



COLLEGE OF DuPAGE

APPENDIX

**Regular Board of Trustees Meeting
May 18, 2017**

APPENDIX

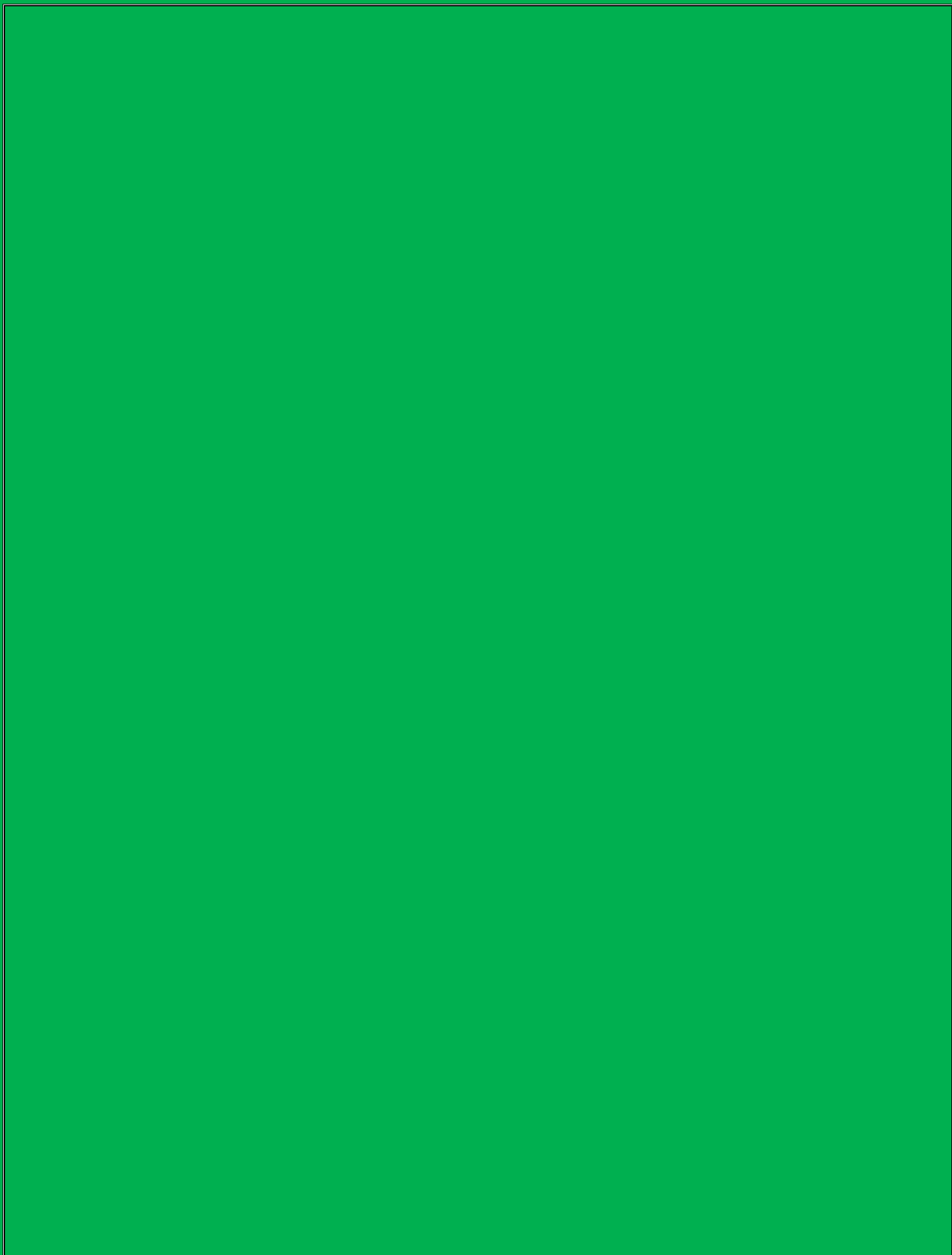
Requests for Proposals:

- i. Consent Agenda Item 8g:
Studio Control Room Upgrade for the
MPTV Television Studio**

- ii. Consent Agenda Item 8k:
Public Safety Desk and Student Tech
Gallery**

- iii. Agenda Item 11:
Contract for McAninch Arts Center (MAC)
Marketing and Public Relations
Consultant for FY2018-2020**

- iv. Agenda Item 13:
Contract for the HSC Cadaver Lab
Renovation**



May 18, 2017

- i. **Consent Agenda Item 8f:**
Studio Control Room Upgrade for the
MPTV Television Studio

RESPONDENT: _____



COMMUNITY COLLEGE DISTRICT NO. 502

**Studio Control Room Upgrade
for the MPTV Television Studio**

RFP NUMBER.: 2017-R0015

PROPOSALS DUE: Tuesday, April 4, 2017 at 2:00 p.m. CST

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

SEND RESPONSES TO:

**COLLEGE OF DuPAGE
PURCHASING DEPARTMENT
BIC BUILDING, ROOM 1540
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
FAX (630) 942-3750

February 15, 2017

REQUEST FOR PROPOSAL

Proposals for a **Studio Control Room Upgrade for the MPTV Television Studio** will be received by the College of DuPage, District 502, at the office of the Purchasing Manager, Berg Instructional Center (BIC) Building, Room 1540, 425 Fawell Blvd., Glen Ellyn, IL 60137, until **2:00pm CST, Tuesday, April 4**, at which time the respondents names will be read publicly.

A mandatory pre-proposal site visit will be held at 11:00 a.m. on March 27, 2017 at 425 Fawell Blvd, Glen Ellyn Il, 60137 in the McAninch Arts Center (MAC Building), Room 179.

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

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

No response shall be withdrawn for a period of ninety (90) days after the advertised close date without the consent of the College.

LEGAL NOTICE

RFP NOTICE

No. 2017-R0015

The College of DuPage is accepting Proposals for a Studio Control Room Upgrade for the MPTV television Studio. RFP documents may be downloaded from the Purchasing Website at: www.cod.edu/about/purchasing/requests/ by clicking on the link for this RFP and following the instructions.

A mandatory pre-proposal site visit will be held at 11:00 a.m. on March 27, 2017 at 425 Fawell Blvd, Glen Ellyn II, 60137 in the McAninch Arts Center (MAC Building), Room 179.

Responses are due to the Purchasing Department up to and no later than **2:00 p.m. CST Tuesday, April 4, 2017 at 2:00 p.m.** at which time the Respondents names will be read publicly.

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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RFP SUBMISSION CHECKLIST

Things to Remember When Submitting a Proposal to the College of DuPage

1. **Read the *entire* document.** In your review, note critical items such as: required goods and services; site visit date, submittal dates, submission requirements, etc.
2. **Note the contact information provided.** The Purchasing Office Buyer at purchasing@cod.edu is the single point of contact for this RFP and is the only contact with whom you are allowed to communicate regarding this RFP. This person is an excellent source of information for any questions you may have. Please read the section entitled *Blackout Period* for more information.
3. **Take advantage of the “question and answer” period.** Submit your questions to the Purchasing Department by the deadline noted in the RFP and view the answers given in the formal addenda issued for this RFP. All addenda issued for an RFP will be emailed to each company that downloaded the documents from the College website, and will include all questions asked and answered concerning the RFP. Please be sure to use a valid email address when you download the documents.
4. **Do not alter, add to, or delete and part of the RFP documents without prior approval.** Please refer to the section titled *Exceptions* for instruction on how to request a deviation to the original RFP.
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 RFP. If so, you must submit a signed copy of the addenda along with your proposal.
6. **Review and read the RFP 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. The copies are provided to the Evaluation Team members and will be used to score your response. Proposals will not be accepted if Sections 4, 5, and 6, are not completed. (Please note there are two (2) signature lines in Section 6 that must be signed.)
7. **Submit your proposal on time.** Note the date and time listed on the front page of the RFP and be sure to submit all required items on time. Late responses will not be accepted and will be returned, unopened. Ensure the envelope/box containing your proposal is appropriately labeled. Please allow adequate time for delivery to the Purchasing Department.
8. **Important dates to know:**
 - RFP Publication Date – 3/20/2017
 - Mandatory pre-proposal site visit – 3/27/2017 at 11:00AM CST
 - Questions Due – 3/28/2017 3:00PM CST
 - Proposals Due – 4/04/2017 2:00PM CST
 - Target Board Approval Date –5/18/2017
 - Contracting Period begins: On or about 5/19/2017

1.0 GENERAL INFORMATION

1.1 DEFINITIONS

- A. RESPONDENT** shall mean the individual or business entity submitting Proposal to supply any or all of the services or goods required by the Contract Documents.
- B. RESPONSE** shall mean the RFP Documents as completed by the Respondent which constitutes the Respondent's proposal.
- C. CONTRACT** shall mean the agreement between the College and Contractor as set forth in the resulting Contract Documents and as awarded by the College of DuPage Board of Trustees.
- D. CONTRACTOR** shall mean the individual or business entity submitting a response and to whom the College of DuPage Board of Trustees awards the resulting 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. PURCHASING MANAGER** shall mean the Purchasing Manager of the College of DuPage.
- H. 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 Contract Documents.

1.2 ERROR IN PROPOSAL

Where a Respondent 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 responses. Within forty-eight (48) hours of the advertised RFP deadline, Respondent 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 Respondent from withdrawing its response based upon a 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 Respondent be allowed to withdraw its response and recommend that the contract be awarded to the next responsible, responsive Respondent. If the Board determines by majority vote, that the Respondent has made a bona fide error, no award will be made upon such response.

1.3 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 resulting 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.

1.4 AWARD OF CONTRACT

The award of the contract will be made within ninety (90) calendar days after the opening of proposals to one or more Respondent's based on recommendation by an Evaluation Committee and pre-determined evaluation criteria and weighting, and is subject to Board of Trustee approval.

The successful Respondent(s) will be notified by electronic mail that their Proposal 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 Proposal/contract 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 proposals, a Respondent may file a written request with the Purchasing Manager on the withdrawal of their Proposal and the Purchasing Manager will permit such withdrawal.

1.5 EQUAL EMPLOYMENT OPPORTUNITY

In the hiring of employees for the performance of work under the resulting 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.

1.6 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 Respondents. 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.

1.7 TAX EXEMPTION

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

1.8 HOLD HARMLESS CLAUSE

Contractor shall indemnify, hold harmless and defend the College of DuPage, its officers, agents, servants, and employees, from and against any and all claims, lawsuits, demands, liabilities, and losses whatsoever occurring or resulting to any and all persons, firms or corporations furnishing or supplying work, services, materials, or supplies in connection with the performance of this agreement, and from any and all claims, liabilities, and losses occurring or resulting to any person, firm, or corporation for damage, injury, or death arising out of or connected with contractor's performance of this agreement, unless such claims, liabilities, or losses arise out of the sole negligence or willful misconduct of the College of DuPage. "Contractors performance" includes contractor's action or inaction and the action or inaction of contractor's officers, employees, agents and subcontractors.

1.9 COMPLIANCE WITH LAWS - PUBLIC CONTRACTS

This project will result in a competitive contract, subject to laws and ordinances governing public contracts. The winning Respondent 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 response or the performance of the resulting Contract. If the winning Respondent observes that any of the Contract Documents are at variance therewith, it shall promptly notify the Purchasing Manager in writing and necessary changes shall be effected by appropriate modification.

1.10 INSURANCE

When work is being performed on-site, The College of DuPage requires a Certificate of Insurance in compliance with the following:

I) Workmen's Compensation Insurance shall be carried for all employees employed in carrying out the work contemplated under this agreement. The insurance shall comply with all State of Illinois and Federal requirements as may relate to Worker's Compensation Insurance. Employer's Liability Insurance shall also be provided for both bodily injury and disease that may arise out of the employment of any person involved in work under this agreement. Limits: \$500,000 Each Accident \$500,000 Each Disease \$500,000 Policy limit on disease

II) Automobile Liability Insurance shall be carried to cover any liability arising out of the use of any automobile. This insurance shall cover owned, non-owned, leased and hired automobiles to protect claims for bodily injury or property damage which may arise from the use of motor vehicles engaged in various operations under this Contract. Combined Single Limit of \$1,000,000 for both bodily injury and property damage.

III) General Liability Insurance shall include: Bodily Injury, Property Damage, Personal Injury, Explosion, Collapse and Underground Damage Liability Endorsements (commonly called X, C, and U hazards), Products and Completed Operations, Blanket Contractual and Broad Form Property Damage coverage, with: Limits: \$1,000,000 Per occurrence \$2,000,000 General Aggregate \$1,000,000 Personal and advertising injury liability \$2,000,000 Products and completed operations aggregate.

Include College of DuPage, its director's & officers, employees and agents as additional insured's on the policy. Stipulate that such insurance is primary and is not in addition to, or contributing with, any other insurance carried by, or for the benefit of College of DuPage. Waive any and all right of subrogation against College of DuPage. Contain separation of insured's endorsement. The aggregate limit must be written per Project or per location limit

IV) Umbrella/Excess Liability Insurance shall be carried to cover any liability in excess of the limits of coverage already required and provided through the primary liability policies. Limits: \$2,000,000 per occurrence.

\$2,000,000 Aggregate Umbrella Excess Liability Insurance must be in excess of the Employer's Liability Insurance, Automobile Liability Insurance, and General Liability Insurance.

V) Property Insurance shall be carried to protect all owned property brought on the premises relative to this agreement.

VI) Terms and Conditions

Prior to the commencement of the agreement, a valid/original Certificate of Insurance evidencing that all required insurance is in force, executed by an authorized representative of the insurance company, must be sent to College of DuPage, Attn: Purchasing Manager. Such Certificates shall identify the specific project/contract and location.

All Insurance companies shall be rated A VI or better by the current Best's Rating Guide and approved by the College.

All policies of insurance must be endorsed to contain a provision giving College of DuPage a thirty-day (30) prior written notice by registered mail of any cancellation of that policy or material change in coverage.

Receipt and review by the College or the College's Representative of any copies of insurance policies or insurance certificates shall not relieve the party to this agreement of his obligation to comply with the insurance provisions of the Agreement.

The insurance provisions of this Agreement shall not be construed as a limitation of the responsibilities and liabilities pursuant to the terms and conditions of this Agreement, including but not limited to liability for claims in excess of the insurance limits and coverage's set forth herein.

All policies shall be written with insurance companies licensed to do business in the State of Illinois. The College reserves the right to verify any information with the carrier.

The College has the right to request a certified copy of any insurance policy. Certificates must be filed with the College at least 30 days before the scheduled date of performance. You are required to add the College to its General Liability insurance policy with the following wording: "College of DuPage, including its current and former trustees, officers, employees, volunteer workers, agents, assigns and students, is added to this policy as additional insured.

1.11 WITHDRAWAL OF PROPOSALS

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

1.12 ACCEPTANCE OF PROPOSALS

The Purchasing Manager shall notify the successful Respondent, in writing, of the award of the Contract by the College within ninety (90) days from the Proposal Opening date. Upon receipt of the Notice of Award, the Contractor shall promptly secure, execute and deliver to the Purchasing Manager any documents required herein.

1.13 CASH BILLING DISCOUNTS

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

1.14 COMPETENCY OF RESPONDENT

No response will be accepted from or Contract awarded to a Respondent 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.

1.15 RESPONDENT WARRANTIES

The submission of a Proposal shall constitute a warranty that: (i) Respondent has carefully and thoroughly reviewed the RFP Documents and has found them complete and free from ambiguities and sufficient to describe the Contract work; (ii) Respondent 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 RFP Documents; and (iii) neither the Respondent 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 Proposal.

1.14 BUSINESS ENTERPRISE PROGRAM

The College of DuPage encourages the participation of qualified minority-, female-, and persons with disabilities-owned businesses in public contracts. The College seeks to promote the economic development of disadvantaged business enterprises by setting aspirational goals to award 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 ICCS 575.

END OF SECTION

2.0 INSTRUCTIONS TO RESPONDENTS

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 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 Respondents to obtain digital copies of RFP documents. It is the responsibility of each prospective Respondent to verify the completeness of their printed RFP documents before submitting a response 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 RFP. 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 understanding of this requirement:

2.3 REQUESTS FOR INFORMATION/CLARIFICATION

If any firm submitting a response for this project is in doubt as to the true meaning of the specifications or other documents or any part thereof, proposer 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 no later than Tuesday, **March 28, 2017 at 3:00pm CST**. Questions for which answers are provided will be communicated to all registered recipients of RFP documents via addendum.

2.4 PROPOSAL MODIFICATIONS

Unless indicated, it is understood that Proposals are in strict accordance with specification requirements. Proposals shall be deemed final, conclusive, and irrevocable. No Proposal shall be subject to correction or amendment for any error or miscalculation. Proposal 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.

2.5 SUBMISSION OF RESPONSES

All Respondents shall submit one (1) original of the completed RFP, three (3) copies of the completed RFP, *and* one flash drive containing all documents, in a sealed envelope and shall deliver them to Purchasing Manager, College of DuPage, BIC Building - Room 1540, 425 Fawell Blvd., Glen Ellyn, Illinois 60137 by the date and hour of the RFP deadline as shown in the legal advertisement. The sealed envelope submitted by the Respondent shall carry the following information on the face of the envelope: Respondent's name, address, subject matter of RFP, advertised date of RFP deadline and the hour designated for RFP deadline as shown in the legal advertisement. Unless otherwise stated, all blank spaces on the forms shall be fully completed. Respondent bears all responsibility for error or omissions in their submission.

2.6 EXCEPTIONS

If any Respondent intends to take any deviations or exceptions from the Specifications or other RFP Documents, Respondent shall submit to the Buyer a written request for a deviation or exception. If the Project Manager considers such deviation or

exception acceptable, the 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 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 RFP Documents. Respondent shall acknowledge receipt of each Addendum issued in the space provided on the RFP form or via a signed addendum. Failure to acknowledge receipt of addenda will result in disqualification of the Proposal.

All requests for deviations or exceptions must be sent in writing to purchasing@cod.edu at least five (5) days prior to the date and time set forth as the RFP Closing Date. The College shall not be responsible for nor bound by any oral instructions, interpretations, or explanations issued by the College or any of its representatives.

Initial understanding of this requirement: _____

2.7 NOTICES

All communications and notices between the College and Respondents regarding the RFP Documents shall be in writing and hand delivered or delivered via United States mail, postage prepaid, or via email. Notices to the Respondents shall be addressed to the name and address or email address provided by the Respondents; notices to the Purchasing Manager shall be addressed to Purchasing Department, College of DuPage, BIC Building - Room 1540, 425 Fawell Blvd., Glen Ellyn, Illinois 60137, or purchasing@cod.edu.

2.8 CONFIDENTIALITY

The Purchasing Department shall examine the responses to determine the validity of any written requests for nondisclosure of trade secrets and other proprietary data identified. After award of the contract, all responses, documents, and materials submitted by the Respondent pertaining to this RFP will be considered public information and will be made available for inspection, unless otherwise determined by the Purchasing Department. All data, documentation and innovations developed as a result of these contractual services shall become the property of the College. Based upon the public nature of these RFPs, a Respondent must inform the College, in writing, of the exact materials in the offer which cannot be made a part of the public record in accordance with the Illinois Freedom of Information Act.

2.9 RESPONDENT WARRANTIES

The submission of a Proposal shall constitute a warranty that: (i) Respondent has carefully and thoroughly reviewed the RFP Documents and has found them complete and free from ambiguities and sufficient to describe the Contract work; (ii) Respondent 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 RFP Documents; and (iii) neither the Respondent 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 Proposal.

2.10 CONSIDERATION OF RESPONSES

The College reserves the right to reject or accept any or all Proposals, to extend the response period, to waive technicalities in the RFP Documents and/or to direct that the project be abandoned or re-issued prior to award of the Contract.

The Respondent acknowledges the right of the College to reject any or all Proposals and to waive any informality or irregularity in any Proposal received. In addition, the Respondent recognizes the right of the College to reject a Proposal if the Respondent failed to submit the data required by the Request for Proposal documents, or if the Proposal is in any way incomplete or irregular.

END OF SECTION

3.0 PROPOSAL SPECIFICATIONS

The MPTV Control Room located next to the MPTV Television Studio is scheduled for an upgrade during the 2017 fiscal year. The items to be upgraded are a new television production switcher, a graphics generator, and a news automation system..

Overview and Background:

The Motion Picture/Television Studio and Control room were remodeled as part of the McAninch Art Center renovations during the summer of 2013. The control room for the studio was relocated from the second floor to the first floor and adjacent to the studio. At that time, then current control room equipment was installed into new cabinetry provided in the remodel.

The current requests look to expand and upgrade current control room equipment to more relevantly accurate equipment used by the four year colleges and universities that our students will move to upon graduation from our programs, which is mimicked in the broadcast industry they will work in.

Design Work and Equipment:

The College is seeking to purchase upgrades/replacement of the video switcher and character generator in the control room and the purchase of a newsroom automation system to support our new Digital Broadcast Journalism degree and Courier TV News and Inside COD feature programs. All equipment must be purchased from Ross Video, or equal/equivalent.

Statement of Work:

All bids must be inclusive of requested equipment, design, installation and training parameters. Timeline info would include equipment choices, timeframe for delivery, timeframe for conceptual drawings and then as builds', training days, etc. All work must be completed and billed prior to June 23, 2017. Training must be completed by June 15, 2017.

Core Control Room Equipment must include:

- Ross Video Carbonite Black 2 M/E Panel, or equal/equivalent
- Ross Video Expression Character Generator, or equal/equivalent
- Ross Video Inception News Automation System, or equal/equivalent
- Training for all equipment.

The Engineering services to be provided include;

- Accurate construction documents for AV infrastructure implementation
- Coordinate procurement of AV equipment, installation
- Provide complete system diagrams and integration with current equipment

In addition, the Design process would allow for:

- AV Program Review/Verification
- Budget Verification
- Initial Design
- Final Systems Design
- Product Spec Document
 - AV Floor Plan and Elevations detailing locations of AV devices
 - AV Video Workflow
 - AV Audio Workflow
 - AV Control Workflow
 - Equipment lists

- System infrastructure requirements including cable and termination specs
- System operational and post operations specs
- Project Scope of Work
- Project Costs including any production racks
- Project Integration Agreement
- Pre-proposal Walkthrough is mandatory

3.1 PROPOSAL REQUIREMENTS

Please submit your hard copy proposal in the following order. Proposals should be prepared simply and economically, providing a straightforward, concise description of the Respondent's capabilities to satisfy the requirements of the RFP. Special bindings, colored displays, promotional materials, etc., are not desired. Emphasis should be on completeness and clarity of content.

The sections should be tabbed or clearly labeled in the order shown below:

Section 1: Required forms- Complete

- a. Completed Certifications Page
- b. Completed Signature Page
- c. Completed Conflict of Interest Disclosure and Non-Collusion Forms
- d. Any issued addenda, signed (if applicable)

Section 2: Qualifications

Provide a brief statement of qualifications/Executive Summary including an understanding of the College's intent and objectives and how your proposed system achieves those objectives. Please include:

- a. General information
 - a. Name of company, primary contact person, address, and telephone and fax number of the firm.
 - b. Brief overview of your organization, including states where you are conducting business, qualities which differentiate your company from your competitors, and the length of time your company has been in business.
- b. A description of the provider's qualifications in accordance with this RFP's minimal requirements. Emphasis should be made in addressing the following criteria:
- c. References – Attach Exhibit 2
 - a. Provide at least three (3) references (attach Appendix A).
 - i. References should be of similar size and scope and magnitude as described in this RFP, and should be from organizations in the higher education arena, if possible.
- d. Evidence of being a Ross Certified dealer, if proposing Ross equipment (preferred, as this is the industry standard).

Section 3: Design

Please detail in your proposal how your system will to meet or exceed the Design requirements listed in this RFP.

Section 4: Equipment

Please detail in your proposal how your system will to meet or exceed the equipment requirements listed in this RFP. Any alternate proposals for product other than the specified Ross equipment must be supported with documentation/product brochures showing evidence that this is equal to or better than Ross equipment.

Section 5: Timeline, Training, and Support

- a. Please detail in your proposal a timeline of activities, assuming award of contract on or about May 19, 2017. Ideally, project should be completed *and invoiced* by June 23, 2017.
- b. Please include information on training and ongoing support.
- c. Please include any warranty information

Section 6: Cost Proposal

Please provide a clear and concise cost proposal, including itemized pricing on all necessary design, coordination, supply, installation, and all other costs, stated or implied, of all scope work items required by this RFP, including, without limitation:

1. All Design/Engineering services;
2. Product spec document
3. All AV equipment;
4. All delivery and installation;
5. All training, if required;
6. Warranty for equipment and warranty length;
7. Estimate of all other project expenses;
8. Any ongoing fixed and variable costs associated with this project.

Please note: The College of DuPage is Tax Exempt.

Section 7: Additional

Please provide any additional information, not listed in the above sections, or any additional information that you feel should be considered.

Section 8: Contract

Please provide sample contract(s) as applicable (Design Service, etc.)

END OF SECTION

3.3 EVALUATION CRITERIA

College of DuPage will appoint a Selection Committee whose responsibility will be to review all responses to this RFP. The following criteria will be used in the evaluation of all proposals.

Evaluation Criteria	Percent of Weighting
Qualifications	On file
Design	On File
Maintenance and Support	On File
Reporting Requirements	On File
Pricing	On File

After the initial evaluation, the top finalists may be requested to make a phone, webinar or in-person presentation, or to further negotiate the terms and conditions of the contract. If notified, the company must be prepared to present with three (3) business days from the date of e-mail notification. Specific instructions regarding the presentation will be included in the notification.

END OF SECTION

4.0 CERTIFICATIONS

IMPORTANT: All Respondents are required to complete this form. Completed form must be returned with response by the RFP deadline. Failure to return this completed form may result in disqualification of response.

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.* (If Applicable)
- 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** When required by law, the Respondent and all Respondent'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

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

STATE NEGOTIATED COOPERATIVE AGREEMENT: YES _____ NO _____ Contract No. _____

Name of Certifying Entity: _____

Certification #: _____ Expiration Date: _____

Signature

Respondent/Company Official: _____ Date: _____

5.0 SIGNATURE PAGE

IMPORTANT: All Respondents are required to complete and sign this form. Completed form must be returned with proposal by the RFP deadline. Failure to return this completed form may result in disqualification of proposal.

Check One:

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

CORPORATION

The undersigned acknowledges receipt of a full set of RFP 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 response will not be accepted.**

The undersigned makes the foregoing response to RFP subject to all of the terms and conditions of the RFP 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 response are true and correct.

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 _____, 2016.

My commission expires: _____

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.

6.0 CONFLICT OF INTEREST DISCLOSURE AND NON-COLLUSION FORM

IMPORTANT: All Respondents are required to complete and sign this form. Completed form must be returned with proposal by the RFP deadline. Failure to return this completed form may result in disqualification of proposal.

RFP #: _____ DATE: _____

CONFLICT OF INTEREST DISCLOSURE

College of DuPage (COD) reserves the right, at its sole discretion, to reject any and all responses, 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 response submitted. Contact with any employee of the College of DuPage during the pre-award period, except as noted in the RFP documents, is strictly forbidden and is considered sufficient grounds for dismissal from the 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 a contract and that this company, corporation, firm, partnership or individual has not prepared this response in collusion with any other Respondent, and that the contents of said response 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 response.

Company Name: _____ Owners/Principal(s)
Name(s)/Title(s): _____

Vendor Address: _____ City, State, Zip: _____

Phone Number: _____ Fax Number: _____

Email Address: _____

Signature
Respondent/Company Official: _____ **Date:** _____

APPENDIX A: REFERENCES

Reference 1:

Name of Individual: _____ Name of Organization _____

Location of Organization: _____

Telephone # _____

Email Address: _____

Length of business relationship with your company: _____

Reference 2:

Name of Individual: _____ Name of Organization _____

Location of Organization: _____

Telephone # _____

Email Address: _____

Length of business relationship with your company: _____

Reference 3:

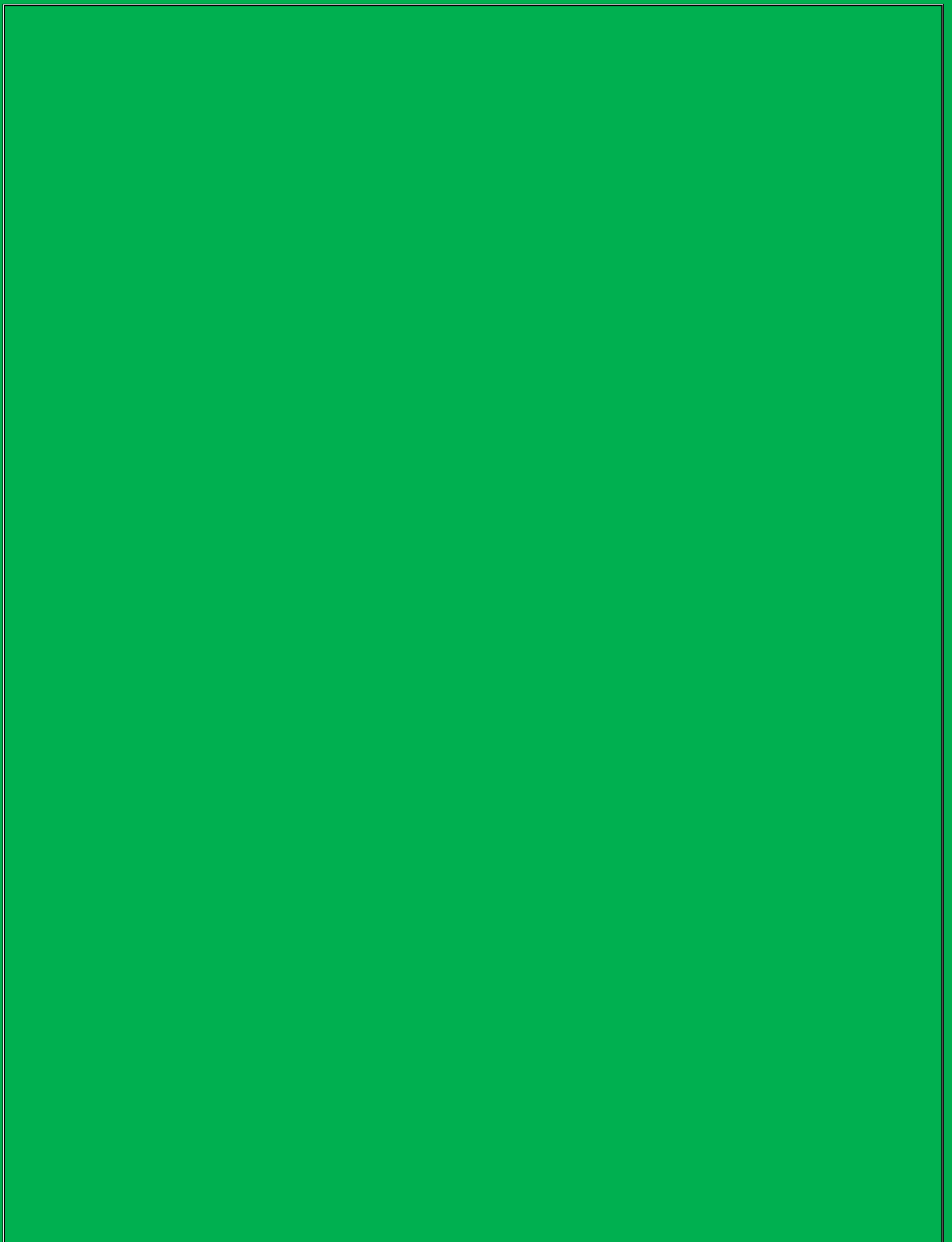
Name of Individual: _____ Name of Organization _____

Location of Organization: _____

Telephone # _____

Email Address: _____

Length of business relationship with your company: _____



May 18, 2017

ii. **Consent Agenda Item 8k:**
Public Safety Desk and Student Tech
Gallery

BIDDER: _____



COMMUNITY COLLEGE DISTRICT NO. 502

**PUBLIC SAFETY DESK & ART GALLERY
IN THE STUDENT RESOURCE CENTER**

BID NUMBER: 2017-B0049

BIDS DUE: Thursday, April 20, 2017 at 2:00pm CST

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 1540
425 FAWELL BLVD.
GLEN ELLYN, ILLINOIS 60137**



Purchasing Department

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

PHONE (630) 942-2217
FAX (630) 942-3750

March 29, 2017

INVITATION TO BID

Sealed bids for an PUBLIC SAFETY DESK & ART GALLERY will be received by the College of DuPage, District 502, at the office of the Purchasing Manager, Berg Instructional Center (BIC) Building, Room 1540, 425 Fawell Blvd., Glen Ellyn, IL 60137, until **2:00PM CST, Thursday, April 20, 2017**, 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 is scheduled for Tuesday, April 11, 2017 at 10:00am in the Purchasing Office, Berg Instructional Center (BIC) Building, Room 1540, 425 Fawell Blvd., Glen Ellyn, IL 60137.

A Bid Deposit in the amount of 15% of the total base bid in the form of a cashier's check, certified check, or Bid Bond 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 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 on 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. 2017-B0049

The College of DuPage is accepting sealed bids for a PUBLIC SAFETY DESK & ART GALLERY. Bid documents may be downloaded from the Purchasing Website at 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 1540, 425 Fawell Blvd., Glen Ellyn, IL 60137 up to and no later than **2:00 p.m. CST Thursday, April 20, 2017**, at which time they will publicly opened. 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.

A pre-bid conference is scheduled for Tuesday, April 11, 2017 at 10:00am in the Purchasing Office, Berg Instructional Center (BIC) Building, Room 1540, 425 Fawell Blvd., Glen Ellyn, IL 60137.

A Bid Deposit in the amount of 15% of the total base bid in the form of a cashier's check, certified check, or Bid Bond is required for this project.

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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; pre-bid date, Bid bond information, submittal dates, submission requirements, etc.
2. **Note the contact information provided.** The Purchasing Office at 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.
- 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 must be identical and be complete. The copies are provided to the Evaluation Team members and will be used to score your response. Bids will not be accepted if Sections 5, 6, and 7 are not completed. (Please note there are two (2) signature lines in Section 7 that must be signed.)
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 – Friday, March 31, 2017
 - Pre-Bid Meeting – Tuesday, April 11, 2017 at 10 am
 - Questions Due – Thursday, April 13, 2017 by 5 pm
 - Bids Due – Thursday, April 20, 2017
 - Target Board Approval Date – Thursday, May 18, 2017
 - Purchase Order Issued once contract is finalized and all required documentation is on file.

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 INSURANCE

When work is being performed on College property, the College of DuPage requires a Certificate of Insurance in compliance with the following:

Please see sample contract, section 10.0 of this request for bid for insurance limits.

Prior to the commencement of the agreement, a valid/original Certificate of Insurance evidencing that all required insurance is in force, executed by an authorized representative of the insurance company, must be sent to College of DuPage, Attn: Purchasing Manager. Such Certificates shall identify the specific project/contract and location.

All Insurance companies shall be rated A VI or better by the current Best's Rating Guide and approved by the College.

All policies of insurance must be endorsed to contain a provision giving College of DuPage a thirty-day (30) prior written notice by registered mail of any cancellation of that policy or material change in coverage.

Receipt and review by the College or the College's Representative of any copies of insurance policies or insurance certificates shall not relieve the party to this agreement of his obligation to comply with the insurance provisions of the Agreement.

The insurance provisions of this Agreement shall not be construed as a limitation of the responsibilities and liabilities pursuant to the terms and conditions of this Agreement, including but not limited to liability for claims in excess of the insurance limits and coverage's set forth herein.

All policies shall be written with insurance companies licensed to do business in the State of Illinois. The College reserves the right to verify any information with the carrier.

The College has the right to request a certified copy of any insurance policy. Certificates must be filed with the College at least 30 days before the scheduled date of performance. You are required to add the College to its General Liability insurance policy with the following wording: "College of DuPage, including its current and former trustees, officers, employees, volunteer workers, agents, assigns and students, is added to this policy as additional insured."

1.19 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 no later than **Thursday, April 13, 2017 at 5:00pm CST**. 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) copy of the Bid, and one flash drive containing all documents, in a sealed envelope and shall deliver them to Purchasing Manager, College of DuPage, BIC Building - Room 1540, 425 Fawell Blvd., Glen Ellyn, Illinois 60137 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, subject matter of Bid, 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.

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 1540, 425 Fawell Blvd., Glen Ellyn, Illinois 60137, or 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 V 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.

2.10 PERFORMANCE AND PAYMENT BOND

The successful Bidder shall furnish a Performance and Payment Bond in the full amount of the Contract on the College Bid Form. Please refer to sample contract, section 10.0. 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 BID OVERVIEW

Police Desk and Student Art Gallery

This project is located on the second floor in an area that connects the BIC building and the library in the SRC building.

At the south end of the corridor there is minor demolition and a revised Police dispatch window will be installed, and a new millwork desk will be added (along with general construction work such as wiring, doors, paint, ceilings etc). At the opposite end of the corridor an existing lobby will be converted into a student art gallery, adding a new interior window wall, doors, flooring, lighting etc.

The work needs to be installed before the start of classes, mid-August.

This work is permitted by DuPage County, and successful bidder will need to be registered with the County before the work begins, that cost is included in the bid.

Please see full drawing and spec starting on page 17.

Please reference the sample contract attached which contains information regarding payment and performance bond and insurance among other terms and conditions relevant to work on the College Campus.

