEY ARE ROUTED TO THEIR DESTINATION AS LONG AS SIGNAL SEPARATION FOR ALL AV CABLING IS MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS DETAILED ON SHET TA-001. ANY CONDUIT RUNS COMBINED IN THIS WAY SHALL BE DONE SO WITH A PULL BOX SIZED PER NEC.
  7. REFER TO DRAWING TA-001 AND SPECIFICATIONS FOR MORE INFORMATION.

**1 RISER DIAGRAM A-C**  
12" = 1'-0"

NOT FOR CONSTRUCTION

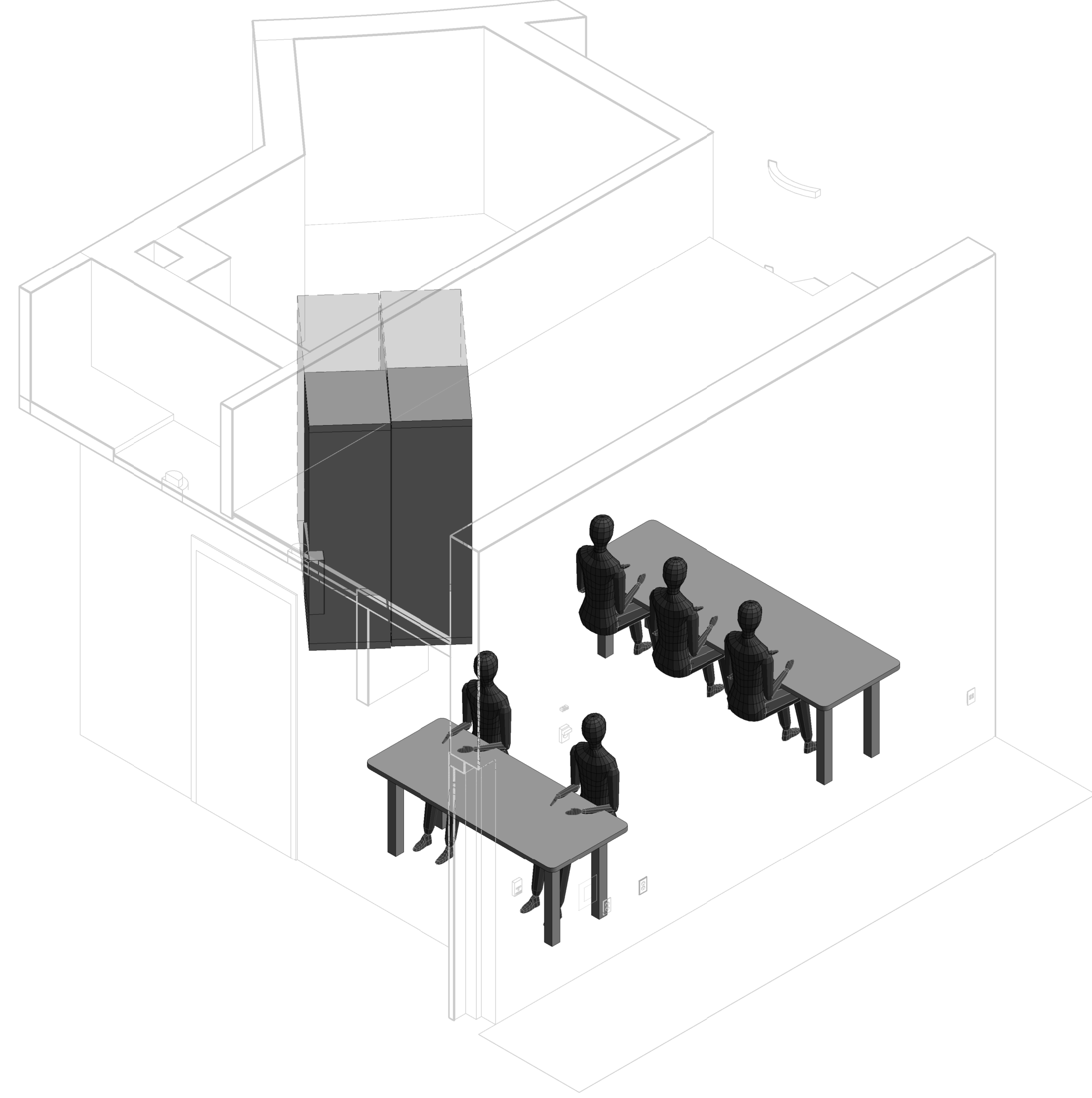
CONDUIT RISER DIAGRAM  
COLLEGE OF DUPAGE SRC2000 RENNOVATION

**TA-640**  
22-1742-00  
ISSUE DATE  
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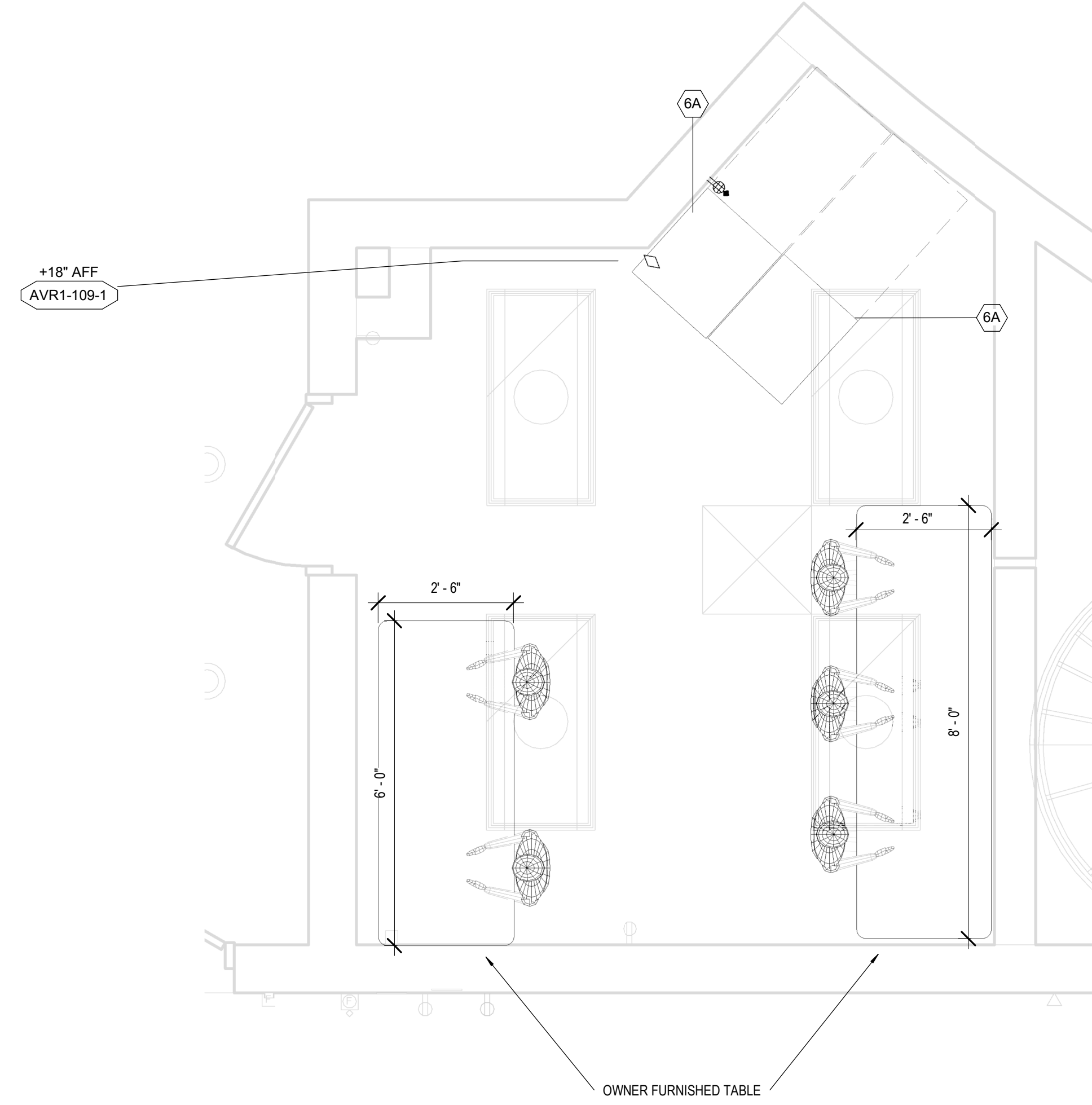
Communication Device Schedule					
AV WIRING DEVICE #	ITEM DESCRIPTION	BACK BOX DESCRIPTION	WIRE TYPE	HOME RUN ROUTE	GROUP
<b>109</b>					
AVR1-109-1	LOCATION FOR RACK MOUNTED CABLING	18" X 18" SURFACE MOUNT	SDI, FIBER, DATA-S, AUDIO, POWER	N/A	B, D, E
<b>A105</b>					
AV1-A105-1	CUSTOM AV BOX WITH PATCH POINTS	18" X 18" FLUSH MOUNT	SDI, FIBER, DATA-S, AUDIO, POWER	AVR1	B, D, E
AV3-A105-1	EXTRON XPT TRANSMISSION WIRING DEVICE	1 GANG, FLUSH MOUNT	DATA-S	AVR1	D
AV4-A105-1	EXTRON XTP TERMINATION FOR LATE COMER EQUIPMENT	1 GANG, CEILING MOUNT	DATA-S	AVR1	D
CP1-A105-1	WIRING DEVICE FOR EXTRON CONTROL PANEL	2 GANG, FLUSH MOUNT	DATA-S	AVR1	D
LT1-A105-2	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	LT1-A105-1	C