4.0 BID FORM

BID FORM FOR 2017-B0049 – Police Safety Desk and Student Art Gallery

FIRM NAME, CONTACT NAME and PHONE NUMBER

The below prices include all stipulations and requirements of Addenda Number(s) _____ .

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.

Police Desk and Student Art Gallery	
Base Bid	\$

Submitted by: _____ (printed)

Submitted by: _____ (signed)

5.0 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 33-E-4 of Public Act 86-150, 720ICLS 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

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

STATE NEGOTIATED BID/ COOPERATIVE AGREEMENT: YES _____ NO _____ Contract No. _____

Name of Certifying Entity: _____

Certification #: _____ Expiration Date: _____

6.0 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 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 _____, 2016. 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.**

7.0 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): _____

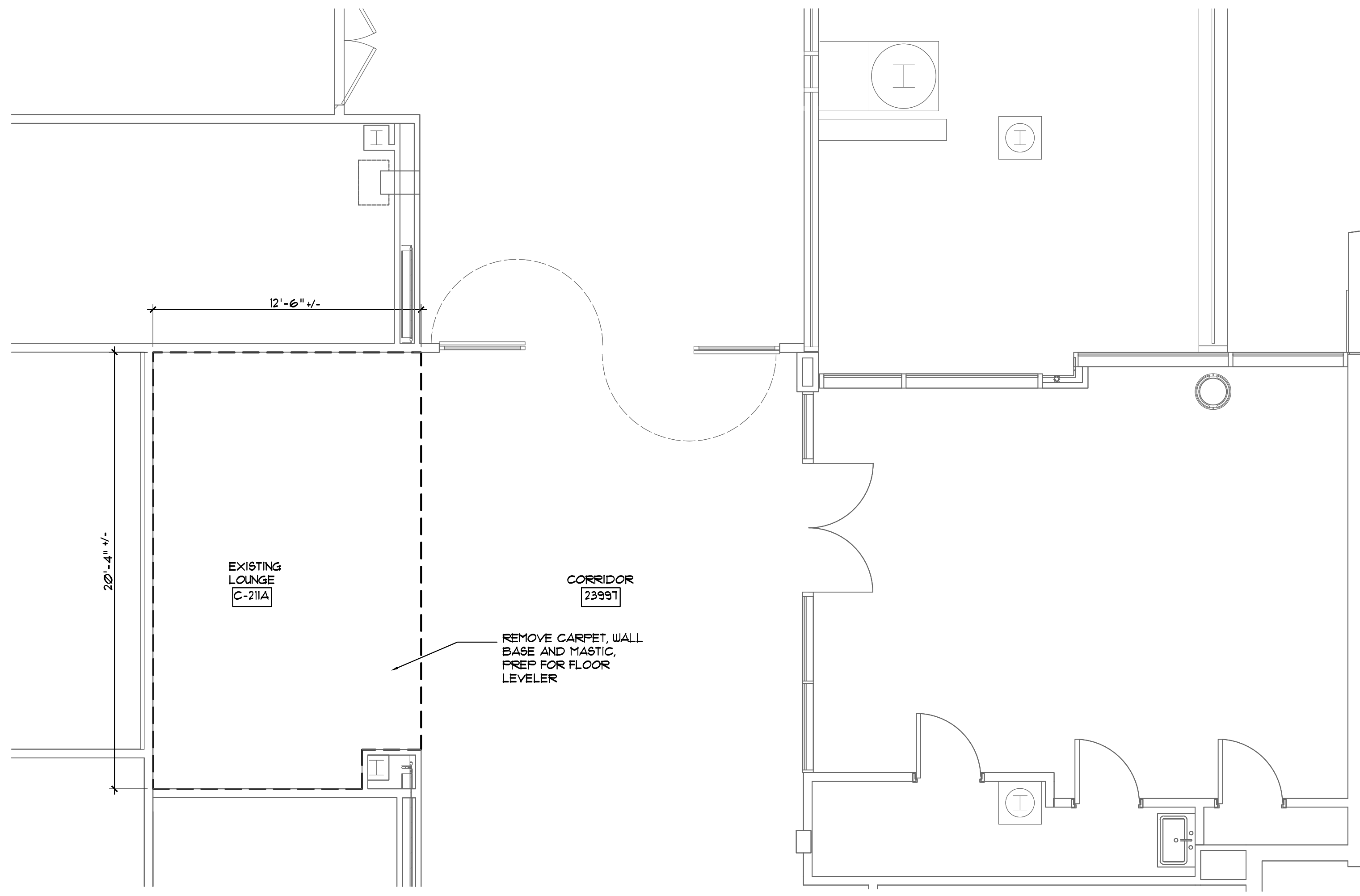
Vendor Address: _____ City, State, Zip: _____

Phone Number: _____ Fax Number: _____

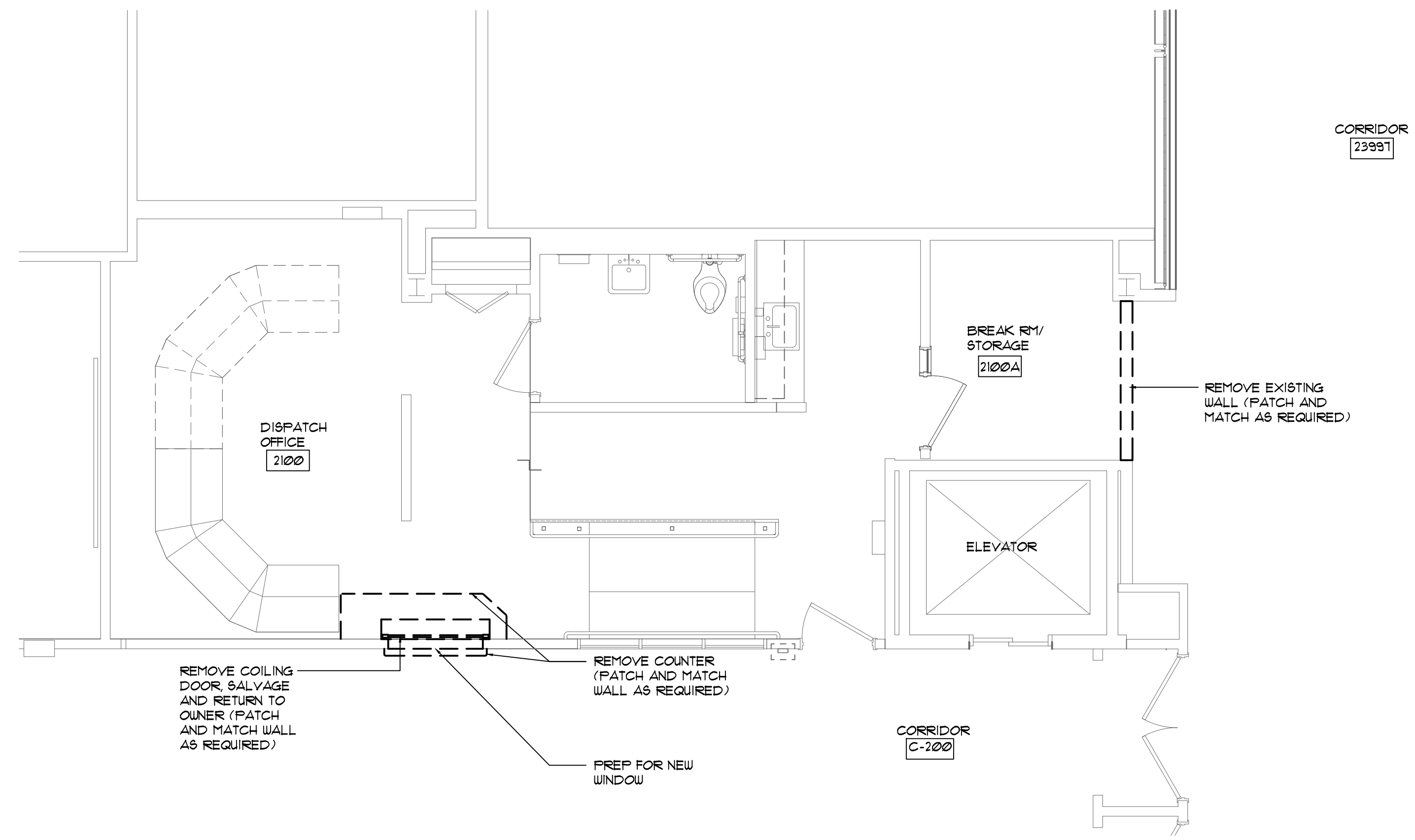
Email Address: _____

Signature

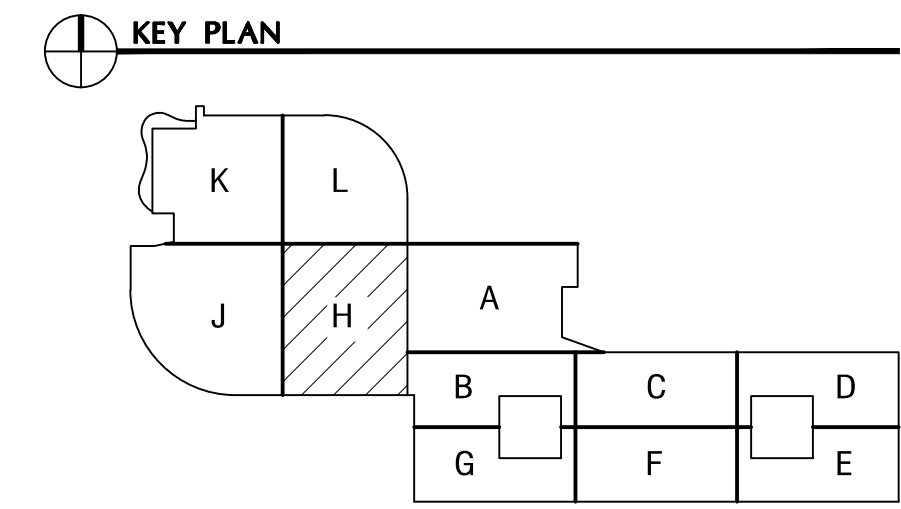
Bidder/Company Official: _____ Date: _____

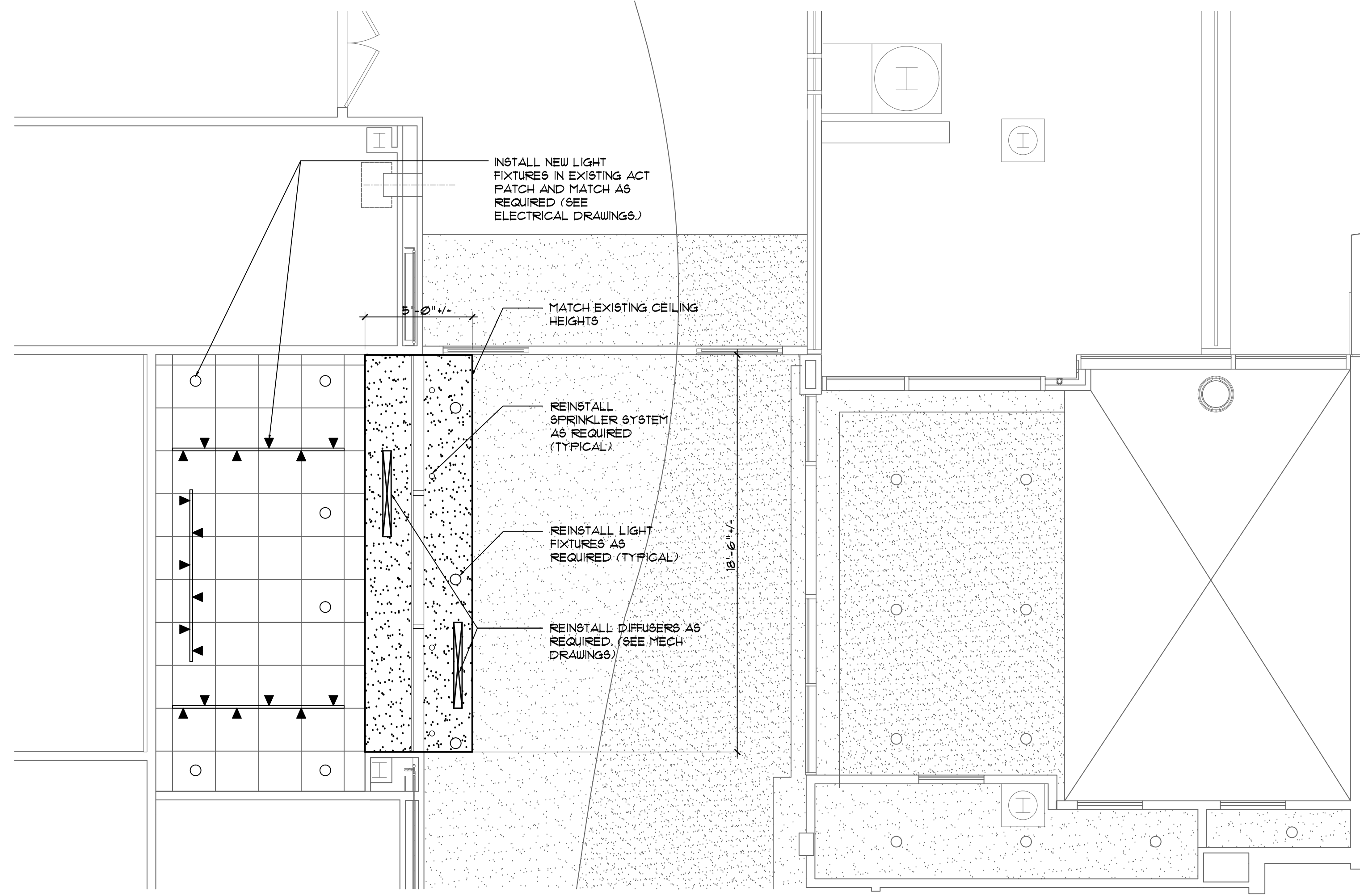


1 FLOOR PLAN
 1/4" = 1'-0"

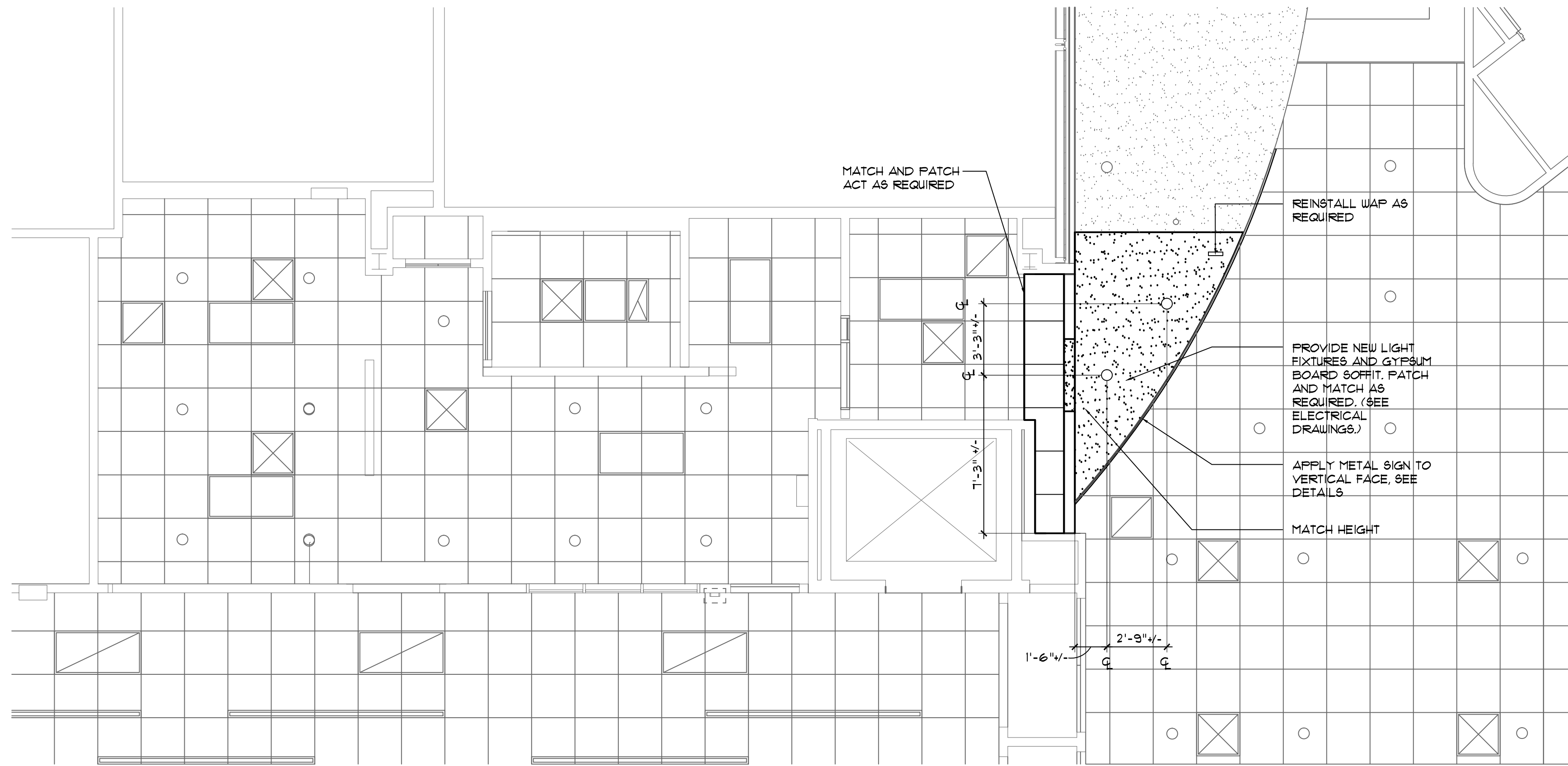


2 FLOOR PLAN
 1/4" = 1'-0"

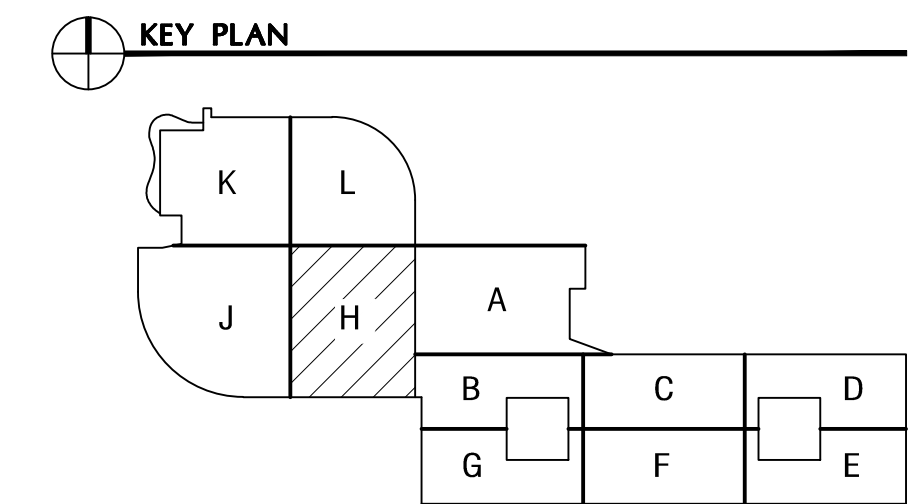


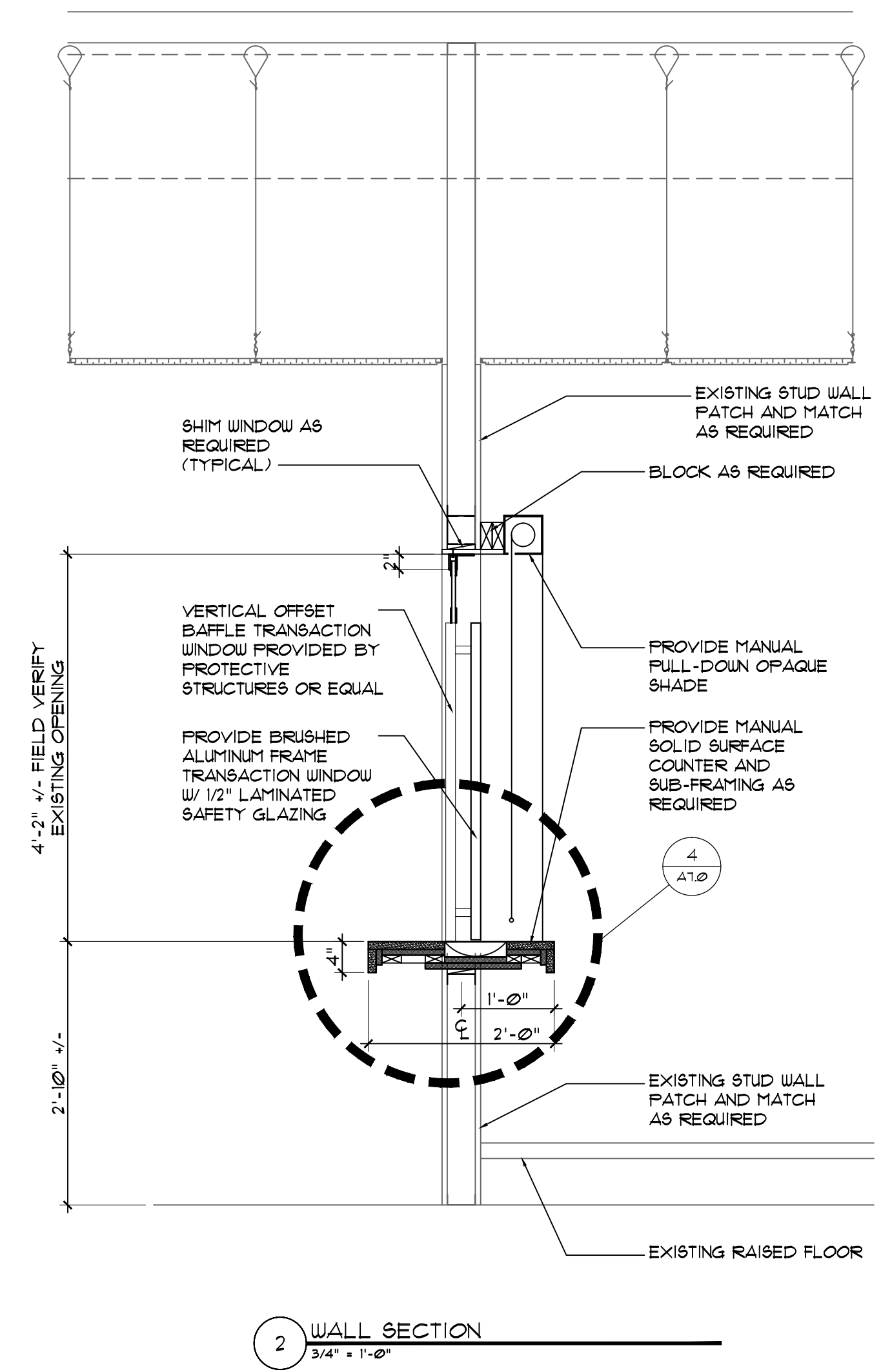
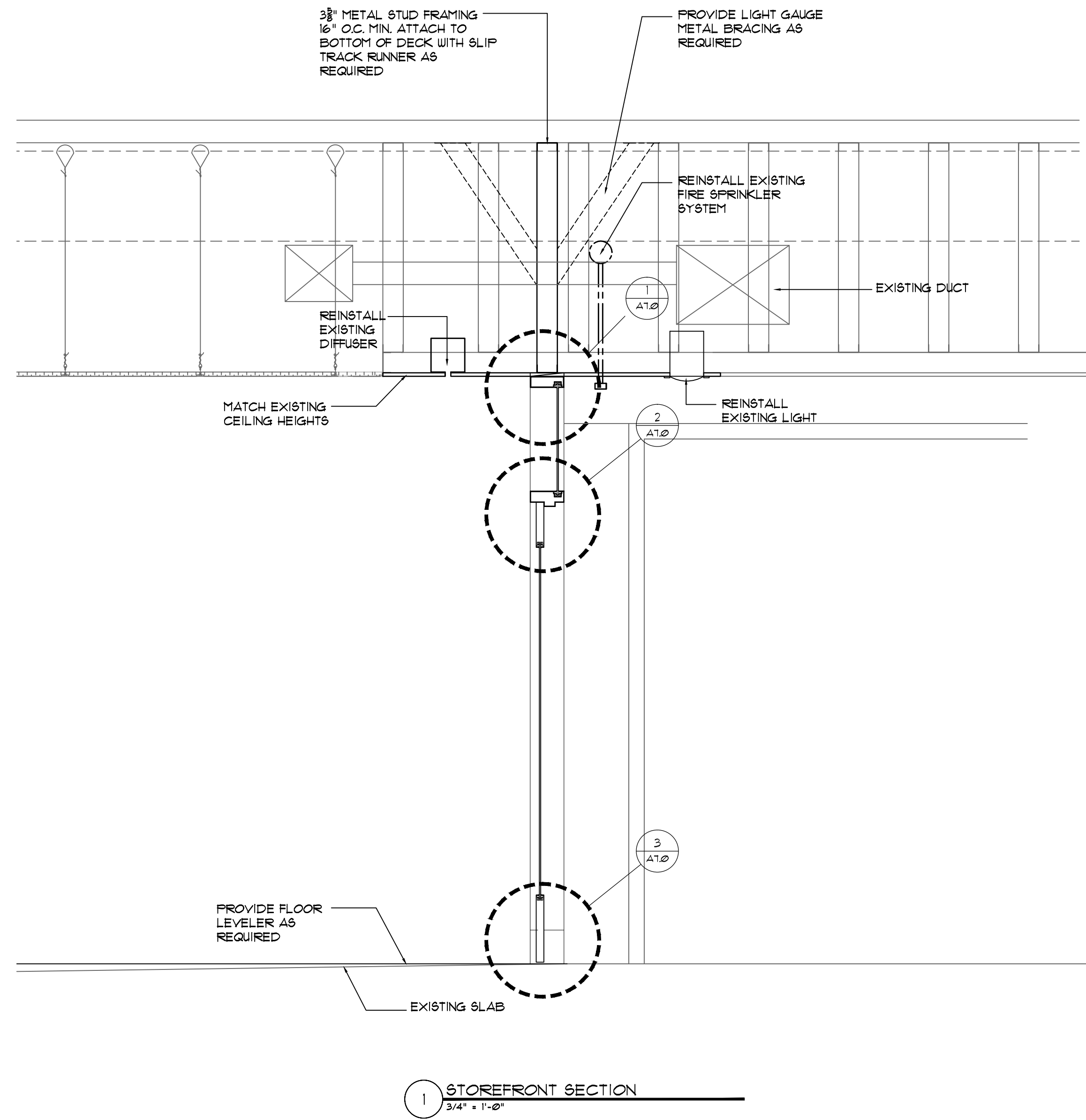


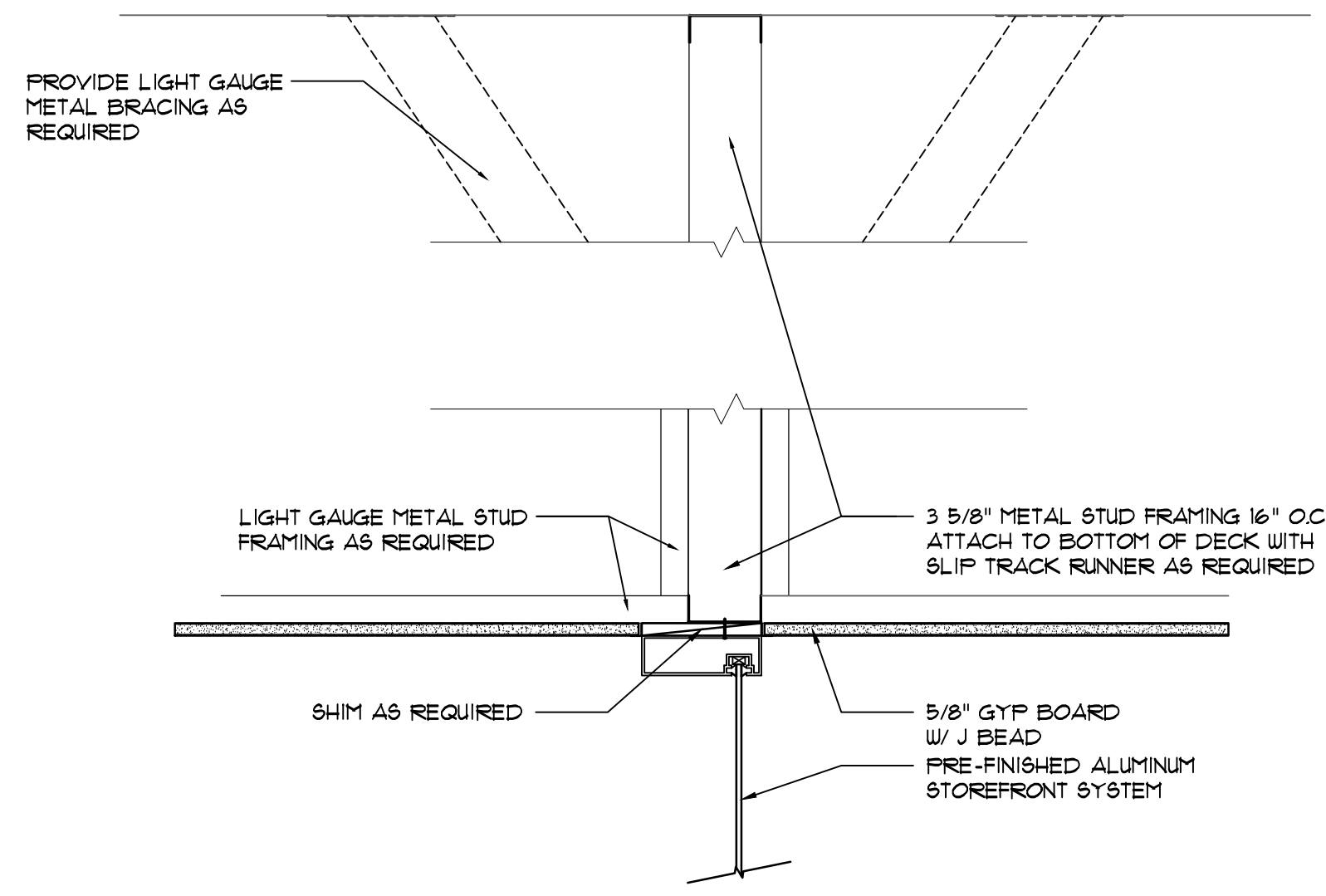
1 REFLECTED CEILING PLAN
 1/4" = 1'-0"



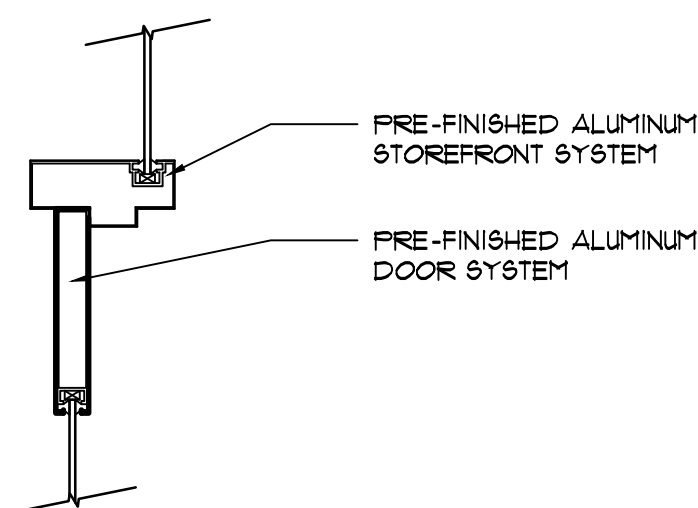
2 REFLECTED CEILING PLAN
 1/4" = 1'-0"



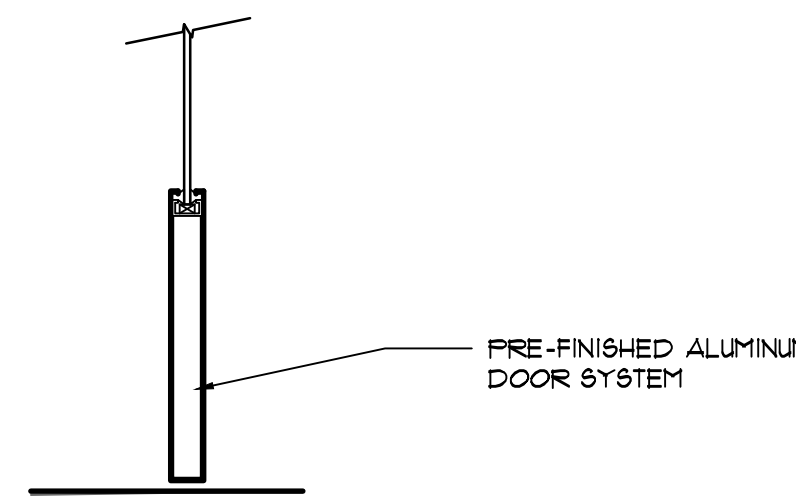




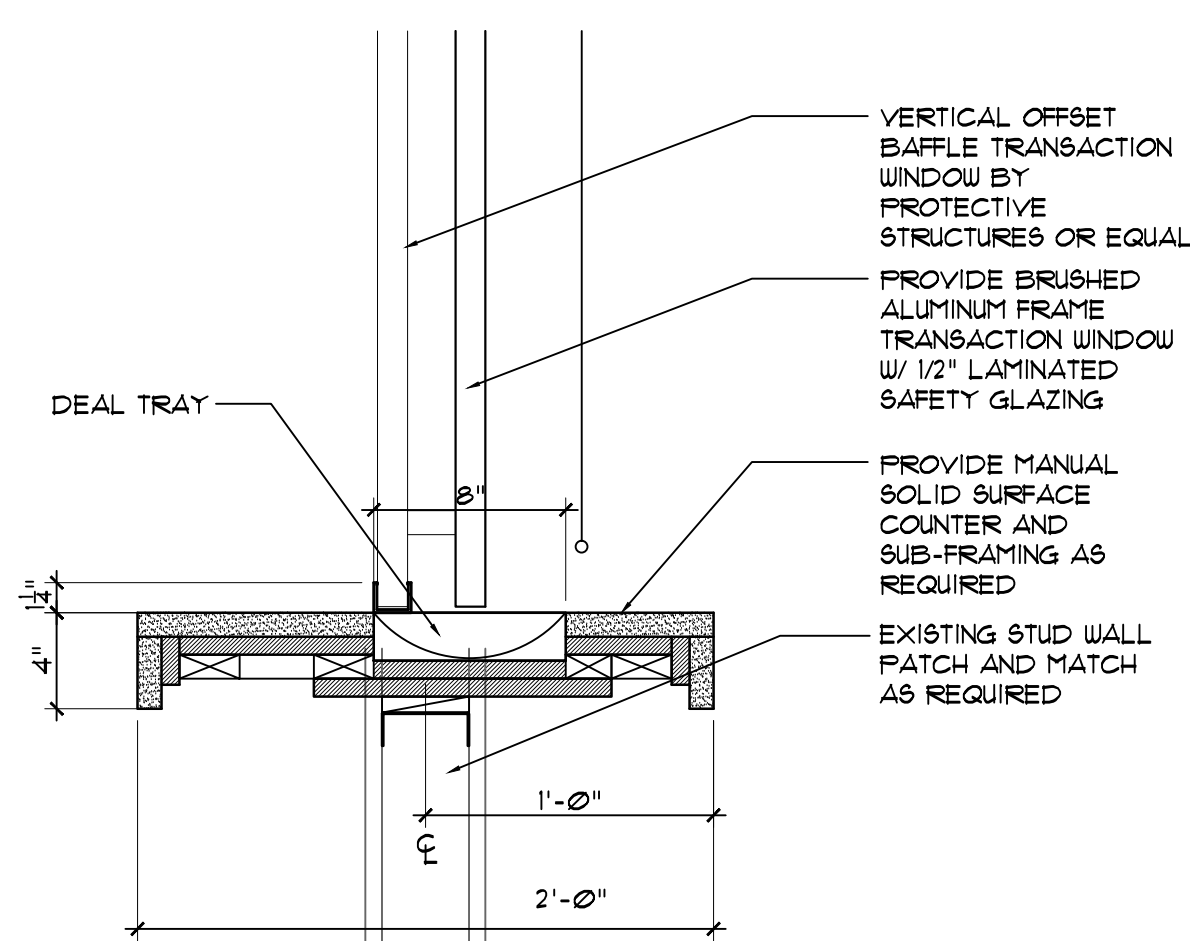
1 DOOR DETAIL
1 1/2" x 1'-0"