LT1-A105-3	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	LT1-A105-2	C
LT1-A105-4	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	LT1-A105-3	C
LT1-A105A-1	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	AVR1	C
SCR1-A105-1	JUNCTION BOX FOR SCREEN TERMINATION	1 GANG, FLUSH MOUNT	CONTROL, POWER	AVR1	D
<b>B106</b>					
AV2-B106-1	CUSTOM AV BOX WITH PATCH POINTS	18" X 18" FLUSH MOUNT	SDI, FIBER, DATA-S, AUDIO, POWER	AVR1	B, D, E
AV3-B106-1	EXTRON XPT TRANSMISSION WIRING DEVICE	1 GANG, FLUSH MOUNT	DATA-S	AVR1	D
AV4-B106-1	EXTRON XTP TERMINATION FOR LATE COMER EQUIPMENT	1 GANG, CEILING MOUNT	DATA-S	AVR1	D
CP1-B106-2	WIRING DEVICE FOR EXTRON CONTROL PANEL	2 GANG, FLUSH MOUNT	DATA-S	AVR1	D
LT1-B106-1	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	AVR1	C
LT1-B106-2	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	LT1-B106-1	C
LT1-B106-3	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	LT1-B106-2	C
LT1-B106-4	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	LT1-B106-3	C
SCR1-106-1	JUNCTION BOX FOR SCREEN TERMINATION	1 GANG, FLUSH MOUNT	CONTROL, POWER	AVR1	D
<b>C107</b>					
AV2-C107-1	CUSTOM AV BOX WITH PATCH POINTS	18" X 18" FLUSH MOUNT	SDI, FIBER, DATA-S, AUDIO, POWER	AVR1	B, D, E
AV3-C107-1	EXTRON XPT TRANSMISSION WIRING DEVICE	1 GANG, FLUSH MOUNT	DATA-S	AVR1	D