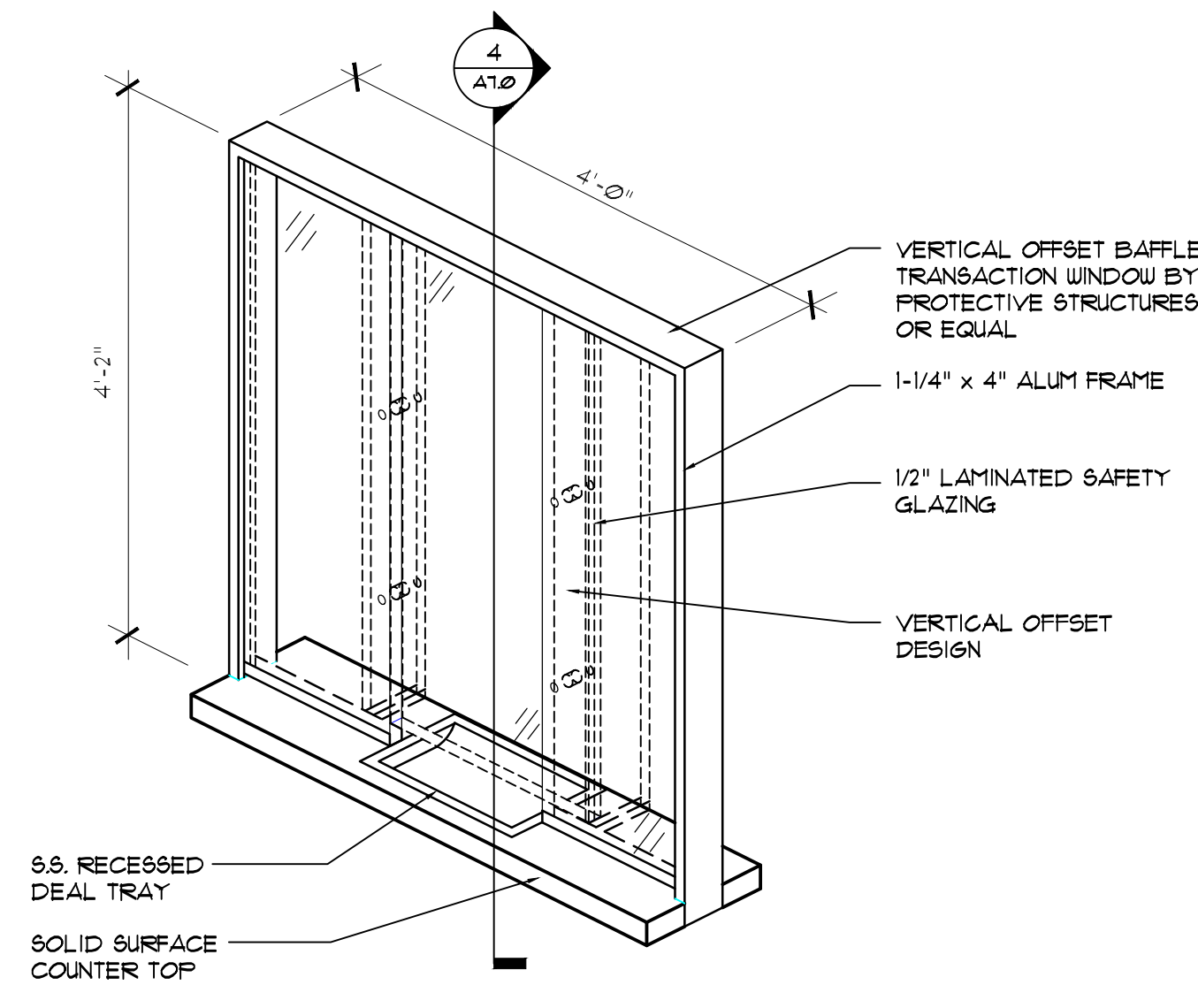
2 DOOR DETAIL
1 1/2" x 1'-0"



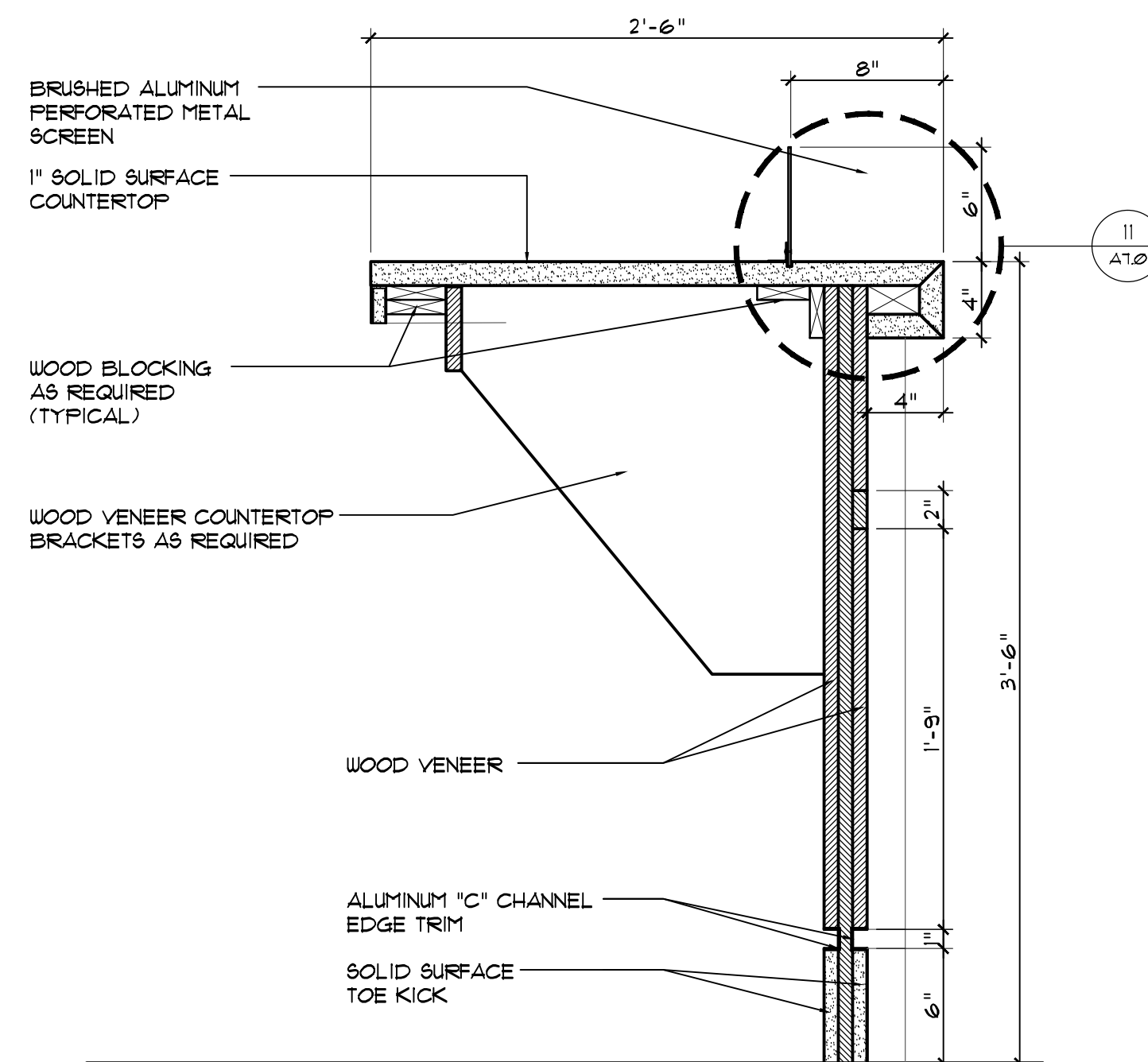
3 DOOR DETAIL
1 1/2" x 1'-0"



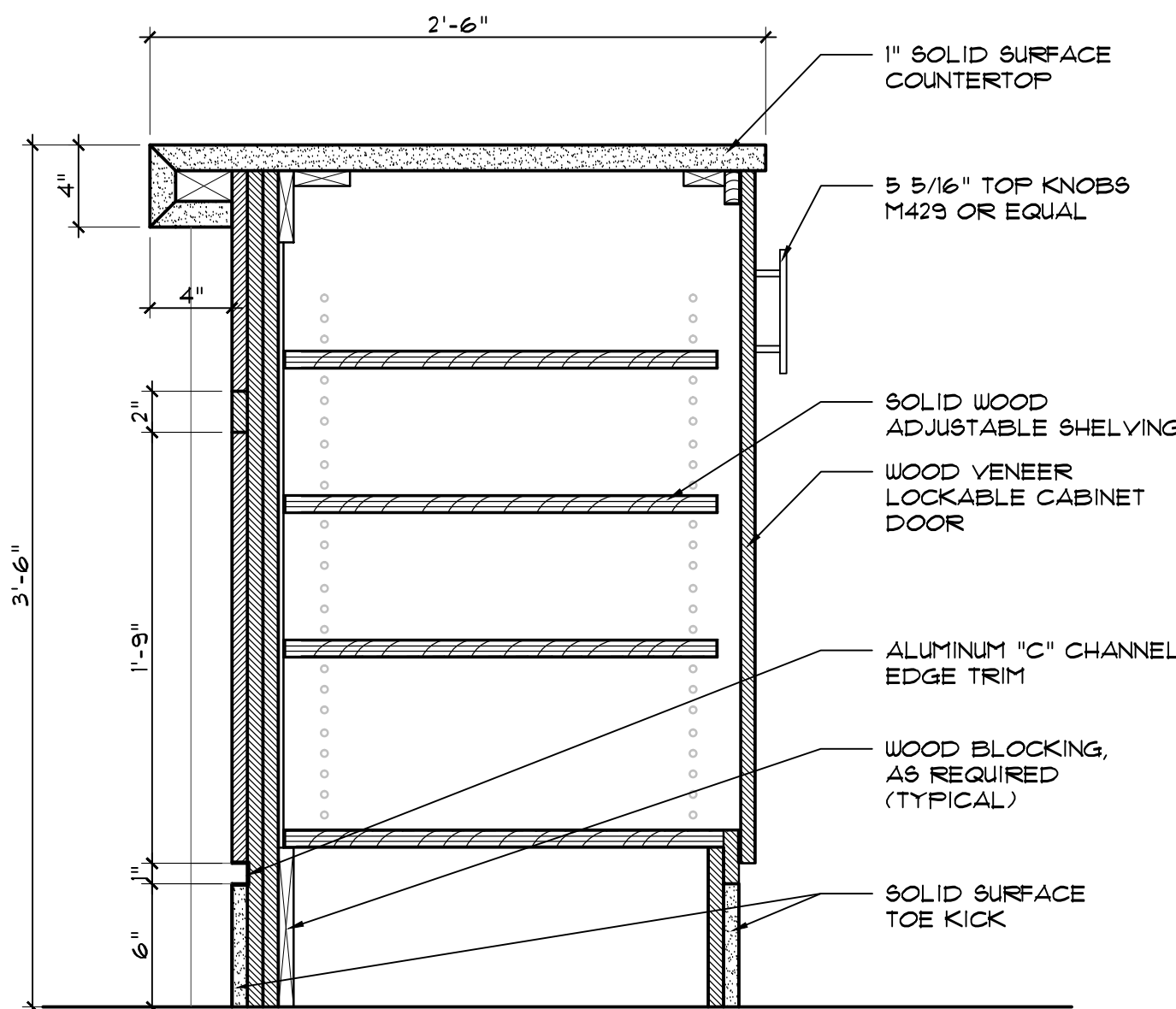
4 TRANSACTION COUNTER DETAIL
1 1/2" x 1'-0"



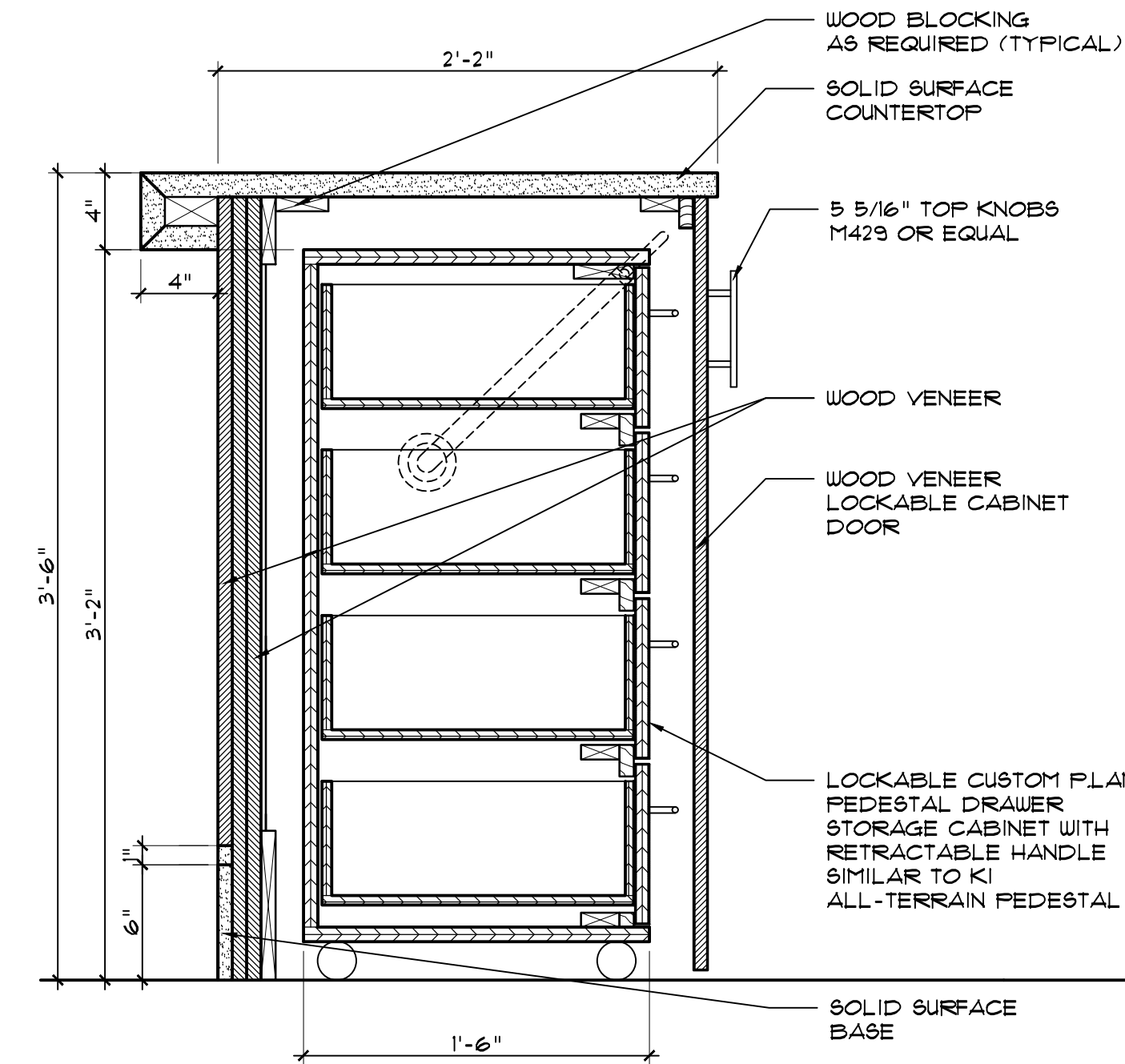
5 VERTICAL OFFSET TRANSACTION WINDOW
3/4" x 1'-0"



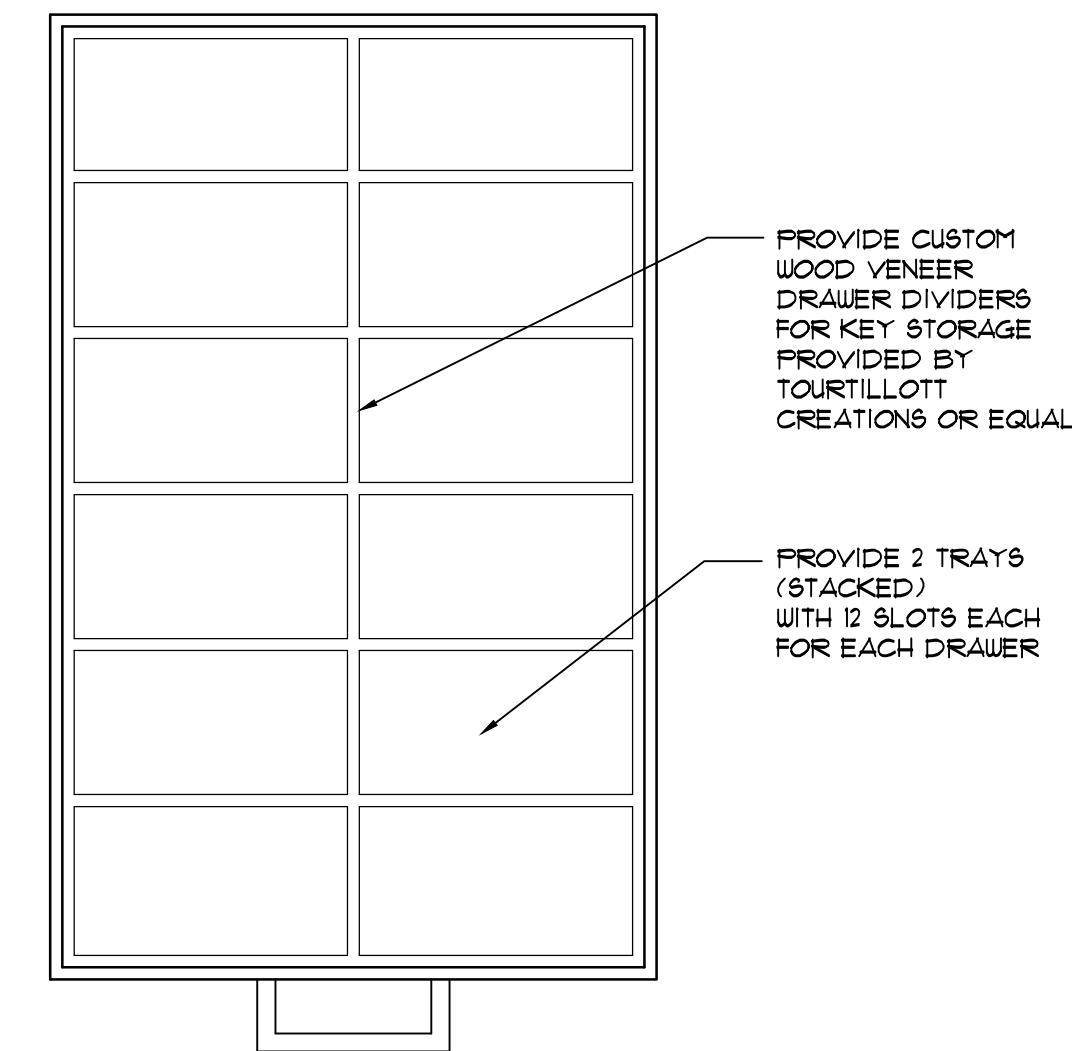
6 DESK DETAIL
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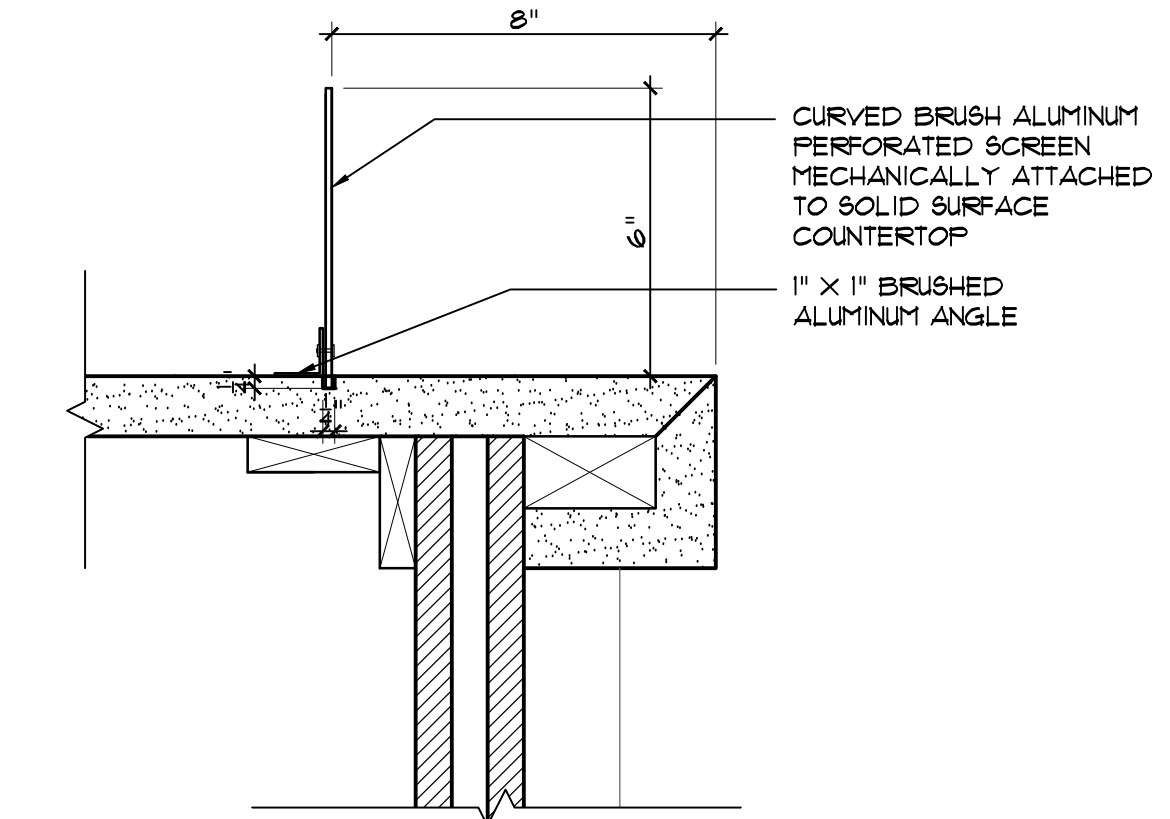
7 DESK DETAIL
1 1/2" x 1'-0"



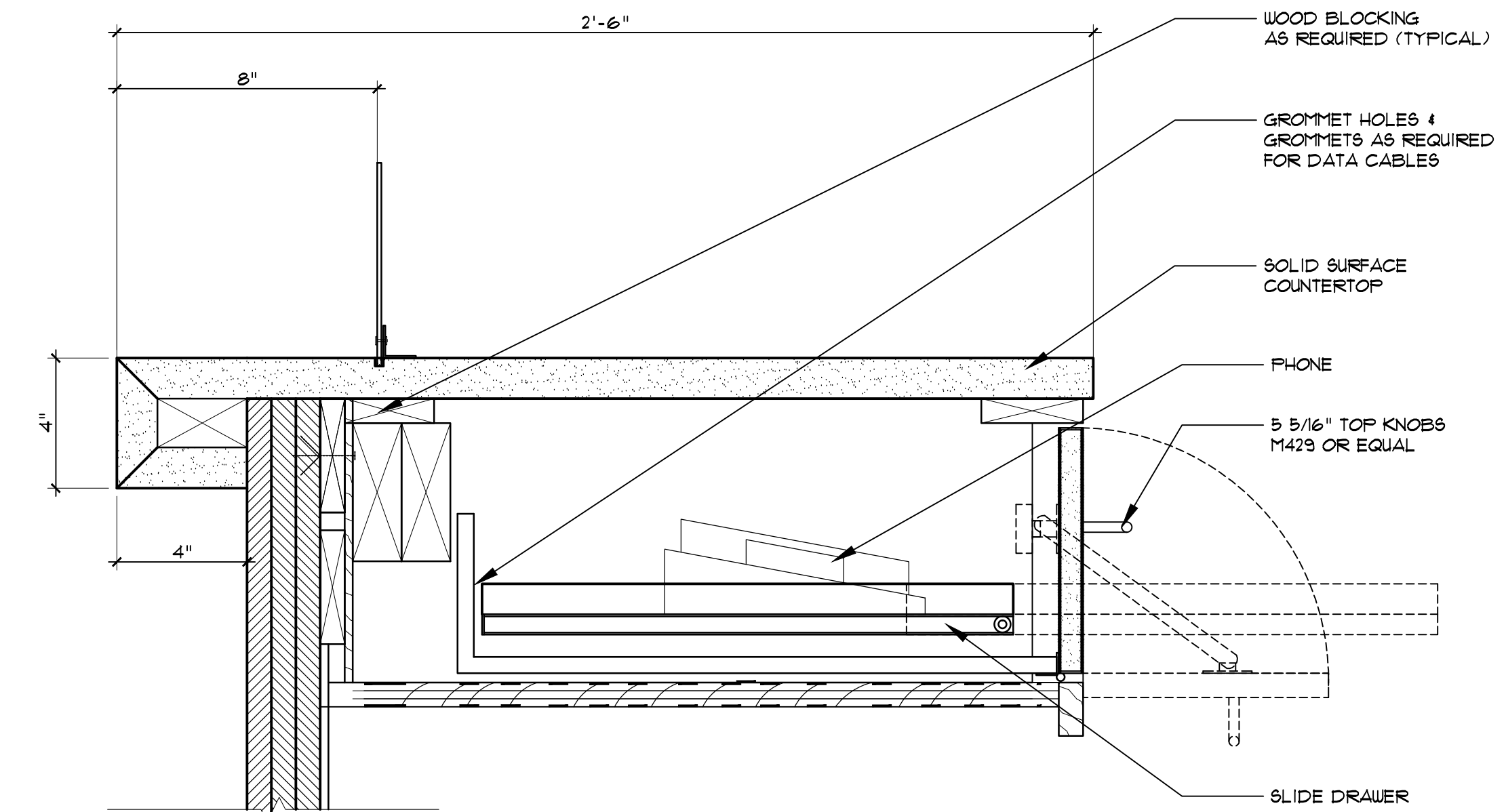
8 DESK DETAIL
1 1/2" x 1'-0"



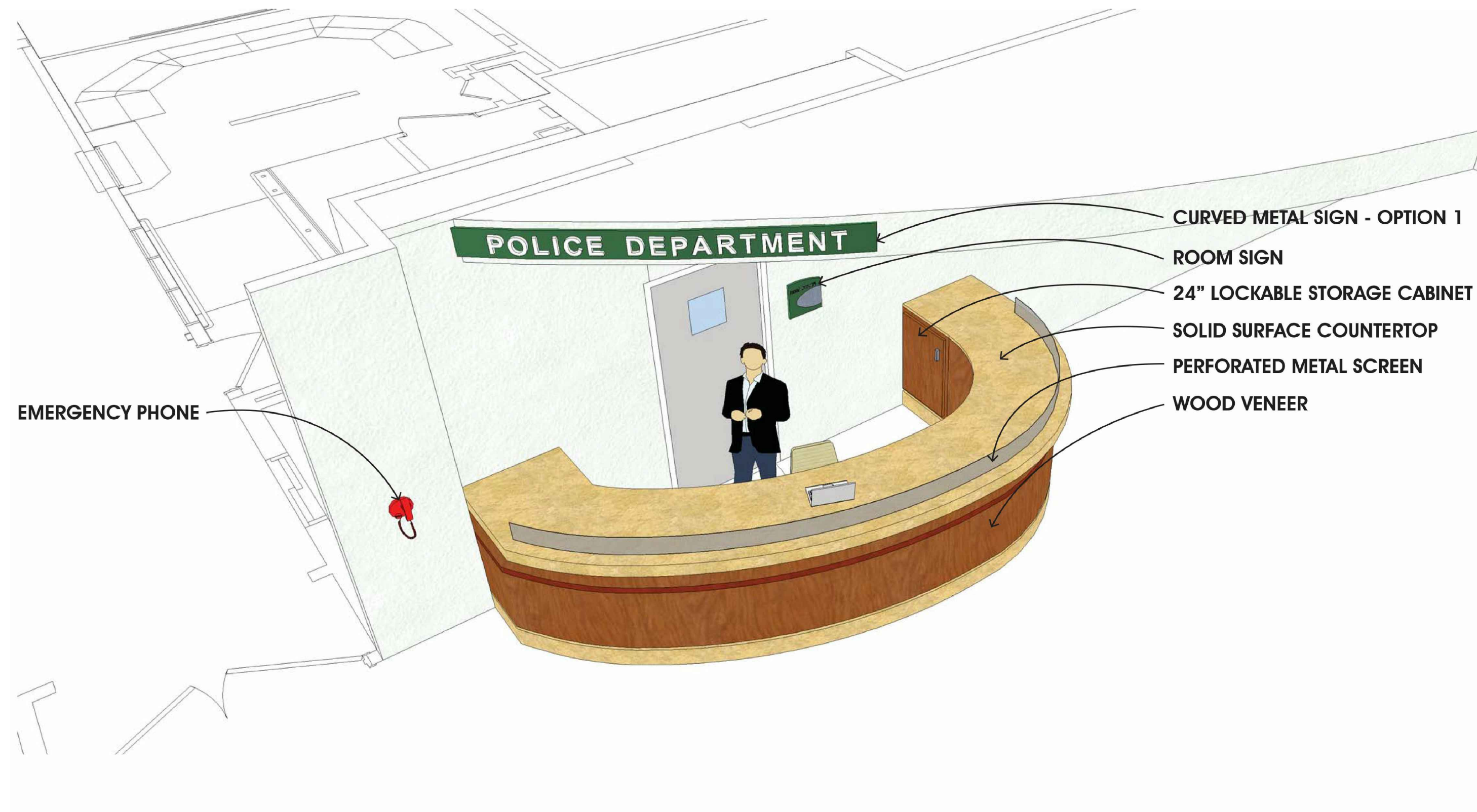
9 KEY STORAGE DRAWER DETAIL
N.T.A.



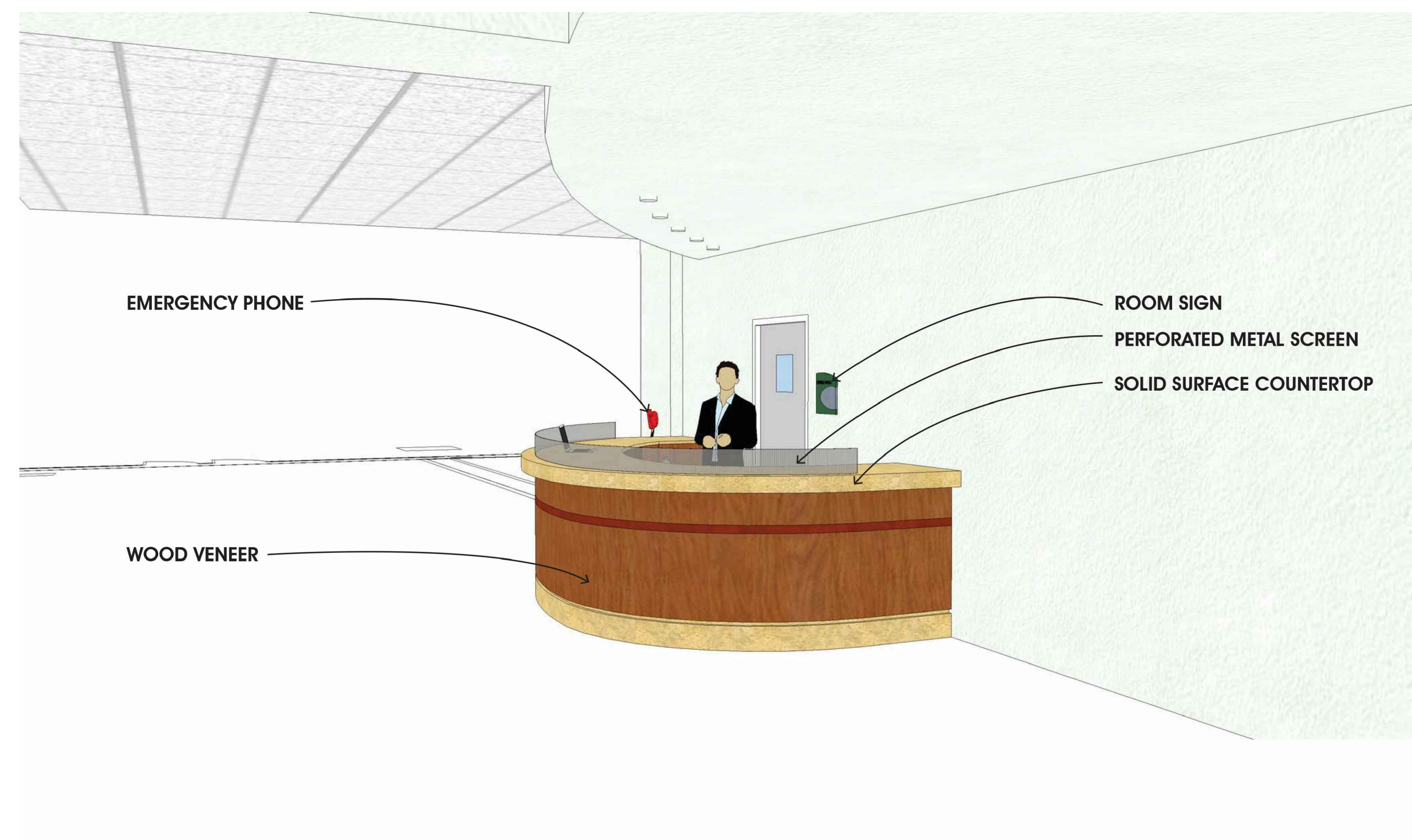
11 SCREEN DETAIL
3" x 1'-0"



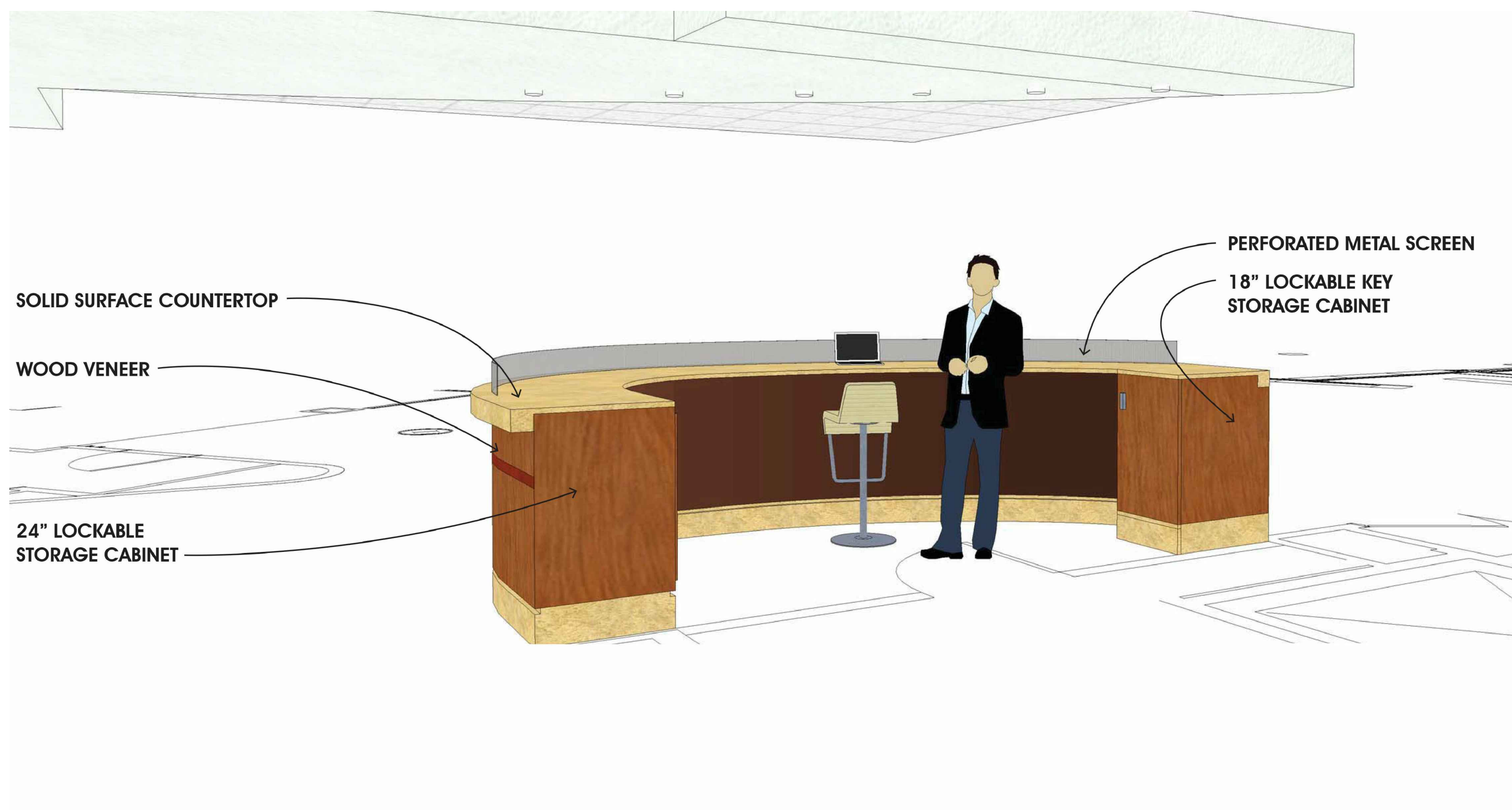
10 PHONE BOX DETAIL
3" x 1'-0"