AV4-C107-1	WIRING DEVICE FOR CEILING MOUNTED PROJECTOR		DATA-S, POWER	AVR1	D
CP1-C107-1	WIRING DEVICE FOR EXTRON CONTROL PANEL	2 GANG, FLUSH MOUNT	DATA-S	AVR1	D
LT1-C107-1	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	AVR1	C
LT1-C107-2	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	LT1-C107-1	C
LT1-C107-3	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	LT1-C107-2	C
LT1-C107-4	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	LT1-C107-3	C
SCR1-C107-1	J BOX FOR MOTORIZED SCREEN	1 GANG, FLUSH MOUNT	CONTROL, POWER	AVR1	D
<b>D101</b>					
AV2-D101-1	CUSTOM AV BOX WITH PATCH POINTS	18" X 18" FLUSH MOUNT	SDI, FIBER, DATA-S, AUDIO, POWER	AVR1	B, D, E
AV3-D101-1	EXTRON XPT TRANSMISSION WIRING DEVICE	1 GANG, FLUSH MOUNT	DATA-S	AVR1	D
AV4-D101-1	WIRING DEVICE FOR CEILING MOUNTED PROJECTOR		DATA-S, POWER	AVR1	D
CP1-D101-1	WIRING DEVICE FOR EXTRON CONTROL PANEL	2 GANG, FLUSH MOUNT	DATA-S	AVR1	D
LT1-D101-1	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	AVR1	C
LT1-D101-2	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	LT1-D101-1	C
LT1-D101-3	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	LT1-D101-2	C
LT1-D101-4	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	LT1-D101-3	C
SCR1-D101-1	J BOX FOR MOTORIZED SCREEN	1 GANG, FLUSH MOUNT	CONTROL, POWER	AVR1	D