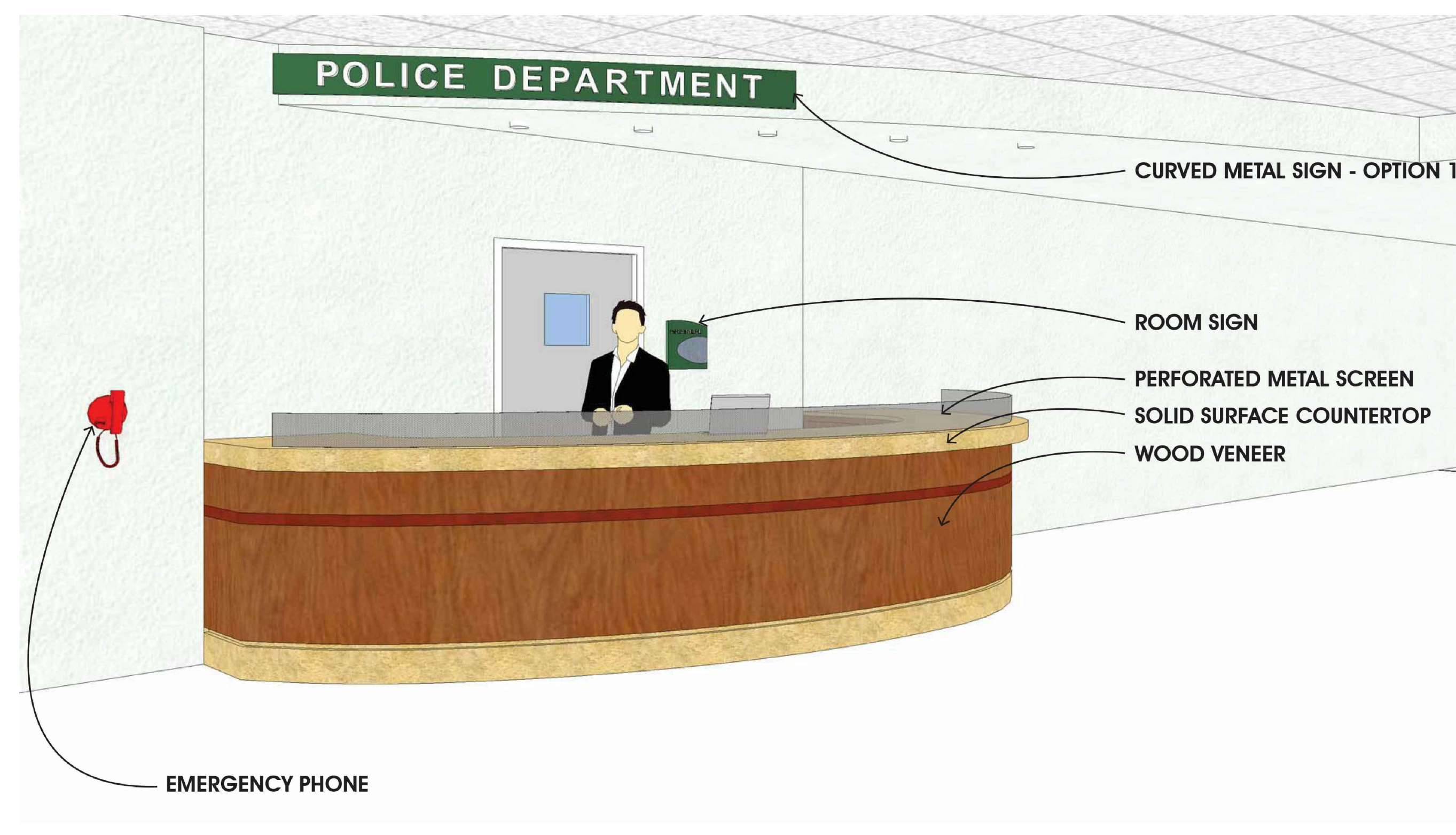
1 PERSPECTIVE
NTA



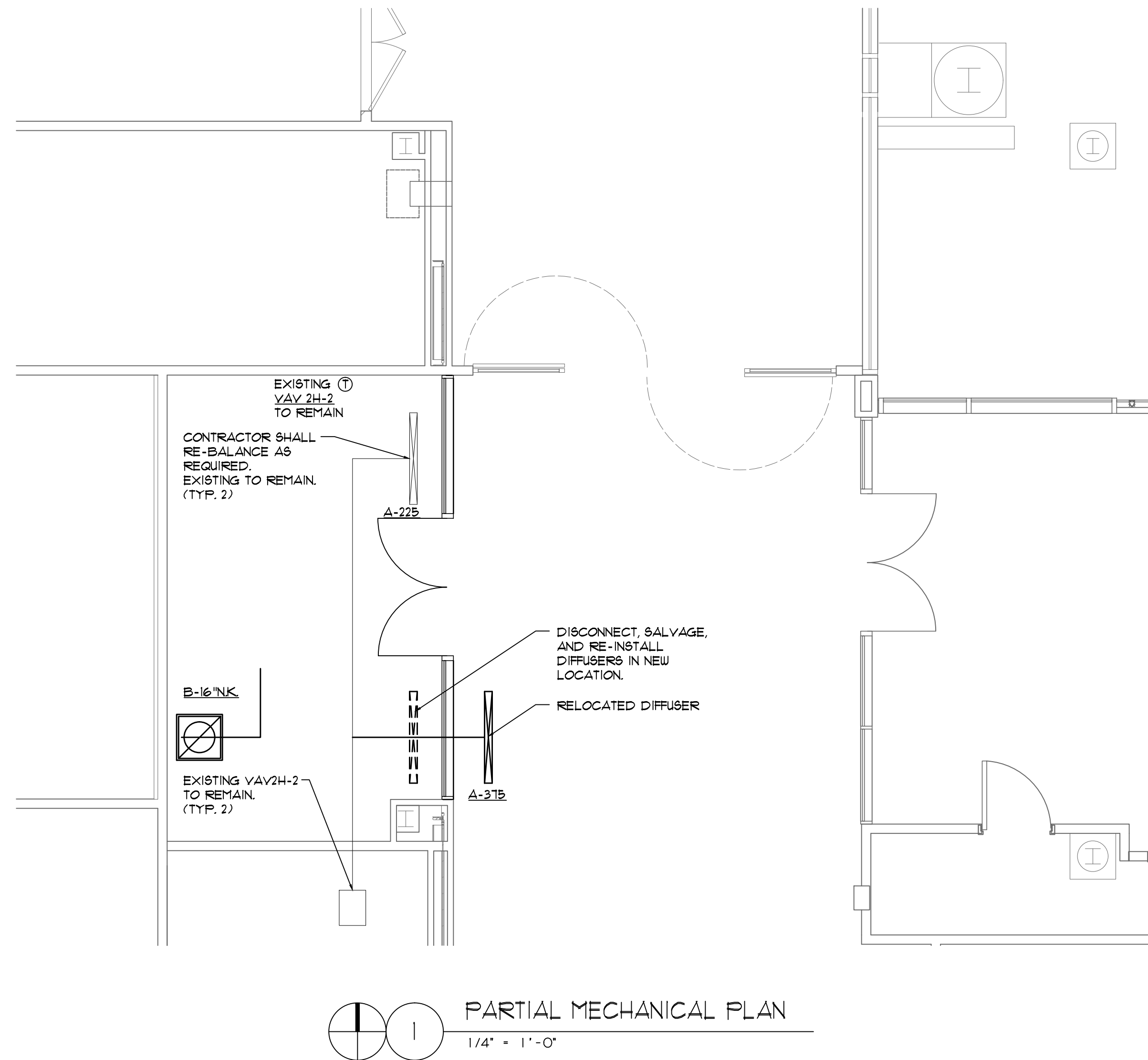
2 PERSPECTIVE
NTA



3 PERSPECTIVE
NTA



4 PERSPECTIVE
NTA



PARTIAL MECHANICAL PLAN
 1/4" = 1'-0"

SPRINKLER NOTES:

- DRAWING IS INTENDED TO PROVIDE SCOPE ONLY. DESIGN AND CALCULATION OF THE SYSTEM IS TO BE BY SPRINKLER CONTRACTOR IN ACCORDANCE WITH NFPA AND THE LOCAL FIRE PREVENTION DEPT. LOCATION AND NUMBER OF HEADS MUST BE VERIFIED BY THE SPRINKLER CONTRACTOR.
- SPRINKLER CONTRACTOR SHALL PREPARE SHOP DRAWINGS AND SUBMIT THEM TO THE USLE / WOODRIDGE FIRE DEPARTMENT FOR APPROVAL PRIOR TO ORDERING, PURCHASING, MANUFACTURING AND INSTALLING ANY PORTION OF THE SPRINKLER SYSTEM.
- ALL PIPING AND SPRINKLER HEADS SHALL BE INSTALLED AS PER NFPA-13, LOCAL CODES, AND ASTM-A120 STANDARDS.
- ALL MATERIALS, WHERE APPLICABLE, SHALL BE U.L. LISTED AND FACTORY MUTUAL APPROVED FOR USE IN AUTOMATIC SPRINKLER SYSTEMS.
- ALL PIPES SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE UTILIZING HANGERS, MATERIALS, AND METHODS PER NFPA 13. PIPING SUPPORT SHALL BE IN ACCORDANCE WITH NFPA 13.
- REDUCERS, UNION, VALVES, HANGERS, SLEEVED THROUGH WALLS AND FLOORS, SPECIALTIES AND OTHER MISCELLANEOUS ITEMS NOT SHOWN ON DRAWINGS SHALL BE FURNISHED BY SPRINKLER CONTRACTOR AS REQUIRED.
- ELECTRIC ALARM DEVICES AND SUPERVISORY DEVICES FOR THE MONITORING OF THE SPRINKLER SYSTEM SHALL BE INSTALLED BY THE FIRE PROTECTION CONTRACTOR. ALL WIRING OF THE DEVICES IS THE RESPONSIBILITY OF OTHERS.
- CHECK AND CONSULT ALL TIMES THE LATEST ARCHITECTURAL, MECHANICAL, ELECTRICAL AND EQUIPMENT DRAWINGS FOR EXACT LOCATION OF EQUIPMENT, LIGHTING FIXTURES, CEILING AIR DIFFUSERS, DUCTWORK, ETC. RE-ROUTE ANY PORTION OF SPRINKLER PIPING AS REQUIRED IN FIELD BY ARCHITECTURAL OR OTHER REVISIONS TO AVOID INTERFERENCES.
- PROVIDE DRY PIPE SPRINKLER SYSTEM ACCORDING TO NFPA 13.
- CONTRACTOR TO BE LICENSED AND SHALL PROVIDE P.E. STAMP FOR PERMIT.
- ALL UNDERGROUND LINES MUST HAVE 10' HEAD TEST AND BE INSPECTED BY CITY.
- CONTRACTOR SHALL MODIFY AND ADD NEW SPRINKLER HEADS IN THE AREA OF WORK AS REQUIRED PER NFPA 13.

FIRE PROTECTION NOTES:

- AREAS SHOWN: LIGHT HAZARD, 0.10 GPM OVER 1,500 SQ. FEET FIELD-FIT PENDANT HEADS TO CENTER OF CEILING TILES.
- LINE PIPING: BLACK STEEL SCHEDULE 40 PIPE, MANUFACTURED TO ASTM-A795, TYPE E, GRADE A, STANDARDS. FITTINGS SHALL BE VICTALIC "FIT" FITTINGS, UL/L/FM RATED TO 175 PSI FOR FIRE PROTECTION SERVICE. GASKETS SHALL BE GRADE E EPDM RUBBER COMPOUND, RATED AT -30F TO +150F. SCREWED FITTINGS SHALL BE CAST IRON THREADED, CLASS 125 (STANDARD), MANUFACTURED PER ANSI B16.4, U.L. LISTED FOR FIRE PROTECTION TO 175 PSI.
- MAIN PIPING: BLACK STEEL SCHEDULE 10 PIPE, MANUFACTURED TO ASTM-A135 STANDARDS.
- RISER NIPPLES & STARTER PIECES: BLACK STEEL SCHEDULE 40 PIPE, MANUFACTURED TO ASTM-A135 STANDARDS.
- GROOVED COUPLINGS: VICTALIC "FIRELOCK" RIGID COUPLINGS, UL/FM APPROVED TO 300 PSI FOR FIRE PROTECTION SERVICE. GASKETS SHALL BE GRADE E (TYPE A) EPDM RUBBER COMPOUND, RATED AT -30F TO +150F.
- GROOVED FITTINGS: VICTALIC "FIRELOCK" FITTINGS, UL/FM APPROVED TO 300 PSI FOR FIRE PROTECTION SERVICE.
- FLANGED FITTINGS: CAST IRON, CLASS 125 (STANDARD), MANUFACTURED PER ANSI B16.1 AND MARKED 125. FLANGES ARE FACED AND DRILLED AMERICAN NATIONAL STANDARD. UL LISTED FOR FIRE PROTECTION TO 175 PSI.
- HANGERS: 3/8" THREADED ROD, CLAMP TO STRUCTURE, UNISTRUT TRAPEZE AS REQUIRED.
- PROVIDE SCHEDULE 40 SLEEVES AT WALL PENETRATIONS AND SEAL HYDROSTATICALLY. TEST COMPLETED SYSTEM AT 200 PSI FOR 2 HOURS. ALARM WIRING AND CENTRAL SUPERVISION FOR FLOW & TAMPER SWITCHES TO BE PROVIDED BY OTHERS. PROVIDE 115 VOLT FLOW & TAMPER SWITCH DEVICES.
- COORDINATE WORK WITH COD FIRE PROTECTION MONITORING. PROVIDE UPDATED SYSTEM REVISIONS INCLUDING GRAPHICS, ETC. AS REQUIRED.

GENERAL MECHANICAL NOTES

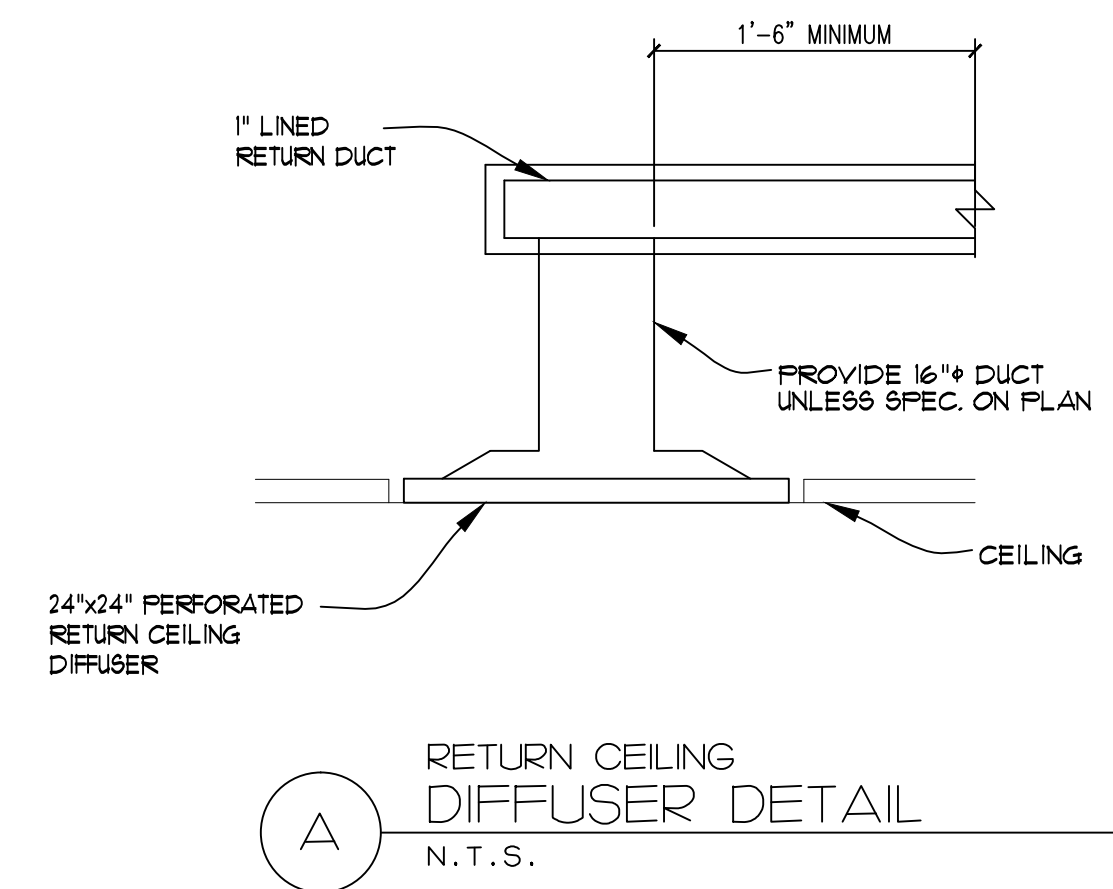
- IT IS THE INTENT OF THESE DRAWINGS AND ATTACHED ARCHITECTURAL AND MECHANICAL SPECIFICATIONS THAT THE CONTRACTOR SHALL PROVIDE, DELIVER AND INSTALL ALL HEATING, VENTILATING AND AIR-CONDITIONING SYSTEMS, DUCTWORK, DIFFUSERS, REGISTERS, GRILLES, LOUVERS, LINING, INSULATION, EXHAUST AIR SYSTEMS, ACCESSORIES, TEMPERATURE CONTROL SYSTEMS, SPECIALTIES, PIPING AND WIRING, WATER SYSTEMS AND DISTRIBUTION PIPING, TOOLS AND EQUIPMENT FOR COMPLETE INSTALLATION OF ALL HVAC SYSTEMS, GUARANTEE AND SERVICE.
 - THIS CONTRACTOR SHALL BE RESPONSIBLE TO INSTALL ALL ITEMS SPECIFIED USING CONSTRUCTION METHODS THAT WILL PROTECT AT ALL TIMES PROPERTY AND PREVENT BODILY INJURY AND/OR DEATH. SPECIAL ATTENTION AND PRECAUTION SHALL BE PAID BY THE CONTRACTOR IN SELECTING THE SAFEST METHODS OR MEANS FOR THE INSTALLATION.
 - THIS ARCHITECT/ENGINEER HAS NO CONTRACTUAL DUTY TO CONTROL, THE SAFEST METHODS OR MEANS OF THE WORK, JOB SITE RESPONSIBILITIES, SUPERVISION, OR TO SUPERVISE SAFETY AND DID NOT VOLUNTARILY ASSUME ANY SUCH DUTY OR RESPONSIBILITY.
 - ALL MECHANICAL WORK SHALL BE EXECUTED IN STRICT ACCORDANCE WITH FEDERAL, STATE, AND LOCAL CODES, ACCEPTED BY THE ARCHITECT AND LEFT IN PERFECT OPERATING CONDITION.
 - CONTRACTOR SHALL CONSULT AND CHECK AT ALL TIMES THE LATEST ARCHITECTURAL, ELECTRICAL, PLUMBING AND EQUIPMENT DRAWINGS FOR EXACT LOCATION OF EACH DIFFUSER, REGISTER, GRILLE, LOUVER, DUCT AND EQUIPMENT.
 - AFTER COMPLETION OF THE PROJECT, SUBMIT THREE SETS OF "AS BUILT" SHOP DRAWINGS AND ALL MANUFACTURERS WARRANTIES, GUARANTIES AND INSTRUCTIONS OF ALL INSTALLED SYSTEMS AND EQUIPMENT PROPERLY BOUND AND LABELED FOR THIS PROJECT. PROVIDE SERVICE CONTACT INFORMATION AND WARRANTY LETTER FROM MECHANICAL INSTALLER ON THE COVER SHEET OF THE MANUALS.
 - CONTRACTOR SHALL PROVIDE ALL SUPPLY / RETURN / EXHAUST DIFFUSERS AND GRILLES WITH VOLUME DAMPERS AT BRANCH TAKE-OFF.
 - ALL MATERIAL SHALL COMPLY WITH THE REQUIREMENTS OF SECTION 602 IN THE IMC 2009.
 - FOR CLARITY, THESE DOCUMENTS DO NOT NECESSARILY SHOW EVERY OFFSET, FITTING, VALVE, ETC.
 - UNLESS OTHERWISE NOTED ON THE ARCHITECTURAL DRAWINGS, CONTRACTOR SHALL CUT, PATCH, AND MATCH EXISTING BUILDING CONSTRUCTION TO REMOVE AND INSTALL WORK AS REQUIRED.
 - PROVIDE TEST AND BALANCE REPORT.
 - COORDINATE WORK WITH COD HVAC CONTROLS MONITORING. PROVIDE UPDATED SYSTEM REVISIONS INCLUDING GRAPHICS, ETC. AS REQUIRED.
- METAL DUCT:**
- ALL DUCTWORK SHALL BE CONSTRUCTED AND INSTALLED IN STRICT ACCORDANCE WITH ASHRAE, SMACNA, AND NFPA STANDARDS AND SHALL COMPLY WITH NFPA 90A BULLETIN, FEDERAL, STATE AND LOCAL CODES. GALVANIZED SHEET ASTM A 653/A 653M AND HAVING G90 COATING DESIGNATION. FABRICATE DUCTS, ELBOWS, TRANSITIONS, OFFSETS, BRANCH CONNECTIONS, AND OTHER CONSTRUCTION ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS".
 - FLEXIBLE DUCT SHALL BE BY FLEXMASTER/TYPE 6B-ACOUSTICAL, INSULATED.

INSULATION SCHEDULE

SERVICE	INSULATION TYPE
ROUND SUPPLY DUCT	2" FLEXIBLE INSULATION
RECTANGULAR RETURN DUCT	1" DUCT LINER

NOTES:

- SLEEVE INSULATION TO HAVE A MINIMUM R-VALUE OF 6 WITH VAPOR BARRIER. INSULATION SHALL HAVE A MAXIMUM FLAME SPREAD RATING OF 25 AND SMOKE-DEVELOPED RATING OF 50 WHEN TESTED IN ACCORDANCE WITH ASTM E84.



GRILLE AND REGISTER SCHEDULE

TAG	DESCRIPTION	NK SIZE	MATERIAL	OBD	MODEL #	MFR	NOTES
A	SALVAGED LINER	-	-	-	-	-	-
B	24"x24" PERFORATED RETURN CEILING DIFFUSER	VARIES	STEEL	NO	PAR	TITUS	1

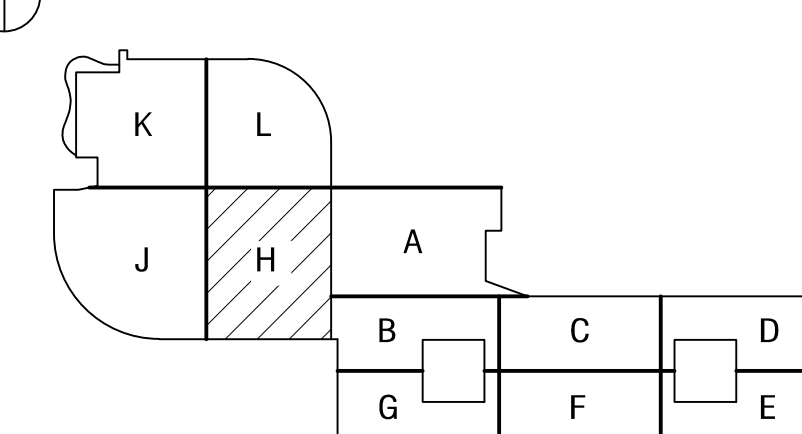
- NOTES:**
- PROVIDE WHITE BAKED ENAMEL FINISH AND PLASTER FRAMES FOR ALL DRYWALL CEILINGS.

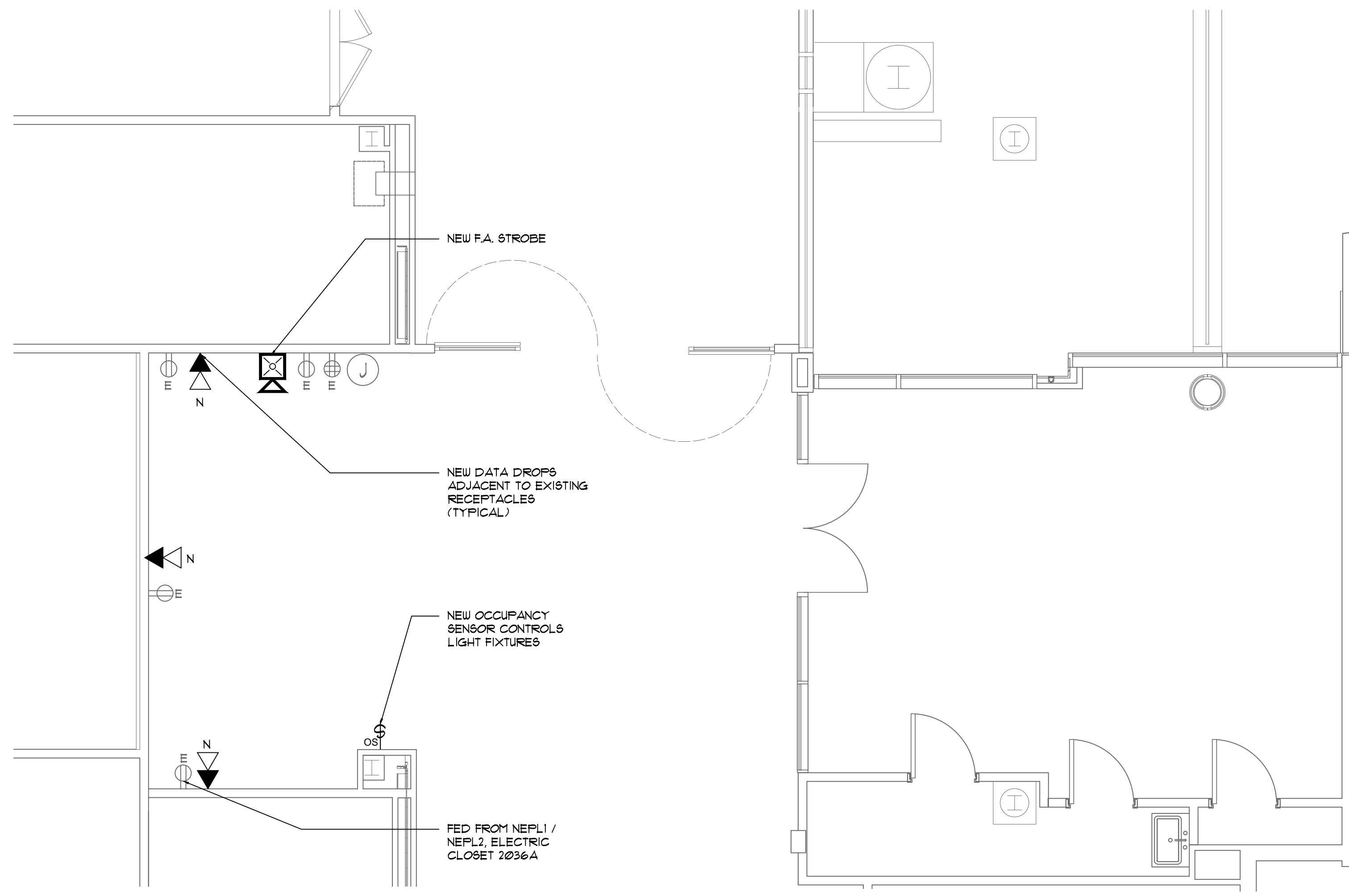
VARIABLE AIR VOLUME TERMINAL SCHEDULE

TAG	LOCATION	PRIMARY HEATING AIRFLOW		PRIMARY COOLING AIRFLOW		INLET SIZE (IN.)	MODEL #
		MAX.	MIN.	MAX.	MIN.		
VAV2H-2	TLR B3	600	-	600	-	-	EXISTING

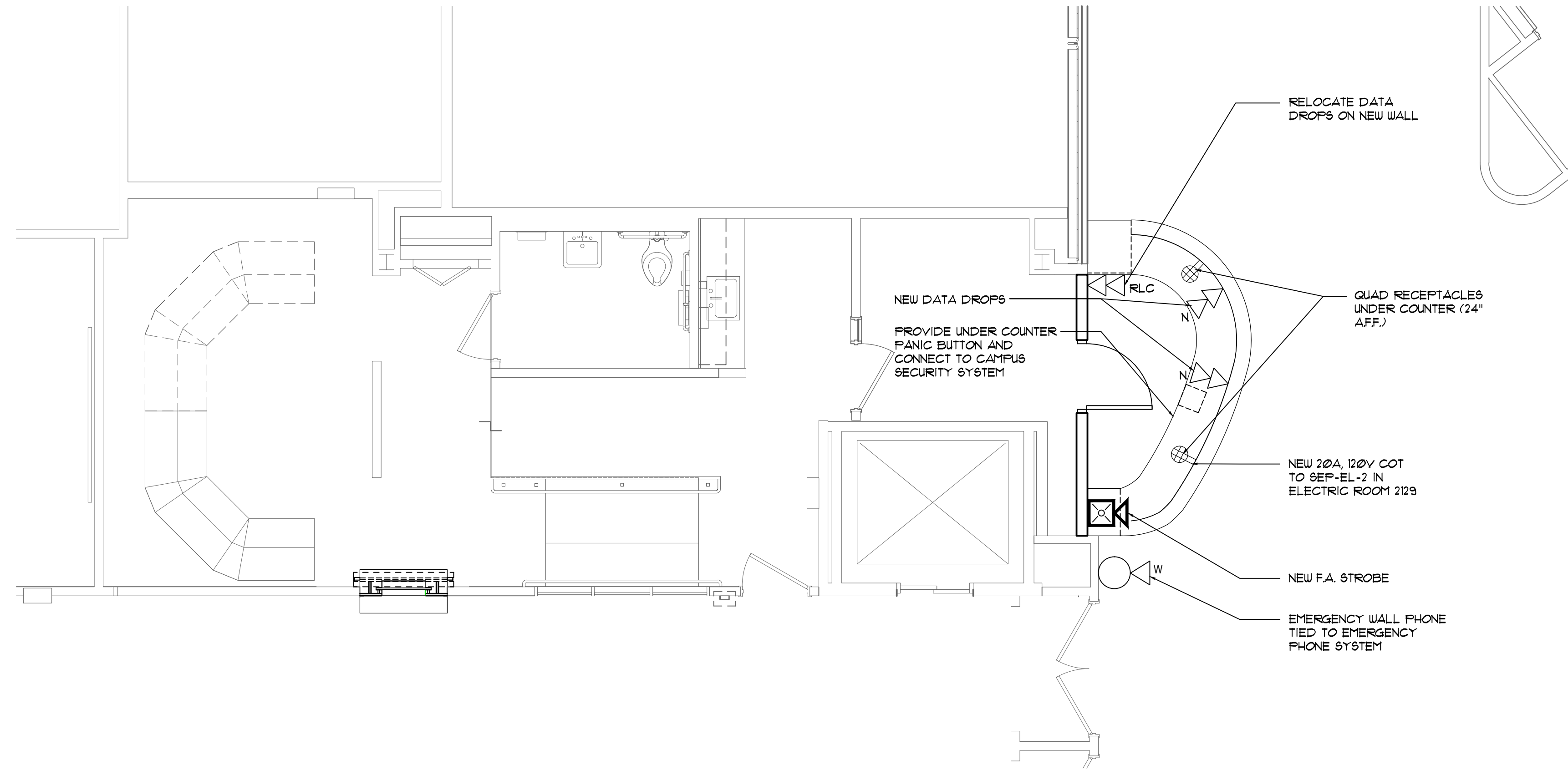
- NOTES:**
- EXISTING TO REMAIN.

KEY PLAN

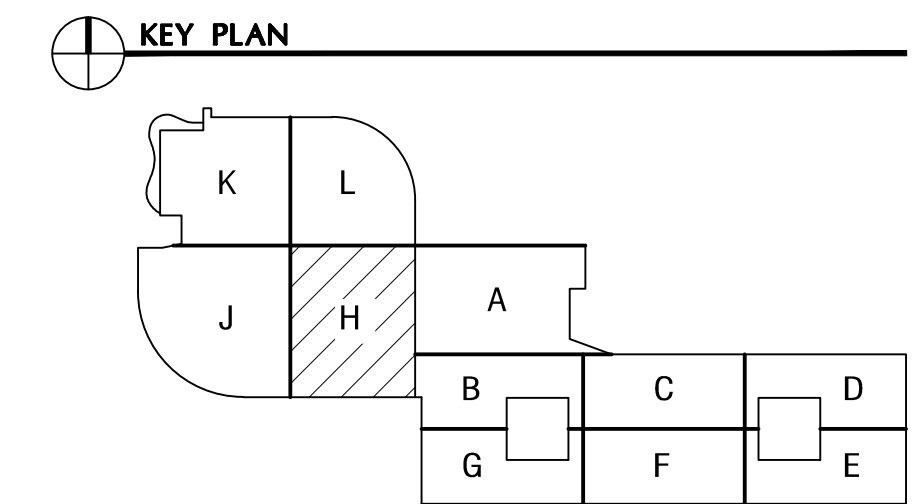




1 POWER 4 SYSTEMS PLAN - NEW
 1/4" = 1'-0"



2 POWER 4 SYSTEMS PLAN - NEW
 1/4" = 1'-0"



BID and PERMIT SET

SPECIFICATIONS

FOR



**PUBLIC SAFETY DESK &
ART GALLERY**

**COLLEGE OF DUPAGE
GLEN ELLYN, IL**

**DATED:
JANUARY 9, 2017**

PREPARED BY:

**CORDOGAN CLARK & ASSOCIATES, INC.
960 RIDGEWAY AVENUE, AURORA, ILLINOIS 60506**

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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. Access to site.
4. Coordination with occupants.
5. Work restrictions.
6. Specification and drawing conventions.

- B. Related Section:

1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

- A. Project Identification: Public Safety Desk and Art Gallery

1. Project Location: 425 Fawell Boulevard, Glen Ellyn, IL 60137.

- B. Owner: College of Dupage, 425 Fawell Boulevard, Glen Ellyn, IL 60137.

1. Owner's Representative: Donald Inman, Senior Project Manager.

- C. Architect: Cordogan, Clark & Associates, Inc., 960 Ridgeway Avenue, 3rd Floor, Aurora, IL 60506.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

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

1. Art gallery enclosure.
2. Public Safety desk.
3. Public Safety transaction window.

B. Type of Contract

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

1.5 ACCESS TO SITE

- A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
1. Limits: Confine construction operations to the classroom. Trades are restricted from areas of campus that are not a part of the construction scope.
 2. Driveways, Walkways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.6 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site and existing building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
 2. Notify the Owner not less than 72 hours in advance of activities that will affect Owner's operations.

1.7 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.

- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7 a.m. to 6 p.m., Monday through Friday, except as otherwise arranged with the Owner.
 - 1. Weekend Hours: Coordinate with the Owner.
 - 2. Early Morning Hours: Coordinate with the Owner.
 - 3. Hours for Utility Shutdowns: Coordinate with the Owner.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 - 1. Notify Architect & Owner not less than two days in advance of proposed utility interruptions.
 - 2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Existing Fire Alarm Interruptions: Do not interrupt fire alarm serving facilities occupied by Owner or others unless permitted under the following conditions according to requirements indicated:
 - 1. Notify Architect & Owner not less than two days in advance of proposed fire alarm interruptions.
 - 2. Obtain Owner's written permission before proceeding with fire alarm interruptions.
 - 3. Existing smoke detectors are to be covered and protected throughout construction.
- E. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Architect & Owner not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.
- F. Nonsmoking Campus: College of Dupage is a smoke free campus. Smoking on campus property is not permitted.
- G. Controlled Substances: Use of tobacco products and other controlled substances on the Project site is not permitted.

1.8 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 the Drawings are described in detail in the Specifications. One or more of the following are used on the 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.

1.9 MISCELLANEOUS PROVISIONS

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDE:

- A. Coordinating Contractor: Review Contractor substitution requests for completeness, impact on overall schedule and coordinated Work of other Contractors. Request and collect additional information from Contractors as required. Forward complete requests to A/E and Owner for review.
- B. Each Contractor: Submit substitution requests meeting the requirements of this section to coordinating contractor as required.

1.2 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.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Regardless of the reason for the substitution request, the Contractor shall submit complete data demonstrating compliance of the proposed substitution with contract documents:
 - 1. An itemized comparison of proposed substitution with product or method specified.
 - 2. Data relating to changes in construction schedule, coordination, and other affected contracts.
 - 3. Accurate cost data on proposed substitution in comparison with product or method specified.
 - 4. Accurate cost data on proposed substitution in comparison with product or method specified.
- B. 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 through the Coordinating Contractor of acceptance or rejection of proposed substitution within twenty-one days of receipt of request, or twenty-one days of receipt of additional information or documentation, whichever is later.
 - 1. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.

2. Use product specified if Architect/Engineer 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.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitution by Change Order. After notice of award, substitutions shall not be accepted if acceptance would require a change order increasing the amount of the contract, and may only be approved by written change order under one of the following conditions:
 1. Substitutions are required for compliance with final interpretations of code requirements or insurance regulations
 2. Unavailability of specified products, through no fault of contractor.
 3. Subsequent information discloses inability of a specified product to perform properly or to fit in designated space.
 4. Manufacturer/fabricator refusal to certify or guarantee performance of a specified product as specified.
 5. When a substitution would be substantially in the Owner's best interests (e.g. better quality, shorter delivery time, lower cost, etc.).
- B. Representations: In making a request for substitution, Contractor represents that:
 1. The proposed product is equal or superior to that specified.
 2. It will provide an equal or superior guarantee for the substitution as was specified.
 3. It will coordinate installation of accepted substitutions into work, making all changes for work to be complete.
 4. It will pay all additional costs and expenses for Owner, A/E, and other contractors affected.
 5. Cost savings (difference between price of product used in bid and substitution) will be passed on to Owner.
- C. Restrictions: Substitutions will not be considered by shop drawing, informal request or when acceptance will require substantial revision of contract documents.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SUBSTITUTION REQUEST

Project Name: **COD PUBLIC SAFETY DESK AND ART GALLERY**
Substitution Request No.: _____

CCA Project No.: 16426

Subject description: _____
Document Reference: _____
Date: _____

Request by: _____
Company Name: _____
Phone Number: _____
Fax Number: _____

Attn.: _____

Response Date: _____

Attachments:

Proposed Substitution:

Manufacturer: _____
Address: _____
Phone: _____
Trade Name: _____
Model No.: _____
Installer: _____

Installer: _____
Address: _____
Phone: _____

Differences between proposed substitution and specified product:

Reason for proposing substitution:

Provide information re: similar installation:

Project: _____
Address: _____
Date Installed: _____
Architect: _____

Proposed substitution affects other parts of Work: Yes No (circle one).

Proposed substitution changes Contract Time: Yes No (circle one).

Savings to Owner for accepting substitution: \$ _____

(Substitution Request Cont.)

The Undersigned certifies:

1. Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
2. Same warranty will be furnished for proposed substitution as for specified product.
3. Same maintenance service and source of replacement parts, as applicable, is available.
4. Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
5. Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
6. Proposed substitution does not affect dimensions and functional clearances.
7. Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
8. Coordination, installation, and changes in the Work as necessary for accepted substitutions will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

Telephone: _____

A/E's Review and Action:

_____ Substitution Approved- Make submittals in accordance with Specification Section 013300.

_____ Substitution Approved As Noted- Make submittals in accordance w/ Specification Section 013300.

_____ Substitution Rejected- Use specified materials.

_____ Substitution Request received too late- Use specified materials.

Signed by: _____

Date: _____

Additional Comments:

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. Requests for Information (RFIs).
 - 3. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
 - 1. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 2. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. RFI: 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, and telephone number 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 telephone numbers, including office, 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.

1.5 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.
- 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.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1.6 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 - 1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.

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, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: AIA Document G716 or CSI Form 13.2A to be submitted electronically in Adobe Acrobat PDF format.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow three 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 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 Division 01 Section "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 bimonthly. 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. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.7 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.
 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: Architect will 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. Conduct the conference to review responsibilities and personnel assignments.
 2. Attendees: Authorized representatives of Owner, 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.
 3. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.

- b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Lines of communications.
 - f. Procedures for processing field decisions and Change Orders.
 - g. Procedures for RFIs.
 - h. Procedures for testing and inspecting.
 - i. Procedures for processing Applications for Payment.
 - j. Distribution of the Contract Documents.
 - k. Submittal procedures.
 - l. Preparation of record documents.
 - m. Use of the premises.
 - n. Work restrictions.
 - o. Working hours.
 - p. Owner's occupancy requirements.
 - q. Responsibility for temporary facilities and controls.
 - r. Procedures for moisture and mold control.
 - s. Procedures for disruptions and shutdowns.
 - t. Construction waste management and recycling.
 - u. Parking availability.
 - v. Office, work, and storage areas.
 - w. Equipment deliveries and priorities.
 - x. First aid.
 - y. Security.
 - z. Progress cleaning.
4. 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 that requires 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 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. Possible conflicts.
 - i. Compatibility requirements.
 - j. Time schedules.
 - k. Weather limitations.
 - l. Manufacturer's written instructions.

- m. Warranty requirements.
 - n. Compatibility of materials.
 - o. Acceptability of substrates.
 - p. Temporary facilities and controls.
 - q. Space and access limitations.
 - r. Regulations of authorities having jurisdiction.
 - s. Testing and inspecting requirements.
 - t. Installation procedures.
 - u. Coordination with other work.
 - v. Required performance results.
 - w. Protection of adjacent work.
 - x. 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. Progress Meetings: Conduct progress meetings at weekly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
 2. Attendees: In addition to representatives of Owner 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 utilization.

- 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.
- E. Coordination Meetings: Conduct Project coordination meetings at regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: In addition to representatives of Owner 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 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 utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Change Orders.
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

REQUEST FOR INFORMATION

Project Name: **COD PUBLIC SAFETY DESK AND ART GALLERY**
RFI NO: _____

CCA Project No.: 16426

Subject: _____
Document Reference: _____
Date: _____

Information requested by: _____ Attn.: _____
Company Name: _____
Phone Number: _____
Fax Number: _____

Attachments: _____

Request for Information: _____ Requested Response Date: _____

Suggested Solution:

RESPONSE FROM: _____ DATE RESOLVED: _____

Cc:

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. Contractor's construction schedule.
 - 2. Daily construction reports.
 - 3. Field condition reports.
- B. Related Sections:
 - 1. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
 - 2. Division 01 Section "Quality Requirements" for submitting a schedule of tests and inspections.

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.
- B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by Architect.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Event: The starting or ending point of an activity.
- E. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

F. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. PDF electronic file.

B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

C. Daily Construction Reports: Submit at monthly intervals.

D. Field Condition Reports: Submit at time of discovery of differing conditions.

1.5 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. 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.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Construction Schedule Submittal: Supply construction schedule to Architect for review within 10 business days of Notice to Proceed.

B. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.

- C. Activities: Treat each story or separate area as a separate numbered activity for each principal 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 Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
 4. 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.
 5. Punch List and Final Completion: Include not more than 15 days for punch list and final completion.
- D. 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. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
 - a. Structural completion.
 - b. Permanent space enclosure.
 - c. Completion of mechanical installation.
 - d. Completion of electrical installation.
 - e. Substantial Completion.

2.2 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. Accidents.
 8. Meetings and significant decisions.
 9. Unusual events (refer to special reports).
 10. Stoppages, delays, shortages, and losses.
 11. Meter readings and similar recordings.
 12. Emergency procedures.
 13. Orders and requests of authorities having jurisdiction.

14. Change Orders received and implemented.
15. Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Partial completions and occupancies.
19. Substantial Completions authorized.

- B. Field Condition Reports: Immediately on discovery of a difference between field 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.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. See Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule.
- C. See Division 01 Section "Quality Requirements" for submitting test and inspection reports.
- D. See Division 01 Section "Closeout Procedures" for submitting warranties.
- E. See Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

- A. 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. Coordinate transmittal of different types of submittals for related parts of the Work 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.
- B. Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
- C. Processing Time: Allow enough 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 7 calendar 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 7 calendar days for review of each resubmittal.
- D. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
- E. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
- F. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
- G. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.
1. Transmittal Form: Use AIA Document G810.
- H. 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.
- I. 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.
- J. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with Construction Manager.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
1. **All submittals shall be in .pdf format and sent electronically. It is the responsibility of each Prime Contractor to provide their information in .pdf format.**
- B. 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 printed data are not suitable 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 written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Manufacturer's catalog cuts.
 - e. Printed performance curves.
 - f. Compliance with specified referenced standards.
 - g. Testing by recognized testing agency.
 4. Number of Copies: Submit .pdfs of Product Data, unless otherwise indicated, via electronic mail. The architect will return the Product Data via electronic mail.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.

- e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Notation of coordination requirements.
 - j. Notation of dimensions established by field measurement.
 - k. Relationship to adjoining construction clearly indicated.
 - l. Seal and signature of professional engineer if specified.
 - m. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
2. Sheet Size: The size of the shop drawings, if printed should be created on sheets at least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
 3. Number of Copies: Submit a .pdf of each submittal via electronic mail. The Architect will return the .pdf via electronic mail.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package. Provide (4) copies of samples.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of appropriate Specification Section.
 3. 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.
- E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location.
1. Number of Copies: Submit .pdf of product schedule or list, unless otherwise indicated. Architect will return the .pdf.
- F. Submittals Schedule: Provide a schedule for all submittals within 10 business days of Notice to Proceed for Architect review.
- G. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."
- H. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."

- I. 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. Use CSI Form 1.5A.
 1. Number of Copies: Submit .pdf of subcontractor list, unless otherwise indicated. Architect will return the .pdf.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 1. Number of Copies: Submit .pdf of each submittal, unless otherwise indicated.
 2. Certificates and Certifications: Provide a notarized 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.
 3. Test and Inspection Reports: Comply with requirements specified in Division 01 Section "Quality Requirements."
- B. Coordination Drawings: Comply with requirements specified in Division 01 Section "Project Management and Coordination."
- C. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- E. Installer Certificates: Prepare 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.
- F. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- G. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- J. Product Test Reports: Prepare written reports indicating 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.

- K. Preconstruction Test Reports: Prepare 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.
- L. Compatibility Test Reports: Prepare 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.
- M. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."
- N. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.
- O. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
 - 1. Statement on condition of substrates and their acceptability for installation of product.
 - 2. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 - 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
- P. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

2.3 DELEGATED DESIGN

- 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.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

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

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. Reviewed
 - 2. Reviewed – Revise As Noted
 - 3. Reviewed – Revise and Resubmit
- C. 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.
- D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300

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 inspecting 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 -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections:
 - 1. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
 - 2. Divisions 02 through 49 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

- A. 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.
- B. 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. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under sample submittals; to demonstrate aesthetic effects and, where

indicated, 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.

- D. Preconstruction Testing: Tests and inspections performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. 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, 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 or trades.
- J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five 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.

1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards 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 a decision 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.

1.5 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. 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.
- C. 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.

1.6 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.
- 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, 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. 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.

1.7 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 inspecting they are engaged to perform.
 2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
 3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
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. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting 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 inspecting 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. 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 Division 01 Section "Submittal Procedures."
- D. 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.
- E. 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.
- F. Associated Services: Cooperate with agencies 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 inspecting. 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 inspecting equipment at Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, 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 Division 01 Section "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

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": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- 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" or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Industry Organizations: 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. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ACI	American Concrete Institute www.concrete.org	(248) 848-3700
AGA	American Gas Association www.aga.org	(202) 824-7000
AGC	Associated General Contractors of America (The) www.agc.org	(703) 548-3118
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
ASCE/SEI	American Society of Civil Engineers/Structural Engineering Institute (See ASCE)	
ASHRAE	American Society of Heating, Refrigerating and Air- Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937 (604) 298-7578

NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(630) 942-6591
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NFPA	NFPA (National Fire Protection Association) www.nfpa.org	(800) 344-3555 (617) 770-3000
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
SEI/ASCE	Structural Engineering Institute/American Society of Civil Engineers (See ASCE)	
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SPRI	Single Ply Roofing Industry www.spri.org	(781) 647-7026
SWRI	Sealant, Waterproofing, & Restoration Institute www.swrionline.org	(816) 472-7974
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

C. 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. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ICC	International Code Council www.iccsafe.org	(888) 422-7233
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D. 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. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-7923
DOC	Department of Commerce www.commerce.gov	(202) 482-2000

EPA Environmental Protection Agency (202) 272-0167
www.epa.gov

OSHA Occupational Safety & Health Administration (800) 321-6742
www.osha.gov (202) 693-1999

E. 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. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG Americans with Disabilities Act (ADA) (800) 872-2253
Architectural Barriers Act (ABA) (202) 272-0080
Accessibility Guidelines for Buildings and Facilities
Available from U.S. Access Board
www.access-board.gov

F. 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. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ICCB Illinois Community College Board (773) 444-0115
www.iccb.org

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

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 requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Sections:
 - 1. Division 01 Section "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to Architect, testing agencies, and authorities having jurisdiction.
- B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

- A. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.

2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- D. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
- E. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 01 Section "Execution" for progress cleaning requirements.
- C. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- B. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- C. Temporary Egress: Maintain temporary egress from existing occupied facilities as required by authorities having jurisdiction.
- D. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
 - 1. Prohibit smoking in construction areas.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Maintenance: Maintain facilities in good operating condition until removal.

END OF SECTION 015000

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.
- B. Related Sections:
 - 1. Division 01 Section "Substitution Procedures" for requests for substitutions.
 - 2. Division 01 Section "References" for applicable industry standards for products specified.

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 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 specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product **prior to submitting a bid**. Identify 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 one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 10 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Division 01 Section "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 Division 01 Section "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. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

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. Store 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.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

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. Refer to Divisions 02 through 49. Sections for specific content requirements and particular requirements for submitting special warranties.

- C. Submittal Time: Comply with requirements in Division 01 Section "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 not in conflict with 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.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. 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.
3. Products:
 - a. Restricted List: 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.
 - b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
4. Manufacturers:
 - a. Restricted List: 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.
 - b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
5. 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.

- 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 Division 01 Section "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: 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 the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 - 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - 3. Evidence that proposed product provides specified warranty.
 - 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 - 5. Samples, if requested.

END OF SECTION 016000

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. Installation of the Work.
- 2. Cutting and patching.
- 3. Coordination of Owner-installed products.
- 4. Progress cleaning.
- 5. Starting and adjusting.
- 6. Protection of installed construction.
- 7. Correction of the Work.

- B. Related Sections:

- 1. Division 01 Section "Submittal Procedures" for submitting surveys.
- 2. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
- 3. Division 02 Section "Selective Structure Demolition" for demolition and removal of selected portions of the building.

1.3 DEFINITIONS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
 - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.

2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
3. Products: List products to be used for patching and firms or entities that will perform patching work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate how long services and systems will be disrupted.

1.5 QUALITY ASSURANCE

A. 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 the Architect before proceeding. Shore, brace, and support structural element 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. Mechanical systems piping and ducts.
 - f. Control systems.
 - g. Communication systems.
 - h. Conveying systems.
 - i. Electrical wiring systems.
 - j. 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. Equipment supports.
 - e. Piping, ductwork, vessels, and equipment.
 - f. 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.
- B. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

1.6 WARRANTY

- A. 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.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- 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 the Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. 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. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.

- c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. 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.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. 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 the Contractor, submit a request for information to Architect according to requirements in Division 01 Section "Project Management and Coordination."

3.3 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.
- 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. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. 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.
- H. 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.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 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. Temporary Support: Provide temporary support of work to be cut.
- C. 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.
- D. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements of Division 01 Section "Summary."
- E. 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.
- F. 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 Division 31 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.
- G. 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.
- H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.5 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 (27 deg C).
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Utilize containers intended for holding waste materials of type to be stored.
 - 4. Coordinate progress cleaning for joint-use areas where more than one installer has worked.
- 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 Division 01 Section "Temporary Facilities and Controls."
- 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 assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.6 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. Comply with manufacturer's written instructions for temperature and relative humidity.

3.7 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

END OF SECTION 017300

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Warranties.
 - 3. Final cleaning.
- B. See Division 01 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
- C. See Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
- D. See Divisions 02 through 49 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.2 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
 - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 - 7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 8. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 - 9. Complete final cleaning requirements.
 - 10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

- B. Inspection: Submit a written request for inspection for Substantial Completion. 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. Reinspection: 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.

1.3 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
 - 1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
 - 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 - 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect 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. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit one electronic version (.pdf) 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.

1.5 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties. **All warranties shall commence at substantial completion and last for 24 months. Special warranties may last longer than 24 months.**
- B. Organize warranty documents into an orderly sequence based on the table of contents of the individual specification sections within the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-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.
- C. 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.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide 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 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 neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. 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.
- f. Remove debris and surface dust from limited access spaces, including trenches, equipment vaults, manholes, attics, and similar spaces.
 - g. Remove labels that are not permanent.
 - h. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - i. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove foreign substances.
 - j. Replace parts subject to unusual operating conditions.
 - k. Leave Project clean and ready for use.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

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 Product Data.
- B. Related Sections:
 - 1. Division 01 Section "Closeout Procedures" for general closeout procedures.
 - 2. Divisions 02 through 49 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 CLOSEOUT SUBMITTALS

- A. 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.

PART 2 - PRODUCTS

2.1 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 or scanned PDF electronic file(s) of marked up paper copy of Product Data.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to project record documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples 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 reference during normal working hours.

END OF SECTION 017839

SECTION 024119 - SELECTIVE DEMOLITION

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. Demolition and removal of selected portions of building or structure.
 - 2. Salvage of existing items to be reused or recycled.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and store.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.5 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: for dust control and noise control.

1.6 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
 - 1. Before selective demolition, Owner will remove all furniture or equipment.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. Hazardous materials will be removed by Owner before start of the Work.
 - 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

1.7 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.

- B. Remove temporary barricades and protections where hazards no longer exist.

3.2 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Dispose of demolished items and materials promptly.

- B. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Protect items from damage.

- C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.3 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

3.4 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - 4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.

3.5 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 035416 - HYDRAULIC CEMENT UNDERLAYMENT

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 polymer-modified, self-leveling, hydraulic cement underlayment for application below interior floor coverings.

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.
 - 1. Place hydraulic cement underlayments only when ambient temperature and temperature of substrates are between 50 and 80 deg F (10 and 27 deg C).

PART 2 - PRODUCTS

2.1 HYDRAULIC CEMENT UNDERLAYMENTS

- A. Hydraulic Cement Underlayment: Polymer-modified, self-leveling, hydraulic cement product that can be applied in minimum uniform thickness of 1/4 inch and that can be feathered at edges to match adjacent floor elevations.
1. 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:
 - a. ARDEX Americas.
 - b. Dayton Superior.
 - c. MAPEI Corporation.
 2. Cement Binder: ASTM C 150/C 150M, portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C 219.
 3. Compressive Strength: Not less than 4000 psi at 28 days when tested according to ASTM C 109/C 109M.
 4. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer, formulated for use with underlayment when applied to substrate and conditions indicated.
- B. Water: Potable and at a temperature of not more than 70 deg F (21 deg C).
- C. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.
- D. Surface Sealer: Designed to reduce porosity as recommended by manufacturer for type of floor covering to be applied to underlayment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for conditions affecting performance of the Work.
- B. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Prepare and clean substrate according to manufacturer's written instructions.
 1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
 2. Fill substrate voids to prevent underlayment from leaking.

3.3 APPLICATION

- A. General: Mix and apply underlayment components according to manufacturer's written instructions.
 - 1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.
 - 2. Coordinate application of components to provide optimum adhesion to substrate and between coats.
 - 3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
- B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C. Apply underlayment to produce uniform, level surface.
 - 1. Apply a final layer without aggregate to product surface.
 - 2. Feather edges to match adjacent floor elevations.
- D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.
- E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.
- F. Apply surface sealer at rate recommended by manufacturer.
- G. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.4 PROTECTION

- A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION 035416

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. Interior non-load-bearing wall framing exceeding height limitations of standard, nonstructural metal framing.
2. Ceiling joist framing.
3. Soffit framing.

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Product Certificates: For each type of code-compliance certification for studs and tracks.
- C. Product Test Reports: For each listed product, for tests performed by a qualified testing agency.
 1. Expansion anchors.
 2. Power-actuated anchors.
 3. Mechanical fasteners.
 4. Vertical deflection clips.
 5. Miscellaneous structural clips and accessories.
- D. 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.
- 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."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- 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. AllSteel & Gypsum Products, Inc.
 - 2. ClarkDietrich Building Systems.
 - 3. MarinoWARE.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design cold-formed steel framing.
- B. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing shall comply with AISI S100, AISI S200, and the following:
 - 1. Wall Studs: AISI S211.
 - 2. Headers: AISI S212.

2.3 INTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges.

- C. 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.

2.4 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, as required.

2.5 ANCHORS, CLIPS, AND FASTENERS

- A. 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.
- B. Welding Electrodes: Comply with AWS standards.

2.6 MISCELLANEOUS MATERIALS

- A. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.
- B. 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.

2.7 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 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. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

3.3 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
- 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. Fasten at each stud intersection.
- 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.

- 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.

3.4 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.

3.5 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.

3.6 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

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wood blocking

PART 2 - PRODUCTS

2.1 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.

2.2 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. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

2.3 METAL FRAMING ANCHORS

- 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. Cleveland Steel Specialty Co.
 - 2. KC Metals Products, Inc.
 - 3. Phoenix Metal Products, Inc.
- B. 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.

- C. 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.

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. 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 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.

END OF SECTION 061053

SECTION 064113 - WOOD-VENEER-FACED ARCHITECTURAL 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. Wood-veneer-faced architectural cabinets.
- 2. Wood furring, blocking, shims, and hanging strips for installing architectural cabinets that are not concealed within other construction.
- 3. Shop finishing of architectural cabinets.

- B. Related Requirements:

- 1. Section 061053 "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.

1.3 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.4 ACTION SUBMITTALS

- A. Shop Drawings: For architectural cabinets.

- 1. Include plans, elevations, sections, and attachment details.
- 2. Show large-scale details.
- 3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
- 4. Show locations and sizes of cutouts and holes for items installed in architectural cabinets.
- 5. Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.
- 6. Apply AWI Quality Certification Program label to Shop Drawings.

- B. Samples: For each exposed product and for each color and finish specified, in manufacturer's or fabricator's standard size.

- C. Samples for Initial Selection: For each type of exposed finish.
- D. Samples for Verification: For the following:
 - 1. Lumber and Panel Products with Shop-Applied Opaque Finish: 5 inches wide by 12 inches long for lumber and 12 by 12 inches for panels, for each finish system and color.
 - a. Finish entire exposed surface.
 - 2. Thermoset Decorative Panels: 12 by 12 inches, for each color, pattern, and surface finish.
 - a. Provide edge banding on one edge.
 - 3. Corner Pieces:
 - a. Cabinet-front frame joints between stiles and rails and at exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.
 - b. Miter joints for standing trim.
 - 4. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and fabricator.
- B. Product Certificates: For the following:
 - 1. Composite wood and agrifiber products.
 - 2. Thermoset decorative panels.
 - 3. Adhesives.
- C. Quality Standard Compliance Certificates: AWI Quality Certification Program.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
 - 1. Shop Certification: AWI's Quality Certification Program accredited participant.
- B. Installer Qualifications: AWI's Quality Certification Program accredited participant.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.8 FIELD CONDITIONS

- A. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.
- B. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 ARCHITECTURAL CABINET FABRICATORS

- A. Source Limitations: Engage a qualified woodworking firm to assume responsibility for production of architectural cabinets with sequence-matched wood veneers.

2.2 CABINETS, GENERAL

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. Provide inspections of fabrication and installation together with labels and certificates from AWI certification program indicating that woodwork complies with requirements of grades specified.
 - 2. The Contract Documents contain requirements that are more stringent than the referenced woodwork quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.

2.3 WOOD CABINETS FOR OPAQUE FINISH

- A. Grade: Premium.
- B. Type of Construction: Frameless.
- C. Door and Drawer-Front Style: Flush overlay.
- D. Species for Exposed Lumber Surfaces: Any closed-grain hardwood.
- E. Panel Product for Exposed Surfaces: MDF.
- F. Semiexposed Surfaces:

1. Surfaces Other Than Drawer Bodies: Match materials indicated for exposed surfaces.

2.4 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
 1. Do not use plain-sawn softwood lumber with exposed, flat surfaces more than 3 inches wide.
 2. Wood Moisture Content: 4 to 9 percent.
- B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

2.5 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets.
 1. 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:
 - a. Accuride International.
 - b. Blum, Julius & Co., Inc.
 - c. CompX International, Inc.
- B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening, self-closing.
- C. Back-Mounted Pulls: BHMA A156.9, B02011.
- D. Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16 inch in diameter.
- E. Catches: Magnetic catches, BHMA A156.9, B03141.
- F. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.
- G. Door Locks: BHMA A156.11, E07121.
- H. Grommets for Cable Passage: 2-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
 1. Color: To match solid surface counter top.
- I. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
 1. Satin Stainless Steel: BHMA 630.

- J. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.6 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

2.7 FABRICATION

- A. Sand wood lightly to remove raised grain on exposed surfaces before fabrication.
- B. Fabricate architectural cabinets to dimensions, profiles, and details indicated. Ease edges and corners to 1/16-inch radius unless otherwise indicated.
- C. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 - 1. Notify Architect seven days in advance of the dates and times architectural cabinet fabrication will be complete.
 - 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.
- D. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

2.8 SHOP FINISHING

- A. General: Finish architectural cabinets at fabrication shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.
- B. General: Shop finish transparent-finished architectural cabinets at fabrication shop as specified in this Section.
- C. General: Drawings indicate items that are required to be shop finished. Finish these items at fabrication shop as specified in this Section.

- D. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural cabinets, as applicable to each unit of work.
 - 1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of cabinets.
- E. Opaque Finish:
 - 1. Grade: Premium.
 - 2. Finish: System - Conversion varnish.
 - 3. Color: As selected by Architect from manufacturer's full range.
 - 4. Sheen: Satin, 31-45 gloss units measured on 60-degree gloss meter per ASTM D 523.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

- A. Grade: Install cabinets to comply with quality standard grade of item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails for exposed fastening, countersunk and filled flush with cabinet surface.
 - 1. For shop-finished items, use filler matching finish of items being installed.
- D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.
 - 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
 - 2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 3. Maintain veneer sequence matching of cabinets with transparent finish.
- E. Shop Finishes: Touch up finishing after installation of architectural cabinets. Fill nail holes with matching filler.

1. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats are shop applied.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets on exposed and semiexposed surfaces. Touch up finishes to restore damaged or soiled areas.

END OF SECTION 064113

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

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 custom hollow-metal doors and frames.

1.3 DEFINITIONS

- A. **Minimum Thickness:** Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.5 ACTION SUBMITTALS

- A. **Product Data:** For each type of product.
 - 1. Include construction details, material descriptions, core descriptions, and finishes.
- B. **Shop Drawings:** Include the following:
 - 1. Elevations of each door type.
 - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 4. Locations of reinforcement and preparations for hardware.
 - 5. Details of each different wall opening condition.
 - 6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
 - 7. Details of anchorages, joints, field splices, and connections.

8. Details of accessories.
9. Details of moldings, removable stops, and glazing.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
 1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- 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. Ceco Door; ASSA ABLOY. Series: Medallion Maxim.
 2. Curries Company; ASSA ABLOY. Series: 707T w/12ga. Extruded lock/hinge Rail.
 3. Deansteel Manufacturing Company, Inc. Series: SLP
 4. Kewanee Door: a Spargo Group company. Series: D400 w/ Polystyrene core.
 5. Steelcraft; an Allegion brand. Series: DW or LW w/ Polystyrene core.

2.2 INTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Standard-Duty Doors and Frames: SDI A250.8, Level 1; SDI A250.4, Level C.
 1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.

- b. Construction: 16- gauge
 - c. Thickness: 1-3/4 inches minimum.
 - d. Face: Uncoated.
 - e. Edge Construction: Model 2, Seamless, filled and ground smooth.
 - f. Edge Bevel: Provide manufacturer's standard beveled or square edges.
 - g. Core: Manufacturer's standard. Honeycomb core is unacceptable.
 - h. Stile: 6" minimum
 - i. Head and Center Rail depth: 10" minimum bottom rail depth (7" minimum head rail required when using parallel mount closers).
 - j. Additional Reinforcing:
 - 1) Minimum 16 gauge internal steel reinforcement of both vertical edges. Vertical and horizontal edge reinforcement shall be welded together prior to face skin application.
 - 2) Minimum 16 gauge internal steel reinforcement of top and bottom edges.
 - 3) Minimum or equivalent to 7 gauge steel for hinges.
 - 4) Minimum 12 gauge steel for lock front.
 - 5) Minimum 20 gauge steel for lock support requirements.
 - 6) Minimum 14 gauge steel for other hardware.
 - 7) Minimum 16 gauge for other surface mounted hardware reinforcements.
 - 8) Minimum 14 gauge for closer and overhead hold open/stop arms.
 - k. Cap top of door (either snap-in or screw retained) if the design of door has a hollow at top.
2. Frames:
- a. Materials: Uncoated steel sheet, minimum thickness of 0.042 inch.
 - b. Construction: Knocked down. 16- gauge.
 - c. Edge Construction: Joints welded and ground smooth. Frame corners shall have internal align tangs to aide in the support and welding of the joint.
 - d. Factory installed reinforcing and preparation for mortised hardware.
 - e. Additional Reinforcing:
 - 1) Minimum 7 gauge steel for hinges.
 - 2) Minimum 12 gauge steel for strike, closers and overhead hold-open/ stop arms, and other surface mounted hardware.
 - 3) Minimum 14 gauge steel strikes and other hardware.
 - f. Size: 2" minimum
 - g. If grouted, require galvanized frames. Where labeled frame is required frame shall be grouted with cement based grout. Non-gypsum based product (e.g. gypcrete) is not acceptable.
3. Exposed Finish: Minimum G60 galvanized and factory primed in very moist or corrosive environments. Require letter from manufacturer that frames are galvanized as specified before delivery. Specify high performance field applied coating.

2.3 FRAME ANCHORS

A. Jamb Anchors:

1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
 2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
 3. Postinstalled Expansion Anchor: Minimum 3/8-inch- diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Material: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.
1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M; hot-dip galvanized according to ASTM A 153/A 153M, Class B.

2.4 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- E. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

2.5 FABRICATION

- A. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
 1. Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

4. Terminated Stops: Terminate stops 6 inches above finish floor with a 90-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.
- B. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

2.6 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

- A. General: Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow-Metal Frames: Comply with SDI A250.11.
 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.

2. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.

1. Non-Fire-Rated Steel Doors: Comply with SDI A250.8.

3.3 CLEANING AND TOUCHUP

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- C. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish according to manufacturer's written instructions.
- D. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

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 storefront framing.
 - 2. Interior manual-swing entrance doors.
- B. Related Requirements:
 - 1. Section 088000 "Glazing" for systems without aluminum support framing.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
 - 1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 - 2. Include full-size isometric details of each vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:
 - a. Joinery, including concealed welds.
 - b. Anchorage.
 - c. Expansion provisions.
 - d. Glazing.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- E. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch lengths of full-size components and showing details of the following:

1. Joinery, including concealed welds.
2. Anchorage.
3. Expansion provisions.
4. Glazing.

- F. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

1.4 INFORMATIONAL SUBMITTALS

A. Preconstruction Laboratory Mockup Testing Submittals:

1. Testing Program: Developed specifically for Project.
2. Test Reports: Prepared by a qualified preconstruction testing agency for each mockup test.
3. Record Drawings: As-built drawings of preconstruction laboratory mockups showing changes made during preconstruction laboratory mockup testing.

B. Qualification Data: For qualified Installer.

C. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by a qualified testing agency.

D. Quality-Control Program: Developed specifically for Project, including fabrication and installation, according to recommendations in ASTM C 1401. Include periodic quality-control reports.

E. Source quality-control reports.

F. Field quality-control reports.

G. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

B. Maintenance Data for Structural Sealant: For structural-sealant-glazed storefront to include in maintenance manuals. Include ASTM C 1401 recommendations for post-installation-phase quality-control program.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

- B. Laboratory Mockup Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated and accredited by IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC 17025.
- C. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated and accredited by IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC 17025.
- D. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
 - 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.
- E. Structural-Sealant Glazing: Comply with ASTM C 1401 for design and installation of storefront systems.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration created by wind and thermal and structural movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Failure of operating components.
 - 2. Warranty Period: 10 years from date of Substantial Completion.
- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.
- B. Seismic Performance: Aluminum-framed entrances and storefronts shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. Seismic Drift Causing Glass Fallout: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.6 at design displacement and 1.5 times the design displacement.
 2. Vertical Interstory Movement: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.7 at design displacement and 1.5 times the design displacement.
- C. Noise Reduction: Test according to ASTM E 90, with ratings determined by ASTM E 1332, as follows.
1. Outdoor-Indoor Transmission Class: Minimum 26.
- D. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
 2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
- E. Structural-Sealant Joints:
1. Designed to carry gravity loads of glazing.
 2. Designed to produce tensile or shear stress of less than 20 psi (138 kPa).

- F. Structural Sealant: Capable of withstanding tensile and shear stresses imposed by structural-sealant-glazed storefront system without failing adhesively or cohesively. When tested for preconstruction adhesion and compatibility, cohesive failure of sealant shall occur before adhesive failure.
1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
 2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.

2.2 MANUFACTURERS

- 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. Entrances, Doors and Storefront Systems:
 - a. Kawneer Company, Inc.
 - b. Tubelite Division of Indal, Inc.
 - c. United States Aluminum Corp.
 - d. Vistawall Architectural Products
 2. Flush Panel Aluminum Doors:
 - a. Special-Lite, Inc.
 - b. Extrudart
 3. Tubular Section Aluminum Flush Panel Doors:
 - a. Heritage Door and Entrance Inc.
 - b. Cross Aluminum Products.
 - c. Thompson Aluminum Door Co.
- B. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

2.3 FRAMING

- A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Construction: Nonthermal.
 2. Glazing System: Retained mechanically with gaskets on two sides and structural sealant on two sides.
 3. Glazing Plane: Front.
 4. Finish: Baked-enamel or powder-coat finish. High performance material coating.
 5. Fabrication Method: Field-fabricated stick system.

- B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- D. Materials:
 - 1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - a. Sheet and Plate: ASTM B 209.
 - b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
 - c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
 - d. Structural Profiles: ASTM B 308/B 308M.
 - 2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.
 - a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 - b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 - c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.4 ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
 - 1. Door Construction: 2" minimum thickness, with minimum 0.125-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
 - 2. Door Type: Tuffline stile and rail (Kawneer 500 Heavy duty) or equal.
 - 3. 5" minimum lock stile, head rail depth 4 1/8", center rail depth 6"; minimum bottom rail depth 10 1/4".
 - 4. Size: 3'-0" x 7'-0" minimum size. 4'-0" x 7'-6" maximum size
 - 5. Door Design: As indicated in drawings.
 - 6. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide nonremovable glazing stops on outside of door.

2.5 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: To match COD standards
- B. General: Provide entrance door hardware for each entrance door to comply with requirements in this Section.
 - 1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and to match COD standards
- C. Require any exposed fasteners to be stainless steel.

2.6 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing."
- B. Glass: ¼" tempered – with factory tint to match existing. Reference: ANSI Z97.1, CPSC 16 CFR 1201 and GANA Glazing Manual.

2.7 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Physical and thermal isolation of glazing from framing members.
 - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 5. Provisions for field replacement of glazing from interior.
 - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.
- F. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

- G. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
- H. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- I. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 ALUMINUM FINISHES

- A. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
 1. Color and Gloss: As selected by Architect from manufacturer's full range.
 2. Retain one of two "High-Performance Organic Finish" paragraphs below; if both are required, indicate location of each system on Drawings, in schedules, or by inserts. Retain AAMA 2604 or AAMA 2605 for high- or superior-performance organic coatings, respectively, on extrusions and panels. If specific products are required, name coating manufacturers and products.

2.9 SOURCE QUALITY CONTROL

- A. Structural Sealant: Perform quality-control procedures complying with ASTM C 1401 recommendations including, but not limited to, assembly material qualification procedures, sealant testing, and assembly fabrication reviews and checks.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, 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. Prepare surfaces that are in contact with structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

3.3 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions and AAMA storefront and entrance guide specifications manual.
 - a. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
 - b. Provide alignment attachments and shims to permanently fasten system to building structure.
 - c. Align assembly plumb and level, free of warp and twist. Maintain assembly dimensional tolerances aligning with adjacent work.
 - d. Set thresholds in bed of mastic and secure.
 - e. Adjusting: Adjust operating hardware for smooth operation.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

F. Install glazing as specified in Section 088000 "Glazing."

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.4 ERECTION TOLERANCES

A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
3. Alignment:
 - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
 - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
 - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.5 MAINTENANCE SERVICE

A. Entrance Door Hardware:

1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.
2. Initial Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of entrance door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper entrance door hardware operation at rated speed and capacity. Use parts and supplies that are the same as those used in the manufacture and installation of original equipment.

3.6 CLEANING AND PROTECTION

A. Cleaning:

1. Remove temporary coverings and protection of adjacent work areas.
2. Repair or replace damaged installed products.
3. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance.
4. Remove construction debris from project site and legally dispose of debris off Site.

B. Protection:

1. Protect installed product's finish surfaces from damage during construction.
2. Protect aluminum entrances from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants.
3. Remove and replace damaged aluminum entrances at no extra cost.

END OF SECTION 084113

SECTION 088000 - GLAZING

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. Glass for interior borrowed lites
 - 2. Glazing sealants and accessories.

1.3 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 ACTION SUBMITTALS

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

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and glass testing agency.
- B. Product Certificates: For glass.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- B. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- C. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 - 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F (4.4 deg C).

1.11 WARRENTY

- A. Specify the following (minimum) warranties:
 - 1. Laminated glazing: 5 years free of defects from edge separations, delamination and blemishes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- 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. Oldcastle BuildingEnvelope™.
2. Pilkington North America.
3. Trulite Glass & Aluminum Solutions, LLC.

- B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
- C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.
- C. Safety Glazing: Provide at all locations below transoms and provide glazing that complies with 16 CFR 1201, Category II.
- D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites 1/4 inch thick
 2. For laminated-glass lites, properties are based on products of construction indicated.

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.

- E. Strength: Provide fully tempered float glass.

2.4 GLASS PRODUCTS

- A. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
 - 1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written instructions.
 - 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
 - 3. Interlayer Color: Clear unless otherwise indicated.

2.6 GLAZING SEALANTS

- A. General:
 - 1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 - 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
 - 1. 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:
 - a. Dow Corning Corporation.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.
 - c. May National Associates, Inc.; a subsidiary of Sika Corporation.
 - 2. Applications: Butt joints, etc.

2.7 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.8 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
 - 1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Minimum required face and edge clearances.
 - 3. Effective sealing between joints of glass-framing members.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to

produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

- E. Install gaskets so they protrude past face of glazing stops.

3.6 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.7 MONOLITHIC GLASS SCHEDULE

- A. Glass Type: fully tempered float glass.
 - 1. Minimum Thickness: 1/4 inch.
 - 2. Safety glazing required.

3.8 LAMINATED GLASS SCHEDULE

- A. Glass Type: Clear laminated glass with two plies of ultraclear fully tempered float glass.
 - 1. Minimum Thickness of Each Glass Ply: 1/4 inch.
 - 2. Interlayer Thickness: 0.090 inch.
 - 3. Safety glazing required.