Communication Device Schedule					
AV WIRING DEVICE #	ITEM DESCRIPTION	BACK BOX DESCRIPTION	WIRE TYPE	HOME RUN ROUTE	GROUP
<b>E102</b>					
AV1-E102-1	CUSTOM AV BOX WITH PATCH POINTS	18" X 18" FLUSH MOUNT	SDI, FIBER, DATA-S, AUDIO, POWER	AVR1	B, D, E
AV3-E102-1	EXTRON XPT TRANSMISSION WIRING DEVICE	1 GANG, FLUSH MOUNT	DATA-S	AVR1	D
AV4-E102-1	EXTRON XTP TERMINATION FOR LATE COMER EQUIPMENT	1 GANG, CEILING MOUNT	DATA-S	AVR1	D
CP1-E102-1	WIRING DEVICE FOR EXTRON CONTROL PANEL	2 GANG, FLUSH MOUNT	DATA-S	AVR1	D
LT1-E102-1	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	AVR1	C
LT1-E102-2	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	LT1-E102-1	C
LT1-E102-3	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	LT1-E102-2	C
LT1-E102-4	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	LT1-E102-3	C
SCR1-E102-1	J BOX FOR MOTORIZED SCREEN	1 GANG, FLUSH MOUNT	CONTROL, POWER	AVR1	D
<b>F103</b>					
AV1-F103-1	CUSTOM AV BOX WITH PATCH POINTS	18" X 18" FLUSH MOUNT	SDI, FIBER, DATA-S, AUDIO, POWER	AVR1	B, D, E
AV3-F103-1	EXTRON XPT TRANSMISSION WIRING DEVICE	1 GANG, FLUSH MOUNT	DATA-S	AVR1	D
AV4-F103-1	EXTRON XTP TERMINATION FOR LATE COMER EQUIPMENT	1 GANG, CEILING MOUNT	DATA-S	AVR1	D
CP1-F103-6	WIRING DEVICE FOR EXTRON CONTROL PANEL	2 GANG, FLUSH MOUNT	DATA-S	AVR1	D
LT1-F103-1	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	AVR1	C
LT1-F103-2	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	LT1-F103-1	C
LT1-F103-3	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	LT1-F103-2	C
LT1-F103-4	CEILING MOUNTED SPEAKER TERMINATION	CEILING MOUNTED SPEAKER TERMINATION	SPKR18-2	LT1-F103-3	C
SCR1-F103-1	J BOX FOR MOTORIZED SCREEN	1 GANG, FLUSH MOUNT	CONTROL, POWER	AVR1	D
<b>G104</b>					
AV2-G104-1	CUSTOM AV BOX WITH PATCH POINTS	18" X 18" FLUSH MOUNT	SDI, FIBER, DATA-S, AUDIO, POWER	AVR1	B, D, E
AV2-G104-2	CUSTOM AV BOX WITH PATCH POINTS	18" X 18" FLUSH MOUNT	SDI, FIBER, DATA-S, AUDIO, POWER	AVR1	B, D, E
AV3-G104-1	EXTRON XPT TRANSMISSION WIRING DEVICE	1 GANG, FLUSH MOUNT	DATA-S	AVR1	D
AV3-G104-2	EXTRON XPT TRANSMISSION WIRING DEVICE	1 GANG, FLUSH MOUNT	DATA-S	AVR1	D
AV4-G104-1	WIRING DEVICE FOR CEILING MOUNTED PROJECTOR		DATA-S, POWER	AVR1	D
CP1-G104-1	WIRING DEVICE FOR EXTRON CONTROL PANEL	2 GANG, FLUSH MOUNT	DATA-S	AVR1	D
CP1-G104-2	WIRING DEVICE FOR EXTRON CONTROL PANEL	2 GANG, FLUSH MOUNT	DATA-S	AVR1	D
LT1-G104-1	CEILING MOUNTED SPEAKER TERMINATION		SPKR18-2	AVR1	C
LT1-G104-2	CEILING MOUNTED SPEAKER TERMINATION		SPKR18-2	LT1-G104-1	C
LT1-G104-3	CEILING MOUNTED SPEAKER TERMINATION		SPKR18-2	LT1-G104-2	C
LT1-G104-4	CEILING MOUNTED SPEAKER TERMINATION		SPKR18-2	LT1-G104-3	C
LT1-G104-5	CEILING MOUNTED SPEAKER TERMINATION		SPKR18-2	LT1-G104-4	C
LT1-G104-6	CEILING MOUNTED SPEAKER TERMINATION		SPKR18-2	LT1-G104-5	C
LT1-G104-7	CEILING MOUNTED SPEAKER TERMINATION		SPKR18-2	LT1-G104-6	C
LT1-G104-8	CEILING MOUNTED SPEAKER TERMINATION		SPKR18-2	LT1-G104-7	C
LT1-G104-9	CEILING MOUNTED SPEAKER TERMINATION		SPKR18-2	LT1-G104-8	C
LT1-G104-10	CEILING MOUNTED SPEAKER TERMINATION		SPKR18-2	LT1-G104-9	C
SCR1-G104-1	J BOX FOR MOTORIZED SCREEN	1 GANG, FLUSH MOUNT	CONTROL, POWER	AVR1	D

3 control room



1 control booth  
1/2" = 1'-0"



2 Section 9  
1/2" = 1'-0"