END OF SECTION 088000

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.

1.3 ACTION SUBMITTALS

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

PART 2 - PRODUCTS

2.1 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 INTERIOR GYPSUM BOARD

- A. Manufactures: Subject to compliance with requirements, provide products by the following:

- 1. American Gypsum.
- 2. Certain Teed Corp.
- 3. Georgia-Pacific Gypsum LLC.
- 4. Lafarge north America Inc.
- 5. National Gypsum Company.
- 6. USG Corporation.

- B. Gypsum Wallboard: ASTM C 1396/C 1396M.

- 1. Thickness: 5/8 inch.
- 2. Long Edges: Tapered.

- 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. Thickness: 1/4 inch.
2. Long Edges: Tapered.

D. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch.
2. Long Edges: Tapered.

2.3 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.
2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.

2.4 JOINT TREATMENT MATERIALS

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

B. Joint Tape:

1. Interior Gypsum Board: Paper.

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, 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 compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

2.5 AUXILIARY MATERIALS

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

B. 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 thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

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.

3.2 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 1. Wallboard Type: Vertical surfaces.
 2. Flexible Type: at curved assemblies.
 3. Ceiling Type: Ceiling surfaces.
- B. Generally, design all gypsum board wall to run to underside of floor or roof deck above. Please discuss with Owner, conditions where stopping at finished ceiling is desired.
- C. 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) or 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. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- D. Curved Surfaces:
 1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch long straight sections at ends of curves and tangent to them.

3.3 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 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.
 - 2. J-Bead: Use as required.

3.4 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 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 5: at panel surfaces exposed to view.

3.5 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

SECTION 095123 - ACOUSTICAL TILE CEILINGS

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. Acoustical tiles for interior ceilings.
 - 2. Fully concealed, direct-hung, suspension systems.

1.3 ACTION SUBMITTALS

- A. Samples: For each exposed product and for each color and texture specified, 6 inches in size.
- B. Samples for Initial Selection: For components with factory-applied finishes.
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
 - 1. Acoustical Tiles: Set of full-size Samples of each type, color, pattern, and texture.
 - 2. Concealed Suspension-System Members: 6-inch long Sample of each type.
 - 3. Exposed Moldings and Trim: Set of 6-inch long Samples of each type and color.
 - 4. Seismic Clips: Full size.
- D. Delegated-Design Submittal: For seismic restraints for ceiling systems.
 - 1. Include design calculations for seismic restraints including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Product Test Reports: For each acoustical tile ceiling, for tests performed by a qualified testing agency.
- C. Evaluation Reports: For each acoustical tile ceiling suspension system, from ICC-ES.

- D. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

1.6 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. Acoustical Ceiling Units: Full-size tiles equal to 2 percent of quantity installed.
 - 2. Suspension-System Components: Quantity of each concealed grid and exposed component equal to 2 percent of quantity installed.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical tiles, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical tiles, permit them to reach room temperature and a stabilized moisture content.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations:
 - 1. Suspended Acoustical Tile Ceilings: Obtain each type of acoustical ceiling tile and its suspension system from single source from single manufacturer.
 - 2. Directly Attached Acoustical Tile Ceilings: Obtain each type of acoustical ceiling tile from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- B. 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 C according to ASTM E 1264.
 2. Smoke-Developed Index: 50 or less.
- C. The following criteria are only guidelines. a/e shall verify/confirm these requirements based on other elements that might impact lighting and acoustical performance (e.g. other finish materials, special acoustical requirements for special use rooms):
1. Typical Performance criteria for Educational Spaces:
 - a. Light reflectance shall be not less than 0.08.
 - b. CAC no less than 35.
 - c. NRC no less than 0.55.
 - d. Anti-microbial performance.
 2. Typical Performance criteria for Office and Administration Spaces:
 - a. Similar requirements as for educational spaces.

2.3 ACOUSTICAL TILES

- A. Manufacturers:
1. Armstrong, #1835 Fine Fissure or
 2. Armstrong, Cirrus
 3. BPB
 4. USG
- B. Product provided by manufacturer must match existing acoustical tiles.
- C. Provide standard 24" x 24" x 3/4 thick panels unless noted otherwise in drawings.

2.4 METAL SUSPENSION SYSTEM

- A. Manufacturers:
1. Chicago Metallic Corp.
 2. Donn Ceiling Suspension System
 3. National Rolling Mills, Inc.
- B. Product provided by manufacturer must match existing metal suspension system.

2.5 ACCESSORIES

- A. 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. 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.
- B. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- C. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- D. 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.
- E. Impact resistant clips are not required. A/E shall discuss with Owner if conditions are present requiring clips.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Testing Substrates: Before adhesively bonding tiles to wet-placed substrates such as cast-in-place concrete or plaster, test and verify that moisture level is below tile manufacturer's recommended limits.
- B. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- C. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION OF SUSPENDED ACOUSTICAL TILE CEILINGS

- A. Install suspended acoustical tile ceilings according to ASTM C 636/C 636M, 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 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 tiles.
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. Arrange directionally patterned acoustical tiles as follows:
 - 1. As indicated on reflected ceiling plans.
 - 2. Install tiles with pattern running in one direction parallel to axis of space.
 - 3. Install tiles in a basket-weave pattern.
- G. Install acoustical tiles in coordination with suspension system and exposed moldings and trim. Place splines or suspension-system flanges into kerfed edges of tiles so tile-to-tile joints are interlocked.
 - 1. Fit adjoining tiles to form flush, tight joints. Scribe and cut tiles for accurate fit at borders and around penetrations through ceiling.
 - 2. Hold tile field in compression by inserting leaf-type, spring-steel spacers between tiles and moldings, spaced 12 inches o.c.
 - 3. 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 ADJUSTING

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

END OF SECTION 095123

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Resilient base

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.
- C. Samples for Initial Selection: For each type of product indicated.
- D. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches long.
- E. Product Schedule: For resilient base and accessory products.

1.3 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. Furnish 10 linear feet of each type, color, pattern, and size of resilient product installed.
 2. Require that record documents indicate lot number locations.
 3. Require that attic stock have lot numbers marked clearly on outside of boxes.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

PART 2 - PRODUCTS

2.1 RESILIENT BASE

- 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. Burke Mercer Flooring Products; a division of Burke Industries Inc.
 - 2. Johnsonite; a Tarkett company.
 - 3. Roppe Corporation, USA.
- B. Product provided by manufacturer must match existing base in adjacent corridor.

2.2 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Require that all floor preparation shall be included in contract. Indicate that Owner will not provide compensation to General Contractor or any subcontractor for floor preparation in new construction. In case of remodeling, if existing subfloor conditions are unknown, require Contractor to provide skim coat (with ARDEX K-15, SD-F or similar products) over entire area specified to receive new floor finish material. Specify an allowance with unit cost to be provided for major subfloor repair work (e.g. structural cracking, differential settlement).

- B. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Require top set rubber or vinyl bases. Use coved base for hard surface floor areas. Use straight toed base for carpet areas. Pre-molded outside corners are preferred. Require base to be installed from rolled lengths (120' rolls) to minimize seams (short sections are generally not acceptable).
- C. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- D. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- E. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- F. Do not stretch resilient base during installation.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum horizontal surfaces thoroughly.
 - 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION 096513

SECTION 096813 - TILE 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 modular carpet tile.
- B. Related Requirements:
 - 1. Section 024119 "Selective Demolition" for removing existing floor coverings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
 - 2. Include manufacturer's written installation recommendations for each type of substrate.
- B. 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 Tile: Full-size Sample.
- C. Specify record drawings to include location of product, seams, pile direction and dye lots.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
- C. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

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

1. Methods for maintaining carpet tile, 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 tile.

1.6 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 Tile: Full-size units equal to 2 percent of amount installed for each type indicated.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

1.8 COORDINATION

- A. Generally, carpet is purchased and installed by Contractor; but in some cases, it may be provided by Owner. Verify with Owner.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI's "CRI Carpet Installation Standard."

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 tiles 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 tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.11 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet tile 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 edge raveling, snags, and runs.
 - b. Dimensional instability.
 - c. Excess static discharge.
 - d. Loss of tuft-bind strength.
 - e. Loss of face fiber.
 - f. Delamination.
 - 3. Warranty Period: 10 years from date of Substantial Completion.
 - 4. Specify that the Warranty shall include costs for labor and material replacement in full.
 - 5. Specify that the Warranty shall also include labor and material costs for replacement of floor accessories such as vinyl cove base and transition strips.
 - 6. Specify an extended warranty to be for life of carpet (beyond 10 year period and shall include same failures as 10 year warranty) but shall be for material only.

PART 2 - PRODUCTS

2.1 CARPET TILE

- A. Tandus Illusory #10701 Enchantment. Coordinate with Owner prior to ordering.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.
- C. Metal Edge/Transition Strips: Extruded aluminum with mill 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 tile performance.
- B. Examine carpet tile for type, color, pattern, and potential defects.
- C. Concrete Slabs: Verify that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI's "Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Require all floor preparation to be included in contract. Specify that Owner will not provide compensation to General Contractor or any subcontractor for floor preparation in new construction. In case of remodeling, if existing subfloor conditions are unknown, require Contractor to provide skim coat (with ARDEX K-15, SD-F or similar products) over entire area specified to receive new floor finish material. Specify an allowance with unit cost be provided for major subfloor repair work (e.g. structural cracking, differential settlement).
- C. 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 wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- D. 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 tile manufacturers.
- E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.

- D. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.
- E. Carpet Tiles: Modular tiles to be no smaller than 24" x 24" and installed at locations shown in drawings.
- F. Cut and fit carpet tile 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 tile manufacturer.
- G. Extend carpet tile 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 tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- I. Install pattern parallel to walls and borders.
- J. Access Flooring: Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.
- K. Require calcium chloride (moisture) test shall be done prior to finish floor installation.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with CRI's "Carpet Installation Standard," Section 20, "Protecting Indoor Installations."
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.
- D. Require carpet manufacturer shall provide training for Owner regarding maintenance and cleaning of carpet product.

END OF SECTION 096813

SECTION 099123 - INTERIOR PAINTING

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 paint systems on interior substrates.
 - 1. Gypsum board.

1.3 DEFINITIONS

- A. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523. ("eggshell" finish)

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. Samples for Initial Selection: For each type of topcoat product.
- 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.

1.5 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. Paint: 1 gal. (3.8 L) of each material and color applied.

1.6 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.

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints 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.

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. Sherwin-Williams Company (The).
 3. ICI
 4. MAB
 5. Pittsburgh

2.2 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.

2.3 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. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- C. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- D. 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. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

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.

3.4 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.

3.5 INTERIOR PAINTING SCHEDULE

- A. Gypsum Board Substrates:

1. Latex over Latex Sealer System:
 - a. Prime Coat: Primer sealer, latex, interior, MPI #50.
 - b. Prime Coat: Latex, interior, matching topcoat.
 - c. Intermediate Coat: Latex, interior, matching topcoat.
 - d. Topcoat: Latex, interior, ceramic matte (MPI Gloss Level 1), MPI #53.

END OF SECTION 099123

SECTION 101419 - DIMENSIONAL LETTER SIGNAGE

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. Molded plastic dimensional characters.
 - 2. Baked enamel or powder coat sign.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For signs.
 - 1. Include fabrication and installation details and attachments to other work.
 - 2. Show sign mounting heights, locations of supplementary supports and accessories.
 - 3. Show message list, typestyles, graphic elements, and layout for each sign at least 1/4 size scale.
- C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
 - 1. Include representative Samples of selected typestyles.
- D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
 - 1. Dimensional Characters: Full-size Sample of each type of dimensional character.
- E. Product Schedule: For dimensional letter signs. Use same designations indicated on Drawings or specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturer.
- B. Sample Warranty: For special warranty.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer of products.

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify before fabrication, and indicate measurements on Shop Drawings.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Deterioration of finishes beyond normal weathering.
 - b. Separation or delamination of sheet materials and components.
 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 BAKED ENAMEL OR POWDER COAT SIGN

- A. Fabricate sign with uniform faces, sharp corners, and precisely formed lines and profiles, and as follows:
1. Thickness: Manufacturer's standard for size of sign.
 2. Finishes:
 - a. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard, in solid Pantone Green 343C
 - b. Overcoat: Manufacturer's standard baked-on clear coating.
 3. Mounting: Concealed studs
 4. Typeface: Clearview ADA medium.

2.2 SIGN MATERIALS

- A. Aluminum Sheet and Plate: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- B. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.3 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:
1. Use concealed fasteners and anchors unless indicated to be exposed.
 2. Sign Mounting Fasteners:
 - a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.

2.4 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
 2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
 3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
 4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
 5. Internally brace dimensional characters for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.
 6. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
 7. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing.
- B. Brackets: Fabricate brackets, fittings, and hardware for bracket-mounted signs to suit sign construction and mounting conditions indicated. Modify manufacturer's standard brackets as required.
1. Aluminum Brackets: Factory finish brackets with baked-enamel or powder-coat finish to match sign-background color.

2.5 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

- B. 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.
- C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.
- D. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

2.6 ALUMINUM FINISHES

- A. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with 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, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
- B. Mounting Methods:
 - 1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
 - a. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.

3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed characters and signs that do not comply with specified requirements. Replace characters with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101419

SECTION 101423.13 – ROOM IDENTIFICATION SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. All interior room signs coordinate with Owner's standards.

1.2 DEFINITIONS:

- A. Tactile Header: The room number component with ADA-compliant tactile characters and Grade II Braille the fits into an existing 2-part ADA-compliant room sign.

1.3 REGULATORY REQUIREMENTS

- A. Products shall meet current requirements of the Americans with Disability Act Accessibility Guidelines (ADAAG) and local codes, amendments and modifications.
- B. ANSI 117.1 – For building and facilities
- C. ASTM International (ASTM) D635 – Standard test method for rate of burning and extent and time of burning plastic in a horizontal position.
- D. Underwriters Laboratories (UL) 723 – Standards for test for surface burning characteristics of building materials.

1.4 SUBMITTALS

- A. Upon letter of intent to proceed; and prior to commencement of work, provide the following documentation; schedule for submitting shop drawings, samples, fabrication, and installation. Schedule must be approved by COD Project Manager.
- B. Product data: Provide manufacturer's data sheets on each product to be used including:
1. Preparation instructions and recommendations.
 2. Storage and handling instructions.
 3. Installation methods.
- C. Provide shop drawings of all work described in the scope of work. Shop drawings to include dimensions, detailed construction drawings, materials, and technical data, for each sign type required.
- D. Submit (3) sets of each color, finish and material required of the project.

- E. Provide full size proofs of artwork, characters and symbols for each sign type.
- F. Provide full size prototypes; if mock ups are approved they can be installed as part of the scope of work.
- G. Provide samples of mounting tape.

1.5 PERFORMANCE REQUIREMENTS

- A. Interior ADA-Compliant Room Sign Tactile Headers
 - 1. Match each current, in-use tactile header in color, materials, shape, and size and replace with tactile header with new room number.
 - 2. Fit into existing ADA-compliant room signs.
 - 3. Meet current requirements of the Americans with Disability Act Accessibility Guidelines (ADAAG) and local codes, amendments and modifications.
 - 4. Character spacing (kerning) – Tactile characters to be spaced evenly between characters.

1.6 QUALITY ASSURANCE

- A. Provide Nov Acryl Photopolymer Production log with submittal and upon completion of the project, contractor is required to furnish all close out documents. I.E: Project Manual, as-built drawings, Nova Polymer Production Log.

1.7 PROJECT CONDITIONS

- A. Installer shall become familiar with site conditions prior to installation. Installation shall be coordinated with COD Project manager prior to commencing work.
- B. Maintain environmental conditions (temperature humidity and ventilation) within limits recommended by the manufacturer.

1.8 WARRANTY

- A. Warranty Documents:
 - 1. Provide a five (5) written warranty from date of final acceptance for all signage components, labor, and material.
 - 2. Provide a five (5) year written warranty on all finishes for all signage.
 - 3. Sign contractor shall submit or obtain from subcontractor (s) or manufacturers on corporate letterhead the same warranty requirements from the company supply the Warranty/ Guarantee.
 - 4. Provide a five (5) year written warranty for tactile headers against delamination of tactile components and Grade II Braille.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacture, Basis of Design, Nova Polymer Inc. 8 Evans St. Suite 201, Fairfield, NJ 07004 or approved equal.
- B. Paint manufacturer: Matthews Paint – No Substitutions 760 Pittsburgh Drive; Delaware, OH 43015, phone: 1-800-323-6593 (tactile headers and overhead signs).
- C. Photopolymer manufacturer: Nova Polymer Inc. or approved equivalent; P.O. Box 1305; West Caldwell, NJ 07007 (tactile headers).

2.2 SIGNAGE

- A. Typography: Copy shall be clean and accurate production of type face(s) specified. All caps as indicated on the sign type drawings and signage schedule. Letter spacing to match College of DuPage existing signs.
- B. Arrows, symbols, and pictograms will be provided in styles, size, colors and spacing as indicated on the type drawings and College of DuPage standards.
- C. Braille: grade 2 Braille
- D. Tactile head for all signs shall be SRC (Room number)
- E. All signs shall have a magnetic removable header.
- F. Provide colors as specifies:
 - 1. Raised Copy – White first surface screened.
 - 2. Border line – White, subsurface screened, 2x for opacity.
 - 3. Header Face to match PMS 350c Green, subsurface and 50/50 clear coat 1st surface after screening. Back plate w/ thin metal Xi-8331 sim. To Akzo Nobel Metallic 354D3 first surface and edges painted & 80/20 clear coated.
- G. Aluminum:
 - 1. Aluminum: must be free of any defects impairing strength, durability and appearance.
 - 2. Aluminum plate, angles, channels, extrusions, and other structural items fabricated from alloy 6061-T5, or other alloy as required for applicable function and use as recommended by the ALUMINUM COMPANY OF AMERICA, KAISER ALUMINUM, REYNOLDS ALUMINUM or Equivalent manufacture.
 - 3. For interior signs where brush aluminum plate is a decorative piece, the min thickness is to be 1/16” thick and have a etched relief of 1/32”
 - 4. For interior individual letters where aluminum is utilized, the finish is to be clear aluminum with a brushed vertical grain. A vandal resistant clear coat is required.
- H. Reproductive Process:

1. All fonts are to be provided by the sign contractor.
 - a. Silk screening: executed from photo screen prepared from original art. Hand cut screens are unacceptable.
 - b. Silk screening: executed in such a manner that all edges and corners of finished letter forms are true, level and clean.
 - 1) Inks and or paints utilized in silk screening of imprinted areas will be compatible with the surface area in which it will be applied and be compatible with the surface area in which it will be applied and recommended by the manufacturer.
 - 2) Inks paints that will fade, chip, delaminate or deteriorate in close proximity to ultraviolet light or heat are not allowable.
 - 3) Workmanship in connection with all finished and formation of this product or any product within the contract scope will be done so utilizing the highest standards of the trade.
 - c. Digital printing must meet or exceed 1200 DPI and appear in finish or better than silk screening.
 - d. Vinyl die cutting letters & backers: Legends, arrows and logo types on non-illuminated signs, unless otherwise noted shall be precision die cut from "Scotchlite" brand "Flat Top" wide angle sheeting as manufactured by the 3M Company shall be free of trapped air, bubbles, wrinkles and tears. All copy shall be applied straight and true with proper inter – letter and inter word spacing.
 - e. Precision vinyl die cut letters for signs (bottom portion of sign) will be high performance white vinyl from either White Oracal 751 or White 3M 220. No substitutions will be allowed.

I. Photopolymer:

1. Sign panels shall consist of a light – sensitive coating (Photopolymer) on a polyester backing. All polymers to be Nova Polymer. Contractor shall provide Nova Polymer Production Log with As – built drawings.
2. All polymers must be from a single source manufacture and clear in nature so as used on window inserts sign and match those signs already installed on COD Campus.
3. Sign panels to be either backed up with clear acrylic and mechanically fastened to back plate.
4. Tactile headers shall consist of a light – sensitive coating (photopolymer) on a polyester backing. All polymers to be Nova Polymer.
5. All surfaces to be primed, painted, and sealed with Matthews Paint Company products. Include: manufacturer recommended primer, matte finish acrylic polyurethane paint and sealed with a matte finish, vandal-resistant clear polyurethane overcoat. All paints and sealers to have a finish warranty of five (5) years or greater against peeling, cracking, fading, delamination, and other finish deficiencies.
6. Photopolymer component finishes, including but not limited to tactile and Grade II Braille elements, will have a five (5) year written warranty.

J. Matte Acrylic Enamel:

1. All surfaces of photopolymer sign panels to be painted with matte acrylic enamel produced by Matthews Paint Co. Wisconsin and sealed with a matte finish polyurethane sealer manufactured by Matthews Paint Co. Wisconsin.

- K. Fasteners, anchors, and hardware: of prime commercial quality:
 - 1. Hardware: non- conductive and / or insulated when joining non-compatible material. Paint for shop coating and field touch up of dissimilar metal connecting members, including anchors and clips, shall be alkali – resistant, bituminous paint.
 - 2. Vandal resistant fasteners shall be used whenever possible.
- L. Acrylic Plastic:
 - 1. Acrylic thickness: Per COD standards, as manufactured by ROHM & HASS, or approved equal.
 - 2. Finish: Matte – finish unless noted otherwise on exhibits.
- M. Polycarbonate:
 - 1. Thickness: Per COD standards.
 - 2. Finish: Matte – finish unless noted otherwise on exhibits.
- N. Exterior Surfaces:
 - 1. All exterior surfaces shall be painted with matte acrylic enamel and sealed with a matte finish and a polyurethane sealer for durability unless noted otherwise.
- O. Adhesives:
 - 1. Adhesive and adhesive tapes required for plastic, glass and metal shall be as recommended for the particular use and approved by the manufacturer and guaranteed to meet the manufactures requirements. Adhesive tapes shall be as manufactured by 3M. No substitutions and permitted.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify dimensions, tolerance, and method of attachment with other work.
- B. Examine existing conditions of the project, including elements affecting the installation of products, or performance of the work.
- C. Report unsatisfactory or questionable conditions to the College in writing; do not proceed with the work until the College provides further instructions.

3.2 INSTALLATION

- A. Install signs in accordance to COD standards. All discrepancies are to be brought to the attention of the College of DuPage prior to installation.
- B. Attach signs on drywall using the specified and approved. 3M tape.

3.3 CLEANING

- A. Clean all installed signs after installation is complete.
- B. Remove all labels and protective coverings from completed Work.
- C. Thoroughly clean the Work and adjoining surfaces and areas affected by installation.

3.4 RECORD DOCUMENTS

- A. Provide all as-built drawings of all signs.
- B. Provide NoveAcryl Photopolymer Production Log.

END OF SECTION 101419

SECTION 122413 - ROLLER WINDOW SHADES

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. Manually operated roller shades with single rollers.

- B. Related Requirements:

- 1. Section 061053 "Miscellaneous Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.

1.3 ACTION SUBMITTALS

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

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.

- B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.

- C. Samples: For each exposed product and for each color and texture specified, 10 inches long.

- D. Samples for Initial Selection: For each type and color of shadeband material.

- 1. Include Samples of accessories involving color selection.

- E. Samples for Verification: For each type of roller shade.

- 1. Shadeband Material: Not less than 10 inches square. Mark interior face of material if applicable.
 - 2. Roller Shade: Full-size operating unit, not less than 16 inches wide by 36 inches long for each type of roller shade indicated.
 - 3. Installation Accessories: Full-size unit, not less than 10 inches long.

- F. Roller-Shade Schedule: Provide roller shades for windows only where indicated in drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Contractor. Specify that shades are furnished and installed by Contractor.
- B. Product Certificates: For each type of shadeband material.
- C. Product Test Reports: For each type of shadeband material, for tests performed by a qualified testing agency.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- 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. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

- 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. Cancelite Black-Out Shades; Levelor.
 - 2. Solarfective.
 - 3. Tech Sun-Screens; Graber
 - 4. Tontine
- B. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
 - 1. Bead Chains: Manufacturer's standard
 - a. Loop Length: Full length of roller shade
 - b. Limit Stops: Provide upper and lower ball stops.
 - c. Chain-Retainer Type: Clip, jamb mount
- C. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
 - 1. Roller Drive-End Location: Right side of interior face of shade
 - 2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller
 - 3. Shadeband-to-Roller Attachment: Manufacturer's standard method.
- D. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

2.3 SHADEBAND MATERIALS

- A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- B. Light-Blocking Fabric: Opaque fabric, stain and fade resistant.

2.4 ROLLER SHADE FABRICATION

- A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):
 - 1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch per side or 1/2-inch total, plus or minus 1/8 inch.

Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch, plus or minus 1/8 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
 - 1. Opaque Shadebands: Located so shadeband is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION 122413

SECTION 123661.16 - SOLID SURFACING COUNTERTOPS

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. Solid surface material countertops.

1.3 ACTION SUBMITTALS

- A. Product Data: For countertop materials.
- B. Shop Drawings: For countertops. Show materials, finishes, edge profiles, and methods of joining.
 - 1. Show locations and details of joints.
 - 2. Show direction of directional pattern, if any.
 - 3. Show grommet hole locations.
- C. Samples for Initial Selection: For each type of material exposed to view.
- D. Samples for Verification: For the following products:
 - 1. Countertop material, 6 inches square.
 - 2. One full-size solid surface material countertop, with front edge, 8 by 10 inches, of construction and in configuration specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of countertops.

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.8 COORDINATION

- A. Coordinate locations of utilities that will penetrate countertops.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

- A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
 - 1. 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:
 - a. Affinity Surfaces; a brand of Domain Industries, Inc.
 - b. Avonite Surfaces.
 - c. Wilsonart.
 - 2. Type: Provide Standard type
 - 3. Colors and Patterns: As selected by Architect from manufacturer's full range.

2.2 COUNTERTOP FABRICATION

- A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
 - 1. Grade: Premium
- B. Configuration:
 - 1. Front: [Straight, slightly eased at top with separate apron, 6 inches high, recessed 1/4-inch behind front edge.
- C. Countertops: 3/4-inch- thick, solid surface material with front edge built up with same material.

- D. Fabricate tops with shop-applied edges unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
- E. Joints: Fabricate countertops without joints.

2.3 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by solid surface material manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.
- B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- C. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
- D. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- E. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
 - 1. Install metal splines in kerfs in countertop edges at joints. Fill kerfs with adhesive before inserting splines and remove excess immediately after adjoining units are drawn into position.
 - 2. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.

- F. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.
- G. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
 - 1. Seal edges of cutouts in particleboard subtops by saturating with varnish.

END OF SECTION 123661.16

SECTION 233113 - METAL DUCTS

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. Single-wall rectangular ducts and fittings.
- 2. Single-wall round ducts and fittings.
- 3. Sheet metal materials.
- 4. Duct liner.
- 5. Sealants and gaskets.
- 6. Hangers and supports.

- B. Related Sections:

- 1. Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
- 2. Division 23 Section "HVAC Casings" for factory- and field-fabricated casings for mechanical equipment.
- 3. Division 23 Section "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 PERFORMANCE REQUIREMENTS

- A. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.

1.4 SUBMITTALS

- A. Product Data: For each type of the following products:

- 1. Liners and adhesives.
- 2. Sealants and gaskets.

- B. Coordination Drawings: 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. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
2. Suspended ceiling components.
3. Structural members to which duct will be attached.
4. Size and location of initial access modules for acoustical tile.
5. Penetrations of smoke barriers and fire-rated construction.
6. Items penetrating finished ceiling including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - f. Perimeter moldings.

C. Welding certificates.

D. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.
3. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 2, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 SINGLE-WALL ROUND DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Lindab Inc.
 - b. McGill AirFlow LLC.
 - c. SEMCO Incorporated.
 - d. Sheet Metal Connectors, Inc.
 - e. Spiral Manufacturing Co., Inc.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Transverse Joints - Round Duct," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Seams - Round Duct and Fittings," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.
 - 2. Fabricate flat-oval ducts larger than 72 inches in width (major dimension) with butt-welded longitudinal seams.
- D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct

construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: G90.
 - 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- C. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304 or 316, as indicated in the "Duct Schedule" Article; cold rolled, annealed, sheet. Exposed surface finish shall be No. 2B, No. 2D, No. 3, or No. 4 as indicated in the "Duct Schedule" Article.
- D. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
 - 1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.
- E. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.4 DUCT LINER

- A. Fibrous-Glass Duct Liner: Comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation; Insulation Group.
 - b. Johns Manville.
 - c. Knauf Insulation.
 - d. Owens Corning.
 - 2. Maximum Thermal Conductivity:
 - a. Type I, Flexible: 0.27 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.
 - 3. Antimicrobial Erosion-Resistant Coating: Apply to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
 - 4. Solvent-Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.
 - a. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Insulation Pins and Washers:

1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
- C. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-19, "Flexible Duct Liner Installation."
1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
 2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
 3. Butt transverse joints without gaps, and coat joint with adhesive.
 4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
 5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
 6. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm.
 7. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
 8. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:
 - a. Fan discharges.
 - b. Intervals of lined duct preceding unlined duct.
 - c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm or where indicated.
 9. Secure insulation between perforated sheet metal inner duct of same thickness as specified for outer shell. Use mechanical fasteners that maintain inner duct at uniform distance from outer shell without compressing insulation.
 - a. Sheet Metal Inner Duct Perforations: 3/32-inch (2.4-mm) diameter, with an overall open area of 23 percent.
 10. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

2.5 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Two-Part Tape Sealing System:

1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
2. Tape Width: 3 inches.
3. Sealant: Modified styrene acrylic.
4. Water resistant.
5. Mold and mildew resistant.
6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature: Minus 40 to plus 200 deg F.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
10. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Solvent-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Base: Synthetic rubber resin.
3. Solvent: Toluene and heptane.
4. Solids Content: Minimum 60 percent.
5. Shore A Hardness: Minimum 60.
6. Water resistant.
7. Mold and mildew resistant.
8. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
9. VOC: Maximum 395 g/L.
10. Maximum Static-Pressure Class: 10-inch wg, positive or negative.
11. Service: Indoor or outdoor.
12. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

E. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.

5. Use: O.
 6. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- F. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.
- G. Round Duct Joint O-Ring Seals:
1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
 2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
 3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.6 HANGERS AND SUPPORTS

- A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
- B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
- C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct."
- D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
- E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.
- F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
- G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- H. Trapeze and Riser Supports:
1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
 2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
 3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations.

Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install round ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct with sound caulk. Overlap openings on four sides by at least 1-1/2 inches.
- K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 23 Section "Air Duct Accessories" for fire and smoke dampers.
- L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials.

3.2 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

3.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports."
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 - 1. Where practical, install concrete inserts before placing concrete.
 - 2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 - 3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
 - 4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
 - 5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.
- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Division 23 Section "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 PAINTING

- A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Division 09 painting Sections.

3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Leakage Tests:
 - 1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.
 - 2. Test the following systems:
 - a. Ducts with a Pressure Class Higher Than 3-Inch wg: Test representative duct sections totaling no less than 25 percent of total installed duct area for each designated pressure class.
 - 3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
 - 4. Test for leaks before applying external insulation.
 - 5. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.
- C. Duct system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.8 START UP

- A. Air Balance: Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing for HVAC."

3.9 DUCT SCHEDULE

- A. Supply Ducts:
 - 1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units:
 - a. Pressure Class: Positive 2-inch wg.
 - b. Minimum SMACNA Seal Class: C.
 - c. SMACNA Leakage Class for Rectangular: 12.
 - d. SMACNA Leakage Class for Round and Flat Oval: 12.
 - 2. Ducts Connected to Variable-Air-Volume Air-Handling Units:
 - a. Pressure Class: Positive 4-inch wg.
 - b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 3.
 - d. SMACNA Leakage Class for Round and Flat Oval: 3.
- B. Return Ducts:

1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units:
 - a. Pressure Class: Positive or negative 2-inch wg.
 - b. Minimum SMACNA Seal Class: C.
 - c. SMACNA Leakage Class for Rectangular: 12.
 - d. SMACNA Leakage Class for Round and Flat Oval: 12.
 2. Ducts Connected to Air-Handling Units:
 - a. Pressure Class: Positive or negative 2-inch wg.
 - b. Minimum SMACNA Seal Class: B.
 - c. SMACNA Leakage Class for Rectangular: 6.
 - d. SMACNA Leakage Class for Round and Flat Oval: 6.
- C. Exhaust Ducts:
1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
 - a. Pressure Class: Negative 2-inch wg.
 - b. Minimum SMACNA Seal Class: C if negative pressure, and A if positive pressure.
 - c. SMACNA Leakage Class for Rectangular: 12.
 - d. SMACNA Leakage Class for Round and Flat Oval: 6.
 1. Ducts Connected to Commercial Kitchen Hoods: Comply with NFPA 96.
 - a. Exposed to View: Type 304, stainless-steel sheet, No. 4 finish.
 - b. Concealed: Type 304, stainless-steel sheet, No. 2D finish
 - c. Welded seams and joints.
 - d. Pressure Class: Positive or negative 2-inch wg
 - e. Minimum SMACNA Seal Class: Welded seams, joints, and penetrations.
 - f. SMACNA Leakage Class: 3.
 2. Ducts Connected to Dishwasher Hoods:
 - a. Type 304, stainless-steel sheet.
 - b. Exposed to View: No. 4 finish.
 - c. Concealed: No. 2D finish.
 - d. Welded seams and flanged joints with watertight EPDM gaskets.
 - e. Pressure Class: Positive or negative 2-inch wg
 - f. Minimum SMACNA Seal Class: Welded seams, joints, and penetrations.
 - g. SMACNA Leakage Class: 3.
 3. Ducts Connected to dryer exhaust.
 - a. Aluminum.
- D. Outdoor-Air (Not Filtered, Heated, or Cooled) Ducts:
1. Ducts Connected to Air-Handling Units:
 - a. Pressure Class: Positive or negative 2-inch wg.

- b. Minimum SMACNA Seal Class: B.
 - c. SMACNA Leakage Class for Rectangular: 12.
 - d. SMACNA Leakage Class for Round and Flat Oval: 12.
- E. Intermediate Reinforcement:
- 1. Galvanized-Steel Ducts: Galvanized steel.
 - 2. Stainless-Steel Ducts:
 - a. Exposed to Airstream: Match duct material.
 - b. Not Exposed to Airstream: Match duct material.
- F. Liner:
- 1. Transfer Ducts: Fibrous-Glass Duct Liner, 1-1/2 inch thick.(refer to return ceiling diffuser detail)
- G. Elbow Configuration:
- 1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."
 - a. Velocity 1000 fpm or Lower:
 - 1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
 - 2) Mitered Type RE 4 without vanes.
 - b. Velocity 1000 to 1500 fpm:
 - 1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
 - 2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
 - 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
 - c. Velocity 1500 fpm or Higher:
 - 1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - 2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
 - 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
 - 2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."
 - a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.

- c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
- 3. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-3, "Round Duct Elbows."
 - a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
 - 1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
 - 2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
 - 3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
 - 4) Radius-to Diameter Ratio: 1.5.
 - b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
 - c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam.

H. Branch Configuration:

- 1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-6, "Branch Connections."
 - a. Rectangular Main to Rectangular Branch: 45-degree entry.
 - b. Rectangular Main to Round Branch: Spin in.
- 2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees." Saddle taps are permitted in existing duct.
 - a. Velocity 1000 fpm or Lower: 90-degree tap.
 - b. Velocity 1000 to 1500 fpm: Conical tap.
 - c. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION 233113

SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

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. Ceiling diffusers.
- 2. Rectangular and square ceiling diffusers.
- 3. Linear slot diffusers.
- 4. Fixed face registers and grilles.

- B. Related Sections:

- 1. Division 08 Section "Louvers and Vents" for fixed and adjustable louvers and wall vents, whether or not they are connected to ducts.
- 2. Division 23 Section "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated, include the following:

- 1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
- 2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

PART 2 - PRODUCTS

2.1 CEILING DIFFUSERS

- A. Rectangular and Square Ceiling Diffusers:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carnes.
 - b. Krueger.

- c. METALAIRE, Inc.
 - d. Nailor Industries Inc.
 - e. Price Industries.
 - f. Titus.
 - g. Tuttle & Bailey.
2. Devices shall be specifically designed for variable-air-volume flows.
 3. Material: Steel.
 4. Finish: Baked enamel, white.
 5. Face Size: 24 by 24 inches.
 6. Face Style: Plaque.
 7. Mounting: T-bar.
 8. Pattern: Fixed.
 9. Dampers: None.
 10. Provide plaster frame at drywall ceilings.

2.2 CEILING LINEAR SLOT OUTLETS

A. Linear Slot Diffuser :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carnes.
 - b. Hart & Cooley Inc.
 - c. Krueger.
 - d. METALAIRE, Inc.
 - e. Nailor Industries Inc.
 - f. Price Industries.
 - g. Titus.
 - h. Tuttle & Bailey.
2. Devices shall be specifically designed for variable-air-volume flows.
3. Material - Shell: Steel, insulated.
4. Material - Pattern Controller and Tees: Aluminum.
5. Finish - Face and Shell: Baked enamel, black.
6. Finish - Pattern Controller: Baked enamel, black.
7. Finish - Tees: Baked enamel, white.
8. Slot Width: 1 inch .
9. Number of Slots: Two.
10. Length: 48 inches.
11. Accessories: Center notch where required.

2.3 REGISTERS AND GRILLES

A. Fixed Face Register:

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

- a. A-J Manufacturing Co., Inc.
 - b. Anemostat Products; a Mestek company.
 - c. Carnes.
 - d. Dayus Register & Grille Inc.
 - e. Hart & Cooley Inc.
 - f. Krueger.
 - g. Nailor Industries Inc.
 - h. Price Industries.
 - i. Titus.
 - j. Tuttle & Bailey.
2. Material: Steel.
 3. Finish: Baked enamel, white.
 4. Face Arrangement: 1/2-by-1/2-by-1/2-inch core.
 5. Core Construction: Integral.
 6. Frame: 1 inch wide.
 7. Mounting Frame: Filter.
 8. Mounting: Countersunk screw.
 9. Damper Type: None.
 10. Accessory: Filter.

2.4 SOURCE QUALITY CONTROL

- A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install diffusers, registers, and grilles level and plumb.
- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

- C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

- A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 233713

SECTION 260100 - BASIC ELECTRICAL MATERIALS AND METHODS

26-1 GENERAL INSTRUCTIONS.

1. All requirements under division one and the general supplementary conditions of these specifications shall be a part of this section. Each contractor shall be responsible for becoming thoroughly familiar with all its contents as to requirements which affect this division or section. The work required under this section includes all material, tools, equipment, appliances, hoisting, excavation, backfill, restoration, and labor required to complete all the work as required by the drawings and specifications or reasonably inferred to be necessary to facilitate each system functioning as indicated by the design and the equipment specified. Total installation is to conform to all codes and standards affecting the work. Coordinate with the owner. The contractor shall do all alterations and rework required for the proper integration of new with existing areas.

2. Inspection of site.

The contractor shall personally inspect the site of the proposed work and become fully informed as to the conditions under which the work is to be done. Use field measurements and observations to prepare bid. Commencement of work infers acceptance of all existing conditions.

3. Material and workmanship.

All material and apparatus shall be new and in first class condition. All material and apparatus shall have markings or nameplate identifying the manufacturer and providing sufficient reference to establish quality, size, and capacity. All workmanship shall comply with published industry standards, including NECA/NEIS, NECA-1-2010, and the American Electrician's Handbook, latest edition. OSHA rules, regulations, and requirements are a part of this contract. Electrical contractor shall follow them as well as state and local requirements for the safety of workers on the job and passers-by.

4. Coordination.

The contractor shall coordinate all work with other contractors and subcontractors so that various components of the electrical system will be installed at the proper time, will fit the available space, and will allow proper service access to all equipment. The contractor shall refer to architectural, structural, and mechanical drawings and relevant equipment drawings to determine the extent of clear spaces. The contractor shall make all offsets required to clear equipment, beams, and other structural members, and to facilitate concealing conduit in the manner anticipated in the design. The contractor shall provide materials with trim which will fit properly the types of ceiling, wall, or floor finish actually installed.

5. Dimensions and layout.

The drawings are schematic in nature and not intended to show every accessory or component necessary for a complete installation. Figured dimensions shall be taken in preference to scale dimensions. Determine exact locations by job measurements, by checking the requirements of other trades, and by reviewing all contract documents. The contractor shall be held responsible for errors which could have been avoided by proper checking and inspection.

6. Minor Electrical Demolition.

- a. The Owner determines which sections (if any) of the existing Fire Alarm and/or Fire Suppression systems shall remain in service during demolition.
- b. The Owner determines which sections (if any) of an existing telephone system shall remain in service during demolition.

- c. The drawings are intended to indicate the scope of work required and do not indicate every box, conduit, or wire that must be removed. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING A BID AND VERIFY EXISTING CONDITIONS.
- d. Where walls, ceilings, structures, etc., are indicated as being removed on general drawings, the Contractor shall be responsible for the removal of all electrical equipment, devices, fixtures, raceways, wiring, systems, etc., from the removed area.
- e. Where ceilings, walls, structures, etc., are temporarily removed and replaced by others, this Contractor shall be responsible for the removal, storage, and replacement of equipment, devices, fixtures, raceways, wiring, systems, etc.
- f. Verify that abandoned wiring and equipment serve only abandoned equipment or facilities. Extend conduit and wire to facilities and equipment that will remain in operation following demolition. Extension of conduit and wire to equipment shall be compatible with the surrounding area.
- g. Coordinate scope of work with all other Contractors and the Owner at the project site. Schedule removal of equipment and electrical service to avoid conflicts.
- h. Bid submittal shall mean the Contractor has visited the project site and has verified existing conditions and scope of work.
- i. Maintain existing Fire Alarm and/or Fire Suppression Systems as required by Owner.
 - a. Temporary disabling of an in-service system requires that the Owner be notified 24 hours in advance.
- j. Existing Electrical Service: Maintain existing system in service.
- k. Disconnect electrical systems in walls, floors, structures, and ceilings scheduled for removal.
- l. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations. Assume all equipment and systems must remain operational unless specifically noted otherwise on drawings.
- m. The E.C. is responsible for all temporary lighting and power in all work areas per Division 1. Comply with NECA 200-2010.
- n. Remove, relocate, and extend existing installations to accommodate new construction.
- o. Remove abandoned wiring and raceway to source of supply.
- p. Remove exposed abandoned raceway, including abandoned raceway above accessible ceiling finishes. Cut raceway flush with walls and floors, and patch surfaces. Remove all associated clamps, hangers, supports, etc. associated with raceway removal.
- q. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is removed. Provide blank cover for abandoned outlets that are not removed. Patch openings created from removal of devices to match surrounding finishes.
- r. Disconnect and remove abandoned panel-boards and distribution equipment.
- s. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- t. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories. Provide for proper recycling or disposal of existing lamps and ballasts removed from the site in accordance with EPA and State of Illinois regulations.
- u. Repair adjacent construction and finishes damaged during demolition and extension work. Patch openings to match existing surrounding finishes.
- v. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.
- w. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

- x. HID and fluorescent lamps, determined by the Toxicity Characteristic Leachate procedure (TCLP), to be hazardous waste shall be disposed of in a permitted hazardous waste disposal facility or by a permitted lamp recycler.
- y. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- z. Floor slabs may be post-tensioned. X-ray all penetrations prior to cutting and/or drilling to avoid any tension cables or utilities encased in floor construction.
- aa. Floor slabs may contain conduit systems. The Contractor is responsible for taking any measures required to ensure no conduits or other services are damaged. This includes X-ray or similar non-destructive means.
- bb. The Contractor is responsible for all costs incurred in repair, relocations, or replacement of any cables, conduits, or other services if damaged without proper investigation.
- cc. Distribution and Branch Panelboards: Clean exposed surfaces and check tightness of electrical connections. Lubricate where required. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

6. Ordinances and codes.

Contractor's performance, workmanship, and materials shall comply with state and local building codes, NFPA codes as referenced therein, local amendments, industry standards (NEMA, NECA, etc.), and/or all other applicable codes and ordinances. Contractor shall comply with rules and regulations of the public utilities and municipal departments affected as applicable. Obtain and pay all permits, unless stipulated otherwise in other Division 1. Contractor shall be held responsible for any violations of law. Contractor shall maintain all necessary signal lights and guards for the safety of the public. See drawings for additional information.

7. Substitutions:

- a. The specification provides that the base bid of all contractors shall include the products specifically named, the contractor being permitted to submit in the form of alternates with his proposal products of any other manufacturers for similar use, provided the difference in cost, if any, is specified in each case. The terms "approved" or "approved equal" shall mean approved by the architect as an acceptable alternate bid. The term "equal" or "available manufacturers" shall mean products similar or identical in appearance, function, or specification to a basis-of-design product and manufactured to directly compete with, replace, or supersede the specified product. The architect shall have final authority as to whether a substitution is an acceptable replacement to the specified item. The proposed substitution may also be rejected for aesthetic reasons. In the event of rejection, the specified item shall be furnished.
- b. Value Substitutions: The contractor is completely responsible for all substitutions, changes, or deletions of work or products proposed to and accepted by the owner or architect in lieu of specified, and shall hold the owner and architect harmless for any liabilities created by such changes. As much as is possible, such proposals for change shall indicate how the specified design goals, the work of other trades, and the construction schedule are expected to be impacted. The contractor is responsible for research of all codes and standards applicable to the proposed change, professional design services necessary to implement the change, re-submittals for state and municipal permits and additional fees invoked by the change, and notification of and coordination with other trades impacted by the change. After acceptance of a change proposal by the owner or architect, the contractor shall notify them within ten calendar days of any unexpected discovered conditions that may impact the work. After this period, the contractor shall not be excused from any liabilities created by their own proposed change(s) and shall be responsible for any discovered costs incurred by anyone due to the change(s).

8. Adjusting, aligning, and testing.

All electrical equipment on this project furnished under this division and all electrical equipment furnished by others and installed by the electrical contractor shall be adjusted, aligned, and tested for proper operation by the electrical contractor. Complete wiring systems shall be free from faults. All motors shall be verified for proper rotation and protection. The contractor shall maintain on the project premises the following at all times: a true rms reading voltmeter and ammeter, a megger insulation resistance tester. The contractor shall provide test data readings as requested or as required.

9. Operation and maintenance instructions.

Submit to the architect three copies, unless indicated otherwise in Division 1, of maintenance and operation instruction manuals appropriately bound into manual form including record copies of the following, revised if necessary to show system and equipment as actually installed: manufacturer catalog sheets, wiring diagrams, maintenance instructions, operating instructions, parts lists. Contractor shall also provide adequate owner's staff training at the termination of the work. Electronic submittals are acceptable with the approval of the owner and/or architect.

11. Start up of systems and Commissioning.

Prior to startup of the electrical systems, the contractor shall check all components and devices, lubricate items accordingly, and tighten all screwed and bolted connections. Adjust taps on each transformer for rated secondary voltage. Check and record building's service entrance voltage, grounding conditions, ground resistance, and proper phasing. Balance all single phase loads at each panelboard; redistribute branch circuit connections until balance is achieved. Replace all burned-out lamps. Touch-up paint all marred equipment finishes. After all systems have been inspected and adjusted, confirm all operating features required by the drawings and specifications and make final adjustments as necessary.

Commissioning.

All electrical systems shall be commissioned by the contractor in accordance with applicable section of IECC 2012 and with NECA 90-2009 (or latest iteration), Recommended Practice for Commissioning Building Electrical Systems (ANSI), available from NECA Order Desk at (301)215-4504, orderdesk@necanet.org, or www.neca-neis.org/catalog. Documentation shall be included in the close-out documents.

12. Guarantee.

The contractor shall guarantee against defective workmanship and material for a period of one year from date of substantial completion. Guarantee shall include material to be replaced and all labor required. Manufacturers' standard guarantees and warranties of longer duration shall be in force.

26-2 ELECTRICAL INSTALLATION.

1. Cleaning.

Dirt and refuse resulting from the performance of the work shall be removed from the premises as required to prevent accumulation. The contractor shall cooperate in maintaining reasonably clean premises at all times. Immediately prior to final inspection, the contractor shall make a final cleanup of dirt and refuse resulting from his work. The contractor shall clean all material and equipment installed under the electrical contract. Dirt, dust, plaster, stains, and foreign matter shall be removed from all surfaces. Damaged finishes shall be touched up and restored to their original condition.

2. Cutting and patching.

This contractor shall do all cutting of walls, floors, ceiling etc. as required to install work under this section. The contractor shall obtain permission of the architect or owner before doing any cutting or coring. All holes shall be cut as small as possible. Contractor shall patch walls, floors, etc. as required by work under this section. All patching/repairs shall match the original finish and construction, and be approved by the architect.

3. Rough-in.

Coordinate without delay all roughing-in with general construction. All conduit rough-in shall be concealed except in unfinished areas and where otherwise shown.

4. Conduit.

All conduits shall be run concealed except where otherwise noted (see Section 6 below). All conduits associated with the electrical service or run underground, exposed to weather, or other hazardous conditions shall be rigid. All other conduit may be EMT where approved by local code. Install PVC exposed in corrosive areas such as pools and pool pump rooms and chemical rooms as permitted. PVC in or under slab shall be an acceptable substitute when allowed by local code, and where it is changed to rigid at least 10'-0" before it exits the slab. Minimum conduit size for power applications is 3/4" trade size; minimum conduit size for low voltage applications is 1" trade size; minimum size embedded conduit is 3/4" trade size; maximum size embedded in toppings is 1" trade size. Use flexible metal conduit or liquidtight flexible metal conduit for connections to vibrating equipment, transformer, lighting troffers, and the like. All conduits shall be provided with an insulated equipment grounding conductor.

6. Conduit installation.

Comply with NECA 101-2013.

All wiring shall be run in conduit, except that low voltage power limited cable may be installed concealed using open wiring methods where acceptable to the local AHJ. Conduit shall be installed concealed above suspended ceilings, in wall cavities, or below floors wherever possible or unless noted otherwise on the plans. Notify the architect where concealment is not possible, and provide surface metallic raceway manufactured for the purpose. Run parallel to building lines. Conduit shall be installed to requirements of structure and to requirements of all other work on the project. Conduit shall be installed to clear all openings, depressions, pipes, ducts, reinforcing steel, etc. Conduits shall be installed continuous between connections with a minimum possible number of bends and not more than four 90-degree bends between boxes. Bends shall be smooth and even and shall be made without flattening conduit or flaking enamel or galvanizing. Long radius elbows shall be used where necessary or specified. No short radius bends. Conduits shall be securely fastened in place with approved straps, hangers, and steel supports as required. Groups of horizontal conduit runs shall be clamped to steel channels and suspended from inserts or anchors spaced not more than 10 feet apart. Vertical feeder conduits shall be securely clamped to structural steel members attached to structure. Cable clamps shall be installed for support of vertical feeders where required. Conduit supports shall be added within 12" at one end of all bends. Conduit shall not be supported from suspended ceiling components. Conduit ends shall be reamed before installation and all conduits shall be thoroughly cleaned before installation and kept clean after installation. Openings in boxes shall be plugged or covered as required to keep conduit clean during construction and all conduit shall be fished clear of obstructions before the pulling of wires. All conduits shall be of ample size for pulling of wire and shall not be smaller than code requirements. All electrical work shall be protected against damage during construction. Any work damaged or moved out of line after roughing-in shall be repaired to meet engineer's approval without additional cost to the owner. Conduit termination at panelboards, switchboards, motor control equipment and junction boxes shall be aligned and installed true and plumb. Install approved expansion fittings where conduit passes through expansion joints. Install a pull wire in each empty conduit which is left by the contractor for installation

of wires or cables by others. Make all joints and connections in a manner which will insure mechanical strength and electrical continuity. Thru-wiring of light fixtures is not permitted except in fluorescent channels. Conduit seals shall be installed on all conduits passing from non-conditioned to conditioned spaces and in all conduit penetrations of freezer and cooler walls. Furnish and install the necessary junction boxes, couplings, supports, adapters, etc., to form a complete assembly. Conduits shall be identified for voltage per ANSI A13.1.

7. Conduit sizes indicated on the plan are intended to represent the minimum size required to accommodate the specified conductors. The contractor shall select larger trade sizes and longer radius bends where necessary to alleviate jamming and excessive pulling tension due to distance, number of bends, and the like.

8. Bushings and locknuts.

Where conduits enter boxes they shall be rigidly clamped to the box by interior and exterior locknuts or approved fittings, and the conduit end capped with suitable bushing. Pre-insulated fittings are acceptable; provide bonding at concentric knockouts as applicable.

9. Wire.

All building wire shall have copper conductors, with U.L. label and 600-volt insulation. All wire shall be run in conduit. All exterior wire shall be XHHW stranded below grade; thermoplastic types not acceptable. Interior feeder and branch circuit wire shall be type THHN/THWN for interior applications; use XHHW where a circuit extends beyond the foundation. All wire #10 and smaller shall be solid or stranded per contractor discretion unless otherwise required; wire larger than #10 shall be stranded. Wire within continuous fixture channels shall be type THHN. All branch circuit wire shall be not smaller than #12 awg wire. If no wire size is indicated on the drawings for a branch circuit, provide #12 awg wire and 20a circuit breaker. Non-power limited control wire shall have 600-v insulation and be the proper type, size, construction, and number as required by the equipment manufacturer.

10. Wiring installation.

All wiring shall be installed in approved raceway and enclosures, except where low voltage wire is allowed to be installed via open methods. Support all wire and cables in vertical installations as required by code by installing cable supports or plug-type conduit riser supports. All wire and cable in conduit shall be continuous without taps or splices. All splices or taps shall occur in approved boxes and enclosures and shall be kept to the minimum required, and shall be made with approved solderless connections. All splices, taps, and joints shall be insulated as required by code. All materials used to terminate, splice, or tap conductors shall be designed for the purpose, properly sized, U.L. listed for the specific application and conductors involved, and installed in strict accordance with the manufacturer's specifications using specified tools. Where wire is indicated to be installed, but the connection is indicated "future" or "by others", contractor shall leave a minimum of 3 feet of slack at the box, taping the ends of the conductors.

Conductors shall have insulation of the proper color to match NEC color code table and as indicated below. In larger wire sizes where properly colored insulations are not available, the contractor shall install listed vinyl plastic identification tape of the appropriate color at all termination points, junction boxes, and pull boxes.

120/208-volt system: phase A, black; phase B, red; phase C, blue; neutral, white; ground, green.

277/480-volt system: phase A, brown; phase B, orange; phase C, yellow; neutral, gray; ground, green with white stripe.

All terminal blocks and wire terminals for control wiring shall be properly numbered for identification with listed vinyl stick-on markers or equivalent. Identify fire alarm wiring per NEC 760.

Wiring to low voltage wiring systems shall comply with NEC Section 411 and other sections referenced therein.

Use consistent identification designations throughout Project. Install identifying devices before installing ceilings and similar concealment.

11. Cable Ties.

1. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, Type 6/6 nylon.
 - a. Minimum Width: 3/16 inch (5 mm).
 - b. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).
 - c. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
 - d. Color: Black except where used for color-coding.
2. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, Type 6/6 nylon.
 - a. Minimum Width: 3/16 inch (5 mm).
 - b. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).
 - c. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
 - d. Color: Black.
3. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, self-locking.
 - a. Minimum Width: 3/16 inch (5 mm).
 - b. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 7000 psi (48.2 MPa).
 - c. UL 94 Flame Rating: 94V-0.
 - d. Temperature Range: Minus 50 to plus 284 deg F (Minus 46 to plus 140 deg C).
 - e. Color: Black

11. Junction boxes.

Provide junction boxes, pull boxes, cabinets, and wireways wherever necessary for proper installation of various electrical systems according to the National Electrical Code and where indicated on the drawings. Size as required for the specific function or as required by the NEC, whichever is more restrictive. Junction boxes shall be minimum 4" square or larger, with galvanized cover.

12. Outlet boxes.

All outlet boxes including switch, receptacle, and outlets, shall be manufactured for the purpose, and sized as required per NEC. All boxes shall be set in walls, columns, floors, or ceilings in finished areas so as to be flush with the finished surface and be accurately set and rigidly secured in position. When using spring steel or similar clips to mount a box to a stud, also provide matching far side box supports. Provide plaster rings, extension rings, and masonry rings as required for flush mounting.

13. Outlet locations.

Outlets are only approximately located on the plans, and great care must be used in the actual location by consulting the various large scale detailed drawings and equipment cuts, or by securing definite locations from the architect. The height of outlets shall be installed according to the device height detail provided

on the plans, or as otherwise required by locally accepted accessibility rules, or to accommodate casework heights.

14. Wiring devices.

Comply with NECA 130-2010, Standard for Installing and Maintaining Wiring Devices.

Furnish and install outlets and switches where shown or required. Minor changes relative to the location of electrical equipment may be made by this contractor to comply with the structural and building requirements as determined in the course of construction. All outlets and switches must be of the same manufacturer and not mixed on the project. Color of toggles and receptacles shall be brown in wood surfaces and white for painted surfaces. All switches shall be minimum 20-amp commercial grade equal to Hubbell CS120 series. All receptacles shall be minimum 20-amp commercial grade equal to the Hubbell CRxx family; provide GFCI protection wherever required by code and tamper resistant devices where indicated. Other devices shown but not specified above shall be of the same construction quality as defined above. Receptacles shall be oriented vertically with the ground prong up or horizontally with the neutral up to match a building standard or where a specific orientation is required by local code.

15. Cover plates.

All commercial switch and outlet plates shall be brushed stainless steel. Contractor shall verify the desired material with the architect before installation. Device plates in unfinished spaces shall be compliant stamped steel ("garvin") type manufactured for the purpose; trim covers in damp locations shall be weatherproof as indicated below. Group switches serving the same area under multi-gang trim plates. Plates shall be set plumb, parallel, and flush with the wall finish.

16. Weatherproof covers.

Weatherproof cover plates shall be cast metal with neoprene gasketing and not relying on the device for the integrity of its attachment to the box. Raintite covers shall be durable cast metal with molded metal "in-use" covers that protect cords that are plugged in. Devices shall be listed weather-resistant type.

17. Firestopping.

This contractor shall seal all penetrations through fire rated floor and wall assemblies in accordance with the NFPA codes and UL wall construction types. The sealing system shall be capable of passing a three-hour test, per ASTM E-814 (UL 1479). Penetration sealing system shall be acceptable to the AHJ (E.C. to verify) and installed per the manufacturers recommendations. Use silicon type where accumulation of water is an issue. PVC conduit may not be used as a sleeve through fire rated partitions for any reason.

18. Roof penetrations.

Provide gasketed roof portals (equal to Portals Plus) listed for use with the roofing material as required. All roof penetrations shall be leaktight at the termination of the work.

19. Access doors.

Provide access doors in ceilings, walls, etc. where indicated or required for access to or to maintain work installed under this section. Provide fire rated type in fire-resistance rated elements, gasketed type in showers and locker rooms and similar areas. Milcor or equal.

20. Equipment identification.

This contractor shall furnish and install equipment identification nameplates on all panelboards, safety switches, starters, dimmers, drives, and the like, and wherever mandated by code. Nameplates shall be engraved phenolic plastic, and shall be firmly attached to the equipment. Nameplates shall clearly identify each item, its voltage, and what it controls.

21. Plenum spaces.

All equipment and wiring methods in ceiling cavities used as environmental air plenums shall be approved for the application and conform to the NEC.

22. Seismic Bracing.

Verify seismic rating of the structure with the structural plans. Provide approved engineered seismic bracing or anchors where required for lay-in fixtures, cable trays, conduits, enclosures, and the like as required by code.

26-3. ELECTRICAL SERVICE AND GROUNDING.

1. Connection to serving utilities (when applicable).

Contractor shall provide proper termination, metering provisions, grounding, etc., for electrical services for connection by the serving utility in strict compliance with the requirements of all codes having jurisdiction and the rules of the serving utility involved. All service terminations and connection points shall be verified in the field by this contractor, and he shall work in conjunction with the utility involved in the installation of all service equipment and cable. This contractor shall provide all conduit, cable, accessories, etc. specified by the utility. The contractor shall notify the utility company involved within two weeks after notice to proceed, of all required information necessary in order for the utility to supply the project without delay.

2. Grounding.

Furnish and install a complete bonded grounding electrode system complying with the latest applicable edition of the National Electrical Code. The electrical service, all transformers, raceways, frames, and the like shall be effectively grounded by this contractor in a thorough and efficient manner in conformance with the NEC. All raceways shall contain an equipment grounding conductor; raceways shall not be relied upon as an effective ground return path. Voltage drop shall not exceed 2%.

3. Unless superseded by locally accepted codes and standards, grounding and bonding shall be performed in accordance with NECA 331-2004 (or latest applicable iteration), Standard for Installing Bonding and Service Entrance Grounding.

26-4. DISTRIBUTION AND CONTROL EQUIPMENT.

1. Power distribution panels.

Circuit breaker Types: Panels installed as service entrance equipment shall be permanently marked to identify it as suitable for use as service entrance equipment with number and size breakers as scheduled. Panels shall have copper bus and be braced for available inrush (E.C. to verify with utility). Branch breakers shall have an engraved phenolic nameplate for circuit identification. Panels shall have a hinged, lockable door to cover the circuit breaker handles. A typewritten circuit directory shall be installed on the inside face of the door; provide warning labels indicating arc-flash hazard and mandatory working clearances.

2. Panelboards.

Comply with NECA 407-2009, Recommended Practice for Installing and Maintaining Panelboards. New panelboards shall be equal to Square D NQ or NF series as applicable, unless necessary to match an existing building standard. The panelboards shall be complete with thermal magnetic plastic case circuit breakers of the bolt-on type assembled in a finished cabinet. All 2 and 3-pole breakers shall have common trip. Breakers used as switches shall be marked "SWD." and approved for the purpose. Breakers serving hvac equipment shall be rated HACR type. Provide copper bussed panels, unless indicated

otherwise on the plans, and braced for available inrush (E.C. to verify). Load Centers with plug-in circuit breakers shall be installed only where indicated and shall be acceptable to the local AHJ. Panelboard or load center construction shall be of NEMA design suitable for the environment into which it is installed.

3. Existing panelboards.

New circuit breakers required to be installed in existing panelboards or load centers shall be of the same manufacturer, type, and AIC rating as the existing circuit breakers. The new breaker shall be listed for the application; breakers may not be field modified and otherwise improperly forced into place. Provide new typewritten panel directories showing assignments of all circuits affected by the work.

4. Disconnect switches.

Contractor shall furnish and install fused or non-fused safety switches as noted or required. Provide NEMA heavy duty externally operable type. Fuse holders shall have Class R rejection feature. Construction shall be of a NEMA design suitable for the environment into which it is installed. In kitchen applications, provide NEMA 4X compact non-metallic types equal to Bussman EFJ/ENF series, Hubbell HBLDS3 series, or similar. Manually test all safety switches for proper operation prior to energizing.

5. Fuses.

Fuses shall be of the size and type required. Fuses larger than 600-amp shall be Class L current limiting type. Fuses for motors shall be class RK5 time-delay type. All fuses shall have a minimum 100kaic rating. When applicable, comply with NECA 700-2010, Standard for Installing Overcurrent Protection to Achieve Selective Coordination.

6. Dry-type transformers (where applicable).

Dry-type transformers shall be 150-degree temp rise above 40-degree ambient rated. Insulating materials shall exceed NEMA ST20 standards and be rated for 220-degree c UL component recognized insulation system. Phase, voltage, and size shall be as noted on the drawings. Sound level shall not exceed 45 db per NEMA standards. Units larger than 24kva shall have four 2.5% full capacity primary taps. Units up to 225 kva shall be mounted on vibration isolation pads with a .25" static deflection. Conduit connections to transformers shall be made with flexible metallic conduit with at least 6" of slack in all directions. Transformer enclosures shall be ventilated and be fabricated of heavy gauge sheet steel construction. Maintain minimum NEC clearances and manufacturer required clearances.

7. Variable frequency drives are specified in Division 26 2923 when applicable.

8. For new buildings with emergency power sources and utility services in excess of 1200-amperes, engage the distribution equipment manufacturer's engineering services to provide a selective coordination fault-current study of the electrical distribution system from normal and alternate power sources using a computer software program to plot and diagram time-current-characteristic curves and report recommended settings and ratings of all overcurrent protective devices. The study shall include arcing faults, simultaneous faults, explicit negative sequence, and mutual coupling in zero sequence as deemed necessary by the engineer.

26-5. LIGHT FIXTURES, LAMPS, BALLASTS.

1. Light fixtures shown on the electrical drawings represent general arrangements only. Refer to architectural drawings for more exact locations or specific directions. Coordinate locations with all other trades before installation to avoid conflicts. Light fixture locations in mechanical rooms shall be coordinated with final installed piping and ductwork layouts.

2. Light fixtures.

Light fixtures as scheduled on drawings shall be furnished complete with lamps and ballasts. Provide all material and labor to securely hang fixtures, clean them, and make them completely ready for use. Provide all accessories necessary for a complete installation. Provide proper trim to fit each ceiling condition actually encountered. When required to do so, provide additional approved supports connected to structure to conform to UBC 25-231 seismic requirements. Through wiring of fixtures is not allowed except for fluorescent channels or as manufactured for the purpose. Each recessed troffer fixture must be connected by a whip (maximum 6' long) to a junction box.

3. Lamps.

When applicable, lamps for all lighting fixtures shall be provided and installed by this contractor. Provide lamps or light generators as scheduled on the drawings. In all cases fluorescent lamps shall be compatible with the specified fixture. All linear fluorescent lamps shall be T8 type with 4000k phosphors, unless otherwise indicated. Exterior fixtures must have lamps providing at least 60 lumens per watt. The use of incandescent lamps is not acceptable.

4. Ballasts.

All fluorescent ballasts shall be thermally protected against overheating, minimum ETL-CBM Class P, and comply with the National Ballast Energy law. Sound levels shall not exceed Class A ambient noise levels. Indoor fluorescent ballasts shall be electronic type suitable for operating specified amps; total allowable harmonic distortion less than 20%; 20khz frequency or greater; operate with no visible flicker; withstand line transients as defined in ANSI/IEEE C62.41, Category A; compliant with applicable FCC requirements. Compact fluorescent ballasts shall provide end-of-life protection.

5. LED Luminaire Requirements

- 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. NRTL Compliance: Luminaires shall be listed and labeled by an NRTL.
- c. Recessed Fixtures: Comply with NEMA LE 4.
 1. CRI of minimum 85. CCT of 4000 K nominal.
 2. Minimum rated life of 60,000 hours at 70% lumen output; nominal 116 lumens per watt efficacy..
 3. Standard internal dimmable driver unless otherwise scheduled.
 4. Nominal Operating Voltage: 120 V ac or 277 V ac as applicable.
 - f. Lens Thickness for lensed troffers: At least .095 minimum unless otherwise indicated.
 6. Housings: as indicated by the basis-of-design products.
- d. Strip Light
 1. Integral junction box with conduit knockout entries.
 2. Acrylic lens as scheduled.
 3. Minimum lumens as scheduled. Minimum allowable efficacy of 100 lumens per watt
- e. Surface Mount, Linear.
 1. Minimum lumens as scheduled. Minimum allowable efficacy of 82 lumens per watt.
 2. Standard dimmable driver unless otherwise scheduled.
- f. Warranty Period: five years from date of completion.

LED power supplies and dimming modules shall be matched to the lighting product by the manufacturer. Power supplies shall have protection against open circuit, short circuit, overload, overheating, and transient surge conditions and meet the highest industry standards. Outputs shall be UL Class 2. Dimming shall be full range (nominal) where feasible, and dimming equipment shall be as recommended

by the manufacturer. LED sources shall have the efficacy and color specified, be compliant with the latest applicable iteration of IESNA LM-70 AND LM-79, have a DOE lighting fact sheet available, and be listed for the use.

26-6. MISCELLANEOUS ELECTRICAL

1. Wiring of mechanical equipment.

Furnish and install all power wiring and all line voltage control or interlock wiring of all units, pumps, fans, water heaters, air handlers, kitchen equipment, and othe equipment and appliances as specified or as scheduled elsewhere in the documents or otherwise indicated or inferred by the body of drawings. Connect per manufacturer's wiring diagrams to be furnished with equipment. Furnish and install all loose disconnects and starters needed or required. After installation the contractor shall verify that each motor load has the correct phase rotation and permanently indicate the rotation on the equipment or it's controller or disconnect. This contractor shall verify the actual wire sizing amps for mechanical equipment from the equipment nameplate; electrical installation shall be based on actual required amperages, which may vary from the wire and equipment sizes shown on the drawings. Properly sized electrical wiring and equipment shall be furnished without extra cost to the contract. The contractor shall notify the architect of all changes to be made in the electrical installation due to equipment variances so that the impact on the feeders, panels, fuses, and breaker sizes can be checked prior to the installation. This contractor shall be responsible for coordinating with the mechanical, refrigeration, and plumbing contractors to verify the actual wire sizing amps and correct sizes of all overload heaters and the like for all equipment.

2. Temperature control.

Temperature control wiring is specified under Division 23. When indicated in those specifications, include the control wiring in the electrical work. Where responsibility for the work is not assigned to others, it shall be a part of the electrical contract.

3. Telecommunications systems.

Where the plans call for telecommunications wiring to be part of this contract, provide all telecommunicatioins wiring, termination, and testing per Owner's standard, and comply with BICSI and EIA/TIA standards. In any case, the E.C. shall provide outlet boxes and pathways, such as stubs, sleeves, seals, and the like, as necessary or required to accommodate the work indicated on the plans.

4. Time switches.

Provide time switches with number and type of contacts, sequence, and voltage necessary to accommodate the work. Time switches for exterior lighting control shall be electronic digital astronomic type with manual bypass switch, suitable NEMA enclosure, and battery backup. Provide photocells, contactors, relays, or other controls as required or as indicated. Master lighting controls shall be as specified on the plans; wallbox timers and other controls shall be as scheduled in the symbols legend.

5. Contactors.

Contactors for use with time switches for remote-controlled installations shall be NEMA types, electrically or mechanically held as applicable, and rated for the tungsten or ballast loads indicated. Contactors may be integrated into the respective controlling panelboards at contractor's option.

6. Miscellaneous equipment and connections when applicable.

Provide final power hook-ups to furniture panels; extend telecom wiring into furniture panels and terminate at jacks mounted into modular outlets furnished by others. Where applicable, include empty whips as applicable when installing an empty conduit system for wiring by others.

7. Fire alarm.

The electrical contractor shall include pathways such as raceways, outlet boxes, stub-ups, sleeves, line voltage wiring, power hook-ups, and any other anecdotal materials and labor necessary to support fire alarm work by the Owner's designated vendor. Install special backboxes furnished by the vendor. Coordinate with the owner and AHJ. All NEW fire alarm raceways and outlet boxes shall be identified by a red finish. Job practices shall conform to NECA 305-2010, Standard for Fire Alarm Job Practices. When indicated on the plan, the E.C. shall include the cost of fire alarm design, plan review, provision, installation, testing, and acceptance.

8. Submittals.

a. In addition to Division 1, as applicable, submit for review product data for fixtures, lamps, utility metering equipment, distribution equipment (panels, transformers, and the like), overcurrent devices, loose starters, contactors, and disconnects, branch devices and trim plates, any product substituted for specified, and any product accepted during a "value engineering" process. Provide quantities as stipulated in Division 1, but no fewer than six sets. Submit shop or assembly drawings prior to distribution to field personnel. Electronic submittals are acceptable if approved by the owner and/or architect.

b. Submittals shall be made at the outset of the project and subsequent product releases scheduled in a timely manner. The contractor shall act promptly to determine lead times and accommodate product availability. The contractor shall prepare a list of released products and delivery dates coordinated with the project construction schedule for distribution to the architect, owner, and project manager. Advise the architect immediately of specified or needed products being unavailable or discontinued; any project delays or additional costs resulting from the contractor's neglect of this responsibility shall be at the cost of the contractor.

c. Provide close-out documents as stipulated by Division 1, but not less than all owner's manuals, certifications, and warranties. **PROVIDE COMPLETE DIMENSIONED AS-BUILT DRAWINGS.** Include installation instructions shipped with equipment.

9. Discretionary work. See Division 1 for discretionary work requirements. Where not specified in Division 1, provide the following:

a. Five duplex GFI receptacles on a new circuit within the building (maximum 125' lineal) to be installed as directed in the field by the owner.

b. Five telecommunications stub-ups to be installed as directed in the field by the owner.

END OF SECTION 260100

SECTION 270001 – COMMUNICATIONS (GENERAL)

QUALIFICATIONS/PERSONNEL

- The communications cabling system installation work detailed in these standards shall be carried out by a specialist installer, trained and certified by PANDUIT and capable of providing a system warranty as described herein.
- The Cabling Contractor shall have a Registered Communications Distribution Designer (RCDD) or equal as a permanent member of staff. The RCDD shall be in good standing with the Building Industry Consulting Service International (BICSI) and shall have a current registration.
- The Contractor shall hold a valid State Contractors License for the duration of the project. The installer shall be responsible for obtaining permits and other requirements for performing work on this project.
- The Cabling Contractor shall provide an on-site manager responsible for all Communication work. This individual shall be the single point of contact for the duration of the project.
- The Air Blown Fiber®, each bidder must submit current documentation signed by Sumitomo Electric Lightwave representative stating the Contractor is authorized and certified by Sumitomo Electric Lightwave to provide the FutureFLEX® Air Blown Fiber® cable products installation and warranty certification. Each bidder must also submit documentation with the bid, listing the names of employees that will be used on this project indicating their experience, level of expertise, and certificates of training signed by Sumitomo Electric Lightwave representatives.
- The Contractor shall furnish and install all Tube Cables, Tube Couplings, Tube Distribution Units (TDUs), Fiber Bundles, connectors, and equipment as shown on the drawings and per Sumitomo Recommended Procedures (SRP's).

DEFINITIONS

- Telecommunications Closet (TC): The generic term, this refers to the equipment rooms in which telecommunications cabling terminates. These rooms also house network, video and telephone electronics.
- Building Distribution Facility (BDF): The —Main wiring switching for the building
- Intermediate Distribution Facility (IDF): A secondary wiring switching room
- Horizontal Cabling: Cabling runs from Work Station to IDF or BDF.
- Backbone: Linkage from BDF to IDF.
- House Count: The Contractor shall cross-connect the first (BLUE) pair of each new workstation cable to the riser backbone to link the telecommunications closet to the next closet in the hierarchy. The cross connects wire of colors matching the color of the station cabling conductors (BLUE) shall be used for each cross connect.
- Backbone transmission media may be:
 - o Traditional and Air Blown Optical fiber
 - o Twisted-pair copper
 - o Coaxial copper
 - o A combination of the above
 - o Miscellaneous support facilities
- Material needed for the proper termination and installation of the backbone cables:
 - o Cable support hardware
 - o Firestopping equipment and supplies
 - o Grounding hardware (TIA/EIA-607)
 - o Protection and security
- Inter-Building Cabling – First Level Backbone: provides the transmission path between adjacent

buildings. Includes Fiber Optic and copper cabling.

- Intra-Building Cabling – Second Level Backbone: Provides the transmission path to join the main Telecommunications Closet (or BDF) with other TC's (or IDF) located within the building. Includes Fiber Optic and copper cabling.
- Horizontal cabling and Work Station Cabling: Provides the link from offices, classrooms and common areas to the Telecommunications Closet (TC) serving the area and includes the following transmission media:
 - o 4-pair 100 Ohm Unshielded Twisted Pair (UTP) Category 5E
 - o 4-pair 100 Ohm Unshielded Twisted Pair (UTP) Category 6
 - o Fiber Optic Cable (Multi-Mode and Single-Mode)
 - o RG-6 Coax

QUALITY ASSURANCE

- Equipment and material shall be Underwriters Laboratories listed and labeled. The latest editions of the following codes, standards and guidelines are minimum requirements:
 - o City, State, and Federal codes.
 - o NFPA 70 National Fire Protection Agency
 - o National Electric Code (NEC 1999)
 - o Institute of Electrical and Electronic Engineers (IEEE)
 - o TIA/EIA-568-B.1 Commercial Building Telecommunication Cabling Standard.
 - o TIA/EIA-568-B.2 Commercial Building Telecommunication Cabling Standard.
 - o TIA/EIA-568-B-2.1 Commercial Building Telecommunication Cabling Standard Category 6.
 - o TIA/EIA-569 Commercial Building Standard for Telecommunications Pathways and Spaces.
 - o TIA/EIA-606 the Administration Standard for Telecommunications Infrastructure of Commercial Buildings.
 - o TIA/EIA-607 Commercial Building Grounding and Bonding Requirements for Telecommunications.
 - o TIA/EIA TSB-67 Transmission Performance specifications for Field Testing of Unshielded Twisted Pair Cabling Systems
 - o TIA/EIA TSB-72 Centralized Optical Fiber Cabling Guidelines.
 - o TIA/EIA TSB-75 Additional Horizontal Cabling Practices for Open Offices.
 - o Telecommunications Distribution Methods Manual, (BICSI).
 - o Manufacturers recommendations and installation guidelines.

WORK RESTRICTIONS AND PROCEDURES

GENERAL REQUIREMENTS

- The Cabling Contractor shall examine all drawings and specifications to familiarize themselves with the type of construction to be used, and the nature and extent of work provided by other trades.
- Beginning installation means Contractor accepts existing conditions.
- Contractor shall verify dimensions and the correct locations of hardware before proceeding with the installation of hardware, cabling and/or connections.
- The Cabling Contractor shall be responsible for identifying and reporting to the Owner any existing damage to walls, flooring, tiles and furnishings in the work area prior to start of work. All damage caused by the cable, raceway, or miscellaneous material to the interior surfaces during the communication installation shall be repaired by the Contractor. The repairs must match preexisting color and finish of walls, floors and ceilings. Any contractor damaged ceiling tiles are to be replaced to match color, size, style and texture and shall not be taken from Owner's attic stock.

- The Cabling Contractor shall be responsible for securing all Telecommunications Rooms and offices when not in use. At no time shall the Telecommunications Room be unattended if unsecured.
- Contractor should assume that all installation work including cable placement, termination and testing shall be performed between the hours of 7:00 a.m. to 5:00 p.m. Monday through Friday unless stated otherwise in the bid.
- Qualified personnel utilizing state-of-the-art equipment and techniques shall complete all installation work.
- The Cable system will be tested and documented upon completion of the installation as defined in the section below.
- Products selection, installation plans and termination layouts must be reviewed and approved by the Owner prior to construction. The review does not exempt the Contractor from meeting any of the requirements stated in this document.

SUBMITTALS

- Contractor shall submit a two-foot section of cable(s) of the type(s) to be sent to the site for final approval by the College. This two-foot section shall have the manufacturer's cable markings visible. Upon request, samples from every reel sent to the site shall be provided.
- Contractor shall submit house count table in spreadsheet/tabular format with shop drawing submittals. House count table shall include house count and location id's.

DELIVERY, STORAGE AND HANDLING

- The Cabling Contractor shall be responsible for all deliveries of material construction site. The Owner will not accept deliveries.
- For purposes of bidding, it is to be assumed that the Owner will not provide storage facilities for material. Pending availability, however, this may be arranged subsequent to award.
- Cable shall be stored according to manufacturer's recommendations at a minimum. Cable must be stored in a location protected from vandalism and weather. If cable is stored outside, it must be covered with opaque plastic or canvas with provision for ventilation to prevent condensation and for protection from weather. Manufacturer's storage specifications - in particular, those relating to temperature - shall be followed. All storage costs shall be included in Contract price.
- Tools, materials and equipment shall be confined to area designated by the Owner. The Contractor shall clean up and dispose of all debris and rubbish resulting from work on a daily basis.
- The Contractor is responsible for the clean-up of the dust, debris, shipping and packaging material associated with their installation. The Owner's disposal containers, shall not to be utilized without written authorization.

BDF, IDF, MDF AND TC CLOSET LAYOUT AND REQUIREMENTS

GENERAL REQUIREMENTS:

- The assembly and installation of data racks, Contractor shall confirm counts with Owner. These racks will be secured to the walls by a ladder rack to be provided and installed by the data contractor. This ladder will run across the racks from wall to wall and be attached to the data racks. There will also be a "t" section of this rack, running from the ladder rack to the wall behind the data racks to allow for the data cabling to be routed to the patch panels. The data racks will need to be fastened to the floor.
- Proper HVAC shall be provided in order to maintain operating temperature of 68 deg. F to 70 deg. F with humidity between 40-60 RH.
- Adequate lighting shall be provided in front and behind data racks and equipment.

TELECOMMUNICATIONS CLOSETS, IDF, BDF (GENERAL):

- The dimensions of this closet should be 8' X 10', minimum or larger per Owner and design requirements.
- The communications closet shall have walls sealed or covered to reduce dust development.
- Suspended acoustical ceiling is required.
- Floor shall be sealed or tiled.
- General building storage or plumbing fixtures (e.g. janitor sinks) shall not be permitted.
- Each data rack will need a dedicated 110 V quad circuit with an additional twist lock in parallel. The outlets should be installed near the bottom of the rack. The twist lock specification is L5-20R NEMA 20A 125V 1HP.
- Security System equipment may be installed in this space. If so, one dedicated 20A circuit shall be provided. Verify location of outlet with Owner.
- Security System shall be mounted on 4' x 4' x 3/4" plywood minimum.
- Telephone equipment may be installed in this space. If so, two dedicated 110 V circuits shall be provided. One circuit shall be used by the local PBX, one circuit shall be used by the service providers connecting equipment.
- Grounding bar shall be installed near the phone and data equipment.
- Wall phone jack is required. Verify location with Owner.
- Two data jacks and two voice jacks required. Verify location with Owner.
- 4' x 8' x 3/4" plywood shall be mounted horizontally at 6'-0" (to top of plywood) above finished floor for telephone and cabling equipment.
- Proximity reader controllers can be installed in this space.
- Room shall be secured with proximity card reader and electric lock.
- Adequate lighting shall be provided in front and behind data racks and equipment.

IDF ROOM:

- IDF: The dimensions of this room should be 8' x 10' minimum or larger per Owner and design requirements.
- Design requirements, at a minimum, similar to TC.

BDF ROOM:

- BDF: The dimensions of this room shall be determined by the A/E and will be dependent on equipment quantities and clearances. It shall be no smaller than 8' x 10'.
- Design requirements, at a minimum, similar to TC.

SECTION 270002 – COMMUNICATIONS MATERIALS

VOICE UTP STATION CABLE

- Transmission characteristics of the cable shall meet full Category 5E performance as defined by the TIA/EIA-A-5 Transmission Performance Specifications and Technical Systems Bulletin (TSB) #36.
- Cables shall be Underwriters Laboratory (UL) listed, comply with Article 800 (Communications Circuits) of the National Electrical Code and shall meet the specifications of NEMA (low loss), UL 444, and ICEA.
- The jacket color for "Voice" Station Cables shall be GRAY.
- Voice Station Cables shall meet a CMR (Riser) or CMP (Plenum) rating depending on the particulars of the installation and be suitable for installation in the environments defined including free-air, in conduit, in cable tray and in modular furniture.
- Cable shall be packaged in a way that minimizes tangling and kinking of the cable during installation. Examples are open reels or packages, which incorporate a rotating reel.
- Voice UTP Station Cables shall be Panduit PUP5504IG-UY Category 5e plenum (CMP) Twisted 4-pair UTP copper cable or Panduit PUR5504IG-UY Category 5e riser (CMR) Twisted 4-pair UTP copper cable.

DATA UTP STATION CABLE

- Transmission characteristics of the cable shall meet full Category 6 performance as defined by TIA/EIA-568-B-2.1. Cable shall be UL and/or ETL verified Category 6.
- Cables shall be Underwriters Laboratory (UL) listed, comply with Article 800 (Communications Circuits) of the National Electrical Code and shall meet the specifications of NEMA (low loss), UL 444, and ICEA.
- The jacket color for Data Station Cables shall be BLUE.
- Data Station Cables shall meet a CMR (Riser) or CMP (Plenum) rating depending on the particulars of the installation and be suitable for installation in the environments defined including free-air, in conduit, in cable tray and in modular furniture.
- Cable shall be packaged in a way that minimizes tangling and kinking of the cable during installation. Examples are open reels or packages, which incorporate a rotating reel.
- Data UTP Station Cables shall be Panduit PUP6004BU-UY High Performance Category 6 plenum (CMP) Twisted 4-pair UTP copper cable or Panduit PUR6004BU-UY High Performance Category 6 riser (CMR) Twisted 4-pair UTP copper cable.

COAXIAL STATION CABLE

- Coaxial Station Cable shall be RG-6 coax.
- Cables shall incorporate a 20-AWG solid center conductor and a tinned copper double braid shield (98% coverage). Conductors shall be separated by polyethylene core insulation.
- Cables shall be suitable for installation "free-air" in COD building risers, above drop ceilings, in cable tray or in duct.
- Coaxial cable shall have the following nominal transmission characteristics:
 - 75-Ohm Characteristic Impedance
 - 66% Propagation Velocity
 - 1-pf/ft. Capacitance
- Coaxial station cabling shall be continuous and splice free.
- Coaxial Station Cable shall be Belden p/n 8281A (CMR), CommScope Catalog # 2227K (CMP).

TELECOMMUNICATIONS OUTLET

- At the workstation location, Station Cables shall each be secured in a housing, which shall also accommodate the termination assemblies for those cables. The combined assembly, referred to as the Telecommunications Outlet (TO), shall be modular in design and allow for flexibility in integrating the different configurations required at the site.
- There shall be one (1) basic Telecommunications Outlet configuration:
 - The "Copper-Only" Communication outlet that is capable of supporting only UTP and Coaxial Cabling.
- In addition, provision of a separate, "Voice Only" outlet that is installed to accommodate a wall-mounted Telephone Set shall be considered. This configuration, referred to as "Split Voice", can be used in concert with either of the above configurations.
- The color and material of the frame cover and inserts (if applicable) shall be Electric Ivory Plastic.
- The cover of the telecommunications outlet shall be secured to the base with a screw. The screw(s) shall, in turn, be hidden from view by a label or other covering to discourage casual access.

COPPER ONLY OUTLET

- The Copper-Only Outlet shall comply with the general requirements defined above and with the following *additional* requirements:
 - The Copper-Only Outlet shall provide adequate capacity to accommodate the following maximum configurations:
 - Two (2), four (4) or six (6) modular jacks (Voice or Data)
 - The same as above but one (1) "F" Connector substituted for one (1) modular jack.
 - All jacks and couplings shall mount on either the base of the unit or the cover.
 - The Copper-Only Outlet shall be available in both "flush" and surface mount designs and shall be adaptable to mounting on cellular floor presets or posttests poke thru or under floor wiring.
 - Where flush mounting is not possible, a Surface box shall be used. Surface Box shall be Panduit Single Gang One-piece Deep Box.
- Wall-Mounted Copper-Only Outlets
 - Wall mounted Copper-Only Telecommunications Outlets shall be Panduit CFPL2 2 Port CFPL4 4 Port and CFPL6 6 Port.
- Floor-mounted Copper Only Outlets
 - Floor-mounted Copper-only Outlets shall comply with the above general requirements plus the following:
 - Floor-mounted Copper-only Outlets shall be mounted in an aluminum floor "monument".
 - Communications jack assemblies shall mount on one side of the assembly and be sideways facing (parallel floor). Mounting plates shall be designed to accommodate the modular jack type installed.
 - A protective bracket shall be available to guard against damage to the jack assemblies or patch cord plugs.
 - "Copper-Only" Telecommunications Outlets shall be Walker 500HB (Monument) and 500B back plate, with 500DR front plate. Monument shall be fitted with adapter(s) appropriate for the floor-type being accessed.
 - Jack assemblies shall be mounted on Panduit CF1062 for 2 port and CF1064 for 4 port access. Bracket shall be 500-GUARD.
- Wall mounted Voice Only Outlet
 - Wall-mounted "Voice Only" Outlets shall consist of a mounting plate on which a telephone set may be mounted.
 - The Wall Plate shall be of Stainless Steel construction, mount on a standard single gang

- o outlet box or bracket and include mating lugs for wall phone mounting.
 - o The wall plate shall be Panduit KWP5EY or KWP6PY or equivalent and be fitted with one (1) voice jack meeting the criteria defined below.
- Station Voice Copper Termination at Media Outlet
 - o Station Voice Copper Cables shall each be terminated at the Media Outlet in an Eight-pin Modular Jack, Panduit CJE88T.
 - o Jacks are to be pinned per TIA/EIA-568B with the pairing as follows:
 - Pair 1 – Pins 5&4
 - Pair 2 - Pins 1&2
 - Pair 3 - Pins 3&6
 - Pair 4 - Pins 7&8
 - o The interface between the jack and the station cable shall be a 110-Style block. Blocks shall be designed to maintain the cable's pair twists as closely as possible to the point of mechanical termination.
 - o Voice Termination hardware shall meet Category 5E performance specifications as defined by TIA/EIA-A-5 and TSB40 specifications for connecting hardware.
 - o The color of the Voice Jack shall be WHITE.
 - o Voice Jack shall be Panduit CJ5E88T.
- Station Data Copper Termination at Outlet
 - o Station data copper cables shall each be terminated at the Media Outlet in an Eight-pin Modular Jack. Jack contacts shall have a minimum of 50-micro-inches of gold plating. Panduit CJ688T3.
 - o Jacks are to be pinned per EIA 568B with the pairing as follows:
 - Pair 1 - Pins 5&4
 - Pair 2 - Pins 1&2
 - Pair 3 - Pins 3&6
 - Pair 4 - Pins 7&8
 - o The interface between the jack and the station cable shall be a 110-Style block. Blocks shall be designed to maintain the cable's pair twists as closely as possible to the point of mechanical termination
 - o Data Termination hardware shall meet full Category 6 performance specifications as defined by TIA/EIA-568-B-2.1 and TSB-40A specifications for connecting hardware. All pair combinations must be considered, with the worst-case measurement being the basis for compliance. The Jack must be UL verified and listed. All pair combinations must be considered with the worst case measurement being the basis for compliance.
 - o The color of the Data Jack shall be BLACK.
 - o Data Jack shall be Panduit CJ688T3.

BACKBONE VOICE COPPER CABLE

- Voice Backbone Cable shall incorporate 24 AWG solid annealed Copper Conductors. Conductors shall be insulated with a thermoplastic skin. Maximum diameter of the insulated conductor shall be 0.048 in (1.22 mm).
- Conductors shall be twisted to form pairs and fully color-coded. Conductor twists shall be of varying lay lengths in order to minimize crosstalk.
- All conductors shall be continuous and splice free. Bridge taps are not permitted.
- Cables shall be Underwriters Laboratory (UL) listed, comply with Article 800 (Communications Circuits) of the National Electrical Code and shall meet the specifications of NEMA (low loss), UL 444, and ICEA.
- Cable shall meet the physical and electrical requirements of 100 Ohm "Backbone Cable" as defined by the EIA/TIA-568 Standard for Commercial Building Wiring.
- Inter-Building Cable shall conform to Category 5E performance specifications or better.
- Intra-Building Cable shall conform to Category 5E performance specifications or better.
- Conductors shall be identified by the insulation color of each conductor. The color code shall

follow the industry standard composed of ten (10) distinctive colors to identify 25 pairs in accordance with ICEA publication S-80-576-1988. Marking of each mate of the primary

- conductor in a pair with the color of that primary conductor is optional.
- When cables of larger than 25 pairs are required, the core shall be assembled into 25-pair sub-units, each color coded in accordance with ICEA publication S-80-576-1988. Cables with over 600 pairs shall have 25-pair binder groups combined into super units. These super units shall be wrapped with a solid color thread that follows the primary color scheme of white, red, black, Yellow and violet. Binder color code integrity shall be maintained wherever cables are spliced.
- In exterior applications, the cables shall contain an overall corrugated, coated aluminum shield that is electrically continuous over its entire length.
- The cables shall not incorporate a "T1" screen.
- The cable core shall be protected by a uniform, continuous thermoplastic jacket (sheath) the types specified below. The cable jacket shall be sequentially printed with a footage marker at regular intervals along its length.
- Backbone cabling (Copper/Fiber Optic) shall not share the same raceway or path with horizontal cabling.

INTRA-BUILDING VOICE COPPER CABLE

- Where installed in conduit, cable tray and/or in building riser shafts, cables shall be suitable for such installation and comply with the following *additional* requirements:
- Cables shall meet NEC Article 800 Type CMR.
- Cables shall be Air Core with an 8-mil ALVYN Sheath
- Cables shall be "ARMM?" Series

BACKBONE FIBER OPTIC

- The fiber optic backbone cable may be a multimode fiber (62.5/125 μ m unless otherwise noted), single-mode fiber (8.3/125 μ m) or a combination of both.
- All indoor fiber shall have the designation of OFNR (Optical Fiber Non-conductive Riser for non-plenum environments and OFNP (Optical Fiber Non-conductive Plenum for plenum environments). The construction of all fiber optical cable shall be tight-buffered 900 μ m of distribution design.
- When installing the fiber optic backbone cable, ensure that the minimum cable bend radius and maximum vertical rise recommended by the fiber manufacture is not exceeded.
- All fiber shall be installed in the appropriately sized and correct environmental inner-duct system. No other fiber shall be installed in occupied inner-duct.
- All optical fiber shall be Panduit.

INTER-BUILDING CABLING (COPPER AND FIBER)

- All inter-building or outdoor communications cabling shall be placed in a rigid conduit system. The conduit system shall be suitable for direct burial or encased in concrete. The minimum requirements for the conduit system shall consist of one 4" conduit for copper environment and one 4" conduit for fiber environment.
- The conduit system designed for the copper environment shall not exceed the 40% fill ratio. All cables shall be installed at the same time and no other cables shall be installed after cable installation.
- The conduit system designed for the fiber environment shall have (3) one inch inner-duct installed the entire length of the system. Each inner-duct shall have pulling rope for fiber installation. All fiber shall be pulled in one continuous pull through inner-duct system and no other copper cable of fiber cable may be installed in the future.
- Outdoor copper & optical fiber types shall be determined based on environmental and system

applications at time of installation.

- All copper backbone cabling shall be Panduit.
- All optical fiber backbone cabling shall be Panduit.

MISCELLANEOUS MATERIALS

- Equipment Rack and Associated Hardware
 - Communications equipment rack and cabinets shall be properly anchored at top and bottom.
 - Racks shall be anchored to floor with properly sized drop-in anchors with appropriately sized bolts and washers. All racks and cabinets shall be attached to ladder rack system. If ladder rack system does exist, coordinate with project manager.
 - Horizontal cable management hardware shall be positioned on the equipment racks to allow for an orderly routing of copper and fiber optic jumpers.
 - Jumper Management Panels shall incorporate Horizontal and Vertical distribution rings to accommodate a defined routing of individual jumper cables. Horizontal distribution rings shall be 3" x 3.5" (minimum dimension) and mounted on a 3.5" painted steel plate.
 - Each Jumper Management Panel shall be supplied with a minimum of (10) releasable cable support ties. Ties shall be minimum 6-inches in length.
 - Vertical Jumper Rings shall be positioned on each rack upright equidistant between each Horizontal Management Panel installed.
 - There shall not be more than (3) three Panduit 48 port patch panels per rack.
 - Relay Racks Panduit NetFrame NFR84 Jumper Management Panels shall be Panduit CMPHH2. Vertical Jumper rings shall be Panduit CMVDRC or equivalent. Releasable cable support ties shall be Panduit HL T21-X0 (BLACK).
- Surface Raceway
 - The installation of surface mounted outlets and surface mounted station cable is anticipated at some locations where solid walls inhibit the installation of cable behind the wall. Nonmetallic surface raceway shall be used – no exposed cable shall be permitted.
 - The surface raceway shall have a screw-applied base and have a snap on cover. The use of double-sided tape to anchor the raceways will not be permitted.
 - Both the base and cover shall be manufactured of rigid PVC compounds and be suitable for painting.
 - The raceway shall be of a color fitting the décor of the area and be paintable (by others). Approval of samples by the Engineer prior to installation is required (Upon request by Owner). All fittings including, but not limited to, extension boxes, elbows, tees, fixture boxes and fittings shall match the color of the raceway.
 - Fittings and couplings shall be sized to insure that Category 5E, 6 and fiber optic cables that are routed through them do not exceed their recommended minimum bend radius requirements.
 - The raceway and all system devices must be UL Listed and exhibit nonflammable self-extinguishing characteristics, tested to specifications of the UL94V-0.

 - Raceway shall be sized to accommodate a 50% increase in the number of cables initially installed while maintaining a fill (ratio of cable area vs. raceway area) no greater than 60%. A nominal cable diameter of 0.2" (Voice and Data Cables) should be assumed.

- The non-metallic raceway shall be Panduit *Pan-Way L Series*.
- Bonding and Grounding
 - All bonding conductors shall have green insulation and be copper. The minimum bonding conductor size shall be No. 6 AWG (TIA/EIA-607 5.1.3).
 - All Telecommunication Closets (TC) shall be equipped with a ground bus bar capable of terminating multiple #6 AWG ground cable conductors. All TC's ground bus bars shall be labeled TGB (Telecommunications Grounding Bulbar). TGB shall have a #6AWG cable conductor continuously run to the TMGB (Telecommunications Main Grounding Bulbar). The TMGB shall be bonded to the Main Building Grounding Electrode.

SECTION 270003 – COMMUNICATIONS TERMINATIONS

COPPER TERMINATION HARDWARE AT TELECOMMUNICATIONS CLOSETS

- At the Telecommunications Closet(s), all Copper Cables shall be organized in a fashion compliant with established cabling standards at the College. Where adding to an existing installation, termination components shall be integrated into the existing plan and consider equipment positioning and labeling.
- The Contractor shall cross-connect the first 1st (BLUE) pair of each new workstation cable to the riser backbone to link the telecommunications closet to the next closet in the hierarchy. The cross-connects wire of colors matching the color of the station cabling conductors (BLUE) shall be used for each cross-connect.
- Each 4- or 5-pair group shall be positioned on the terminating hardware in numerical order based on Pair Count or Telecommunications Outlet I.D. with the lowest I.D. Number or Pair first.
- Termination hardware shall be suitable for mounting on walls, in racks, or in distribution frames. Wall mounted cross-connect fields and frames shall be arranged to allow for easy expansion.
- The Contractor shall provide house count to Owner.

VOICE COPPER TERMINATION AT TC (BACKBONE & STATION)

- At the Telecommunications Closet(s), each Voice "Backbone" Cable and 4-pair "Voice" Station cable and shall be terminated on high-density horizontal blocks. Each horizontal row of the cross-connect block must be capable of terminating one (1) twenty-five pair binder group (Tie Cables) or six (6) four pair groups (Station Cables). Where station cables are installed on 110 blocks, the 25th position of each horizontal voice block shall remain vacant.
- Backbone and Station blocks shall be segregated clearly identifying their function.
- The blocks shall be designed to maintain the cable's pair twists as closely as possible to the point of mechanical termination. The installer shall insure that the twists are preserved to within 1-inch if the termination.
- Blocks shall identify pair position by a color designation - Blue, Orange, Green, Brown and Slate (if applicable).
- The mechanical terminations shall:
 - o Have the ability of terminating 22 - 26 AWG plastic insulated, solid and stranded copper conductors.
 - o Provide a direct connection between the cable and jumper wires.
 - o Insert less than 0.02 dB of attenuation @ 100 MHz
- Blocks shall be designed as to allow for cables to be fed from above or below.
- The Voice Termination Hardware shall be Panduit PAN-Punch 110 Cross Connect System. Wall mounted hardware shall be equipped with legs and shall consist of 300- (P110BW300-X) Wiring Blocks configured with P110CB4-X (4-pair) or P110CB5-X (5-pair) Connecting Blocks for Station and Backbone cabling, respectively.

DATA PATCH PANEL

- Copper Data Station Cables shall each be terminated at their designated TC to a Panduit patch panel.
- Category 6 performance per TIA/EIA T568B.2.1 must be maintained by the panel as a system and include this interface. All pair combinations must be considered, with the worst-case measurement being the basis for compliance.

- Jacks are to be pinned per TIA/EIA T568B with the pairing as follows:
 - Pair 1 - Pins 5&4
 - Pair 2 - Pins 1&2
 - Pair 3 - Pins 3&6
 - Pair 4 - Pins 7&8
- Panels shall incorporate cable support and/or strain relief mechanisms to secure the horizontal cables at the termination block and to insure that all manufacturers minimum bend radius specifications are adhered to.
- When multiple floors are being serviced in a closet, each floor should have separate patch panels. Each patch panel should start with lowest sequential number starting with one per each floor, per each closet and then increment by one until each panel is full or no more drops available on that floor with its closest closet. If possible the patch panel for each floor should be installed on a separate rack.
- Contractor shall discuss the use of 24 port patch panel with the owner before usage. Use of 24 port patch panel is discouraged.

COAXIAL PATCH PANEL

- All installed coaxial cables shall be terminated at both the TC and TO locations in a male "F"- Connector matched to the cable type. Connectors may be "Crimp" or "solder" type.
- Each terminated coaxial cable shall be then mated with a female "F" Connector coupling which is, in turn, mounted on a rack-mountable panel.
- Panels shall be of painted steel.
- Coaxial Patch Panels shall be Semtron "JP" Series" or equivalent.

INTER-BUILDING CABLING (COPPER & FIBER)

- Fiber optic backbone shall be terminated as SC in accordance with approved materials list.

SECTION 270004 – COMMUNICATIONS INSTALLATION

- The installation shall follow recognized industry recommendations including those defined by the:
 - o TIA/EIA-568-B.1 Commercial Building Wiring Standard
 - o TIA/EIA-568-B.2 Commercial Building Wiring Standard
 - o TIA/EIA-568-B.2.1 Commercial Building Wiring Standard
 - o TIA/EIA-569 Commercial Building Standard for Pathways and Spaces
 - o TIA/EIA-606 Labeling Guidelines
 - o TIA/EIA-607 Grounding
 - o National Electrical Code (NEC; 1999)
 - o BICSI TDM Manual
 - o Applicable State and Local Codes
- Cable Pathways (Renovation Projects)
 - o Renovation Projects: The Contractor is responsible for verifying the availability of riser access between floors. Where required, the contractor shall core new risers.
 - o All Projects: All new riser holes shall be fitted with sleeves. All riser holes used for the installation, both new and existing, shall be firestopped upon completion of cable installation.
- Cable Installation
 - o All cables, termination components and support hardware shall be furnished, tested, installed and wired by the Contractor.
 - o During pulling operation an adequate number of workers shall be present to allow cable observation at all points of duct entry and exit as well as the feed cable and operate pulling machinery.
 - o Cable pulling shall be done in accordance with cable manufacturer's recommendations and ANSI/IEEE C2 standards. Recommended pulling tensions shall not be exceeded.
 - o Manufacturers minimum bend radius specifications shall follow in handling, installation and securing of all cables. Any cable bent or kinked to radius less than recommended dimension shall not be installed.
 - o All cables shall be installed splice-free.
 - o Cable sheaths shall be protected from damage from sharp edges during and after installation.
 - o Where a cable passes over a sharp edge, a bushing or grommet shall be used to protect the cable.
 - o All cable shall be free of tension at both ends. In cases where the cable must bear some stress, Kellum grips may be used to spread the strain over a longer length of cable.
 - o Ventilation of buildings on the Glen Ellen Campus includes both ducted and ceiling-plenum air return designs as follows:
 - Plenum Return Sites:
 - IC, SRC and PE
 - Ducted Return Sites:
 - M, K & L Buildings, OCC, and Arts Center
 - COD Satellite sites vary by location.
 - o The contractor is responsible for verifying cabling requirements prior to construction to insure that the installation is compliant with all code restrictions.
 - o All openings made to accommodate the installation of any cable shall be sleeved and fire stopped per prevailing code requirements upon completion of cable installation.
 - o At no time shall horizontal cabling share the same raceway or path with Backbone cabling.

HORIZONTAL CABLING STATION

- All Cables and Termination hardware shall be technically compliant with and installed in accordance with TIA-568A, TIA-568-B.2.1 (Standard for Commercial Building Wiring), TIA-569, TSB 36 and TSB-40.
- Where installed free-air, Station Cable shall run at right angles and be kept clear of other trades work. Cables shall be supported according to code utilizing Caddy type J-Hooks mountings and anchored to ceiling concrete, or structural steel beams. The Contractor shall not exceed the maximum cable limit of the cable supports. Cables shall not be attached to existing cabling, plumbing or steam piping, ductwork, ceiling supports or electrical or communications conduit. Supports should be spaced at a maximum 5-foot interval unless limited by building construction. Cable shall never be laid directly on the ceiling grid.
- The maximum Station Cable length shall not exceed 295-feet (90-meters) in order to meet data communications performance specifications. This length is measured from the termination panel in the Telecommunications Closet to the Outlet and must include any slack required for the installation and termination. The Contractor is responsible for installing station cabling in a fashion as to avoid unnecessarily long runs. Any area that cannot be reached within the above constraints should be identified and reported to the College prior to installation. The College must approve any plan changes.
- Slack cable shall be left above each Work Station to allow for repair and/or future office rearrangements without re-cabling. These "service loops" shall be secured at the last cable support (e.g. Caddy type J-Hook) before the cable leaves the ceiling and shall be coiled from 100% to 200% of the cable recommended minimum bend radius. Slack lengths are as follows:
 - o At any location where cables are installed into movable partition walls or modular furniture via a service Pole, approximately 6 feet of slack shall be left for each station cable under 250-feet in length.
- To reduce or eliminate EMI, the following minimum distances shall be adhered to. In particular, regard must be paid to the routing of cable and avoidance of potentially disruptive sources of electrical noise such as motors and fluorescent lighting. The contractor shall notify the College if installation conditions inhibit these guidelines.
 - o No less than (5) five inches from power lines of 2kVa.
 - o No less than (30) thirty inches from high voltage lighting (including fluorescent lighting).
 - o No less than (39) thirty-nine inches from power lines of 5kVa or greater.
 - o No less than (39) thirty-nine inches from transformers and motors.
- Care should be taken in the use of cable ties to secure and anchor the station cabling. Ties should not be over tightened as to compress the cable jacket. No sharp burrs should remain where excess length of the cable tie has been cut.

BACKBONE VOICE COPPER CABLE

- Backbone Voice Copper Cable shall be sized to provide a minimum of 2-pairs per outlet planned in the area plus 30% for growth.
- The outer metallic sheath of the Voice Backbone Cable shall be grounded to either (1) the Telecommunications Grounding Busbar (TGB) or (2) an existing backbone cable shield using a #6 AWG solid copper conductor (GREEN jacket). The grounding plan should be devised as to avoid the potential for ground loops through multiple ground points.

FIBER OPTIC CABLE

- At TC locations, provision shall be made to protect exposed fiber optic cables and secure the cable in the transition from cable tray, conduit and/or innerduct to the termination enclosure.

- A minimum of 5-meters (~ 15-feet) of slack Inter- and Intra-Building Fiber Optic Cable shall be provided at each TC. This slack is exclusive of the length of fiber that is required to accommodate termination requirements and is intended to provide for cable repair and/or equipment relocation. The cable slack shall be stored in a suitable enclosure to protect the cable from damage.
- Where fiber optic cable is installed in innerduct, the innerduct(s) shall be secured in a fashion as to insure their stability. This may be through fastening to the wall for the riser chase closet or through the installation of a small diameter rigid conduit. The only acceptable residual tension on the fiber optic cable is that due to its own weight.

TELECOMMUNICATIONS OUTLET

- Telecommunications Outlets shall be positioned at a height matching existing services. Where no guide is available, outlets shall be mounted with the center of the outlet 18-inches above floor height unless instructed otherwise by the College.
- Positioning of wall-mounted telephone outlets should be in compliance with the provisions of the Americans with Disabilities Act (ADA).
- Outlets shall be securely mounted and level.
- All unused slots or positions in the Telecommunications Outlet shall be covered with blank inserts.
- At the Outlet location, subsurface routing of cables inside "fishable" walls is preferred. Where this cannot be accommodated, however, station cable shall be routed via surface raceway. Raceway should be of adequate dimensions to allow for installation of the cable in compliance with the manufacturers specification including bend radius, crush and tensile limits. Exposed surface raceway should be paintable and fit the decor of the space. Telecommunication Outlet installation on sheetrock walls shall be preceded by the installation of a bracket which mounts securely to the sheetrock (e.g. "Caddy" or "MPLS" Bracket). The Outlet Frame shall, in turn, be secured to the bracket. Telecommunications Outlets shall not be screwed directly to the sheetrock.

COPPER TERMINATION HARDWARE

- Copper Termination Hardware at TC
 - o At the Telecommunications Closets, all Data and Voice Cables shall be positioned on termination hardware in sequence of the Outlet I.D. starting with the lowest number. All four pairs, terminating on each voice modular jack shall appear on the Telecommunications Closet 110 blocks. Termination Hardware (Blocks and Patch Panels) Positioning and Layout must be reviewed and approved by the College prior to construction. The review does not exempt the Contractor from meeting any of the requirements stated in this document.
 - o Except in the IC PBX Room, Voice Termination Hardware shall be wall mounted on plywood board. The contractor shall neatly route and secure new cables via cable management hardware (e.g. D Rings and cable guides) from cable tray to the cable termination hardware. Old cable ties shall be removed and replaced with Velcro style cable wraps to maintain a tidy appearance. Cables shall be fed from below the Termination Hardware in a manner that will facilitate growth.

- o The Height of the Voice Termination Field shall not exceed 6-feet (72-inches) above floor level to facilitate cable maintenance. Backbone Cabling should be positioned to the Left; Station cabling to the Right.
- o Where multiple floors are served from a single TC, the Termination Field for each floor shall be segregated from each of the others. Following the standard established at the site, each cross connect field for a given floor is positioned in a separate vertical column (Voice). Spare capacity should be considered in the design and be provided for each grouping.
- o At the Voice Termination Blocks (all 110-type interface), the installer shall insure that the twists in each Voice Cable pair are preserved to within 1.0-inch of the termination. The cable jacket shall be removed only to the extent required to make the termination.
- o Where Voice Termination Hardware is wall mounted, Horizontal Troughs incorporating split plastic distribution rings shall be provided by the Contractor to accommodate routing of jumpers. Troughs shall be positioned at the top of each column of termination blocks and between each 300-pair wiring block. Troughs shall be Panduit P110JTW.
- o The Contractor shall cross-connect the first 1st (BLUE) pair of each new workstation cable to the riser backbone to link the telecommunications closet to the next closet in the hierarchy. The cross-connects wire of colors matching the color of the station cabling conductors (BLUE) shall be used for each cross-connect.
- o In new installations, a jumper wire spool holder shall be installed at the Telecommunications Closet(s). One full (1000-foot) spool of 24-AWG one-pair jumper wires, one spool each white-blue/blue shall be supplied with the holder. The holder shall be designed for use as a spool holder and shall mount securely to the plywood or ladder rack (above the Voice Field).
- o The Contractor shall provide house count to Owner
- Data Patch Panel
 - o At the Data Patch Panel 110-type interface, the installer shall insure that the twists in each Data Cable pair are preserved to within 0.5-inch of the termination. The cable jacket shall be removed only to the extent required to make the termination.

MISCELLANEOUS MATERIALS INSTALLATION

- Jumper Management Hardware
 - o Horizontal cable management hardware shall be positioned on the equipment racks to allow for an orderly routing of copper and fiber optic jumpers. At minimum, these Jumper Management Panels shall be positioned:
 - Horizontal management shall be placed above and below each forty-eight (48) port Data Patch Panels.
 - Horizontal management shall be placed above and below each fiber Optic HDC (Station fiber).
 - Horizontal management shall be placed above and below each pair (2) of Fiber Optic Termination Panels (Backbone).
- Surface Raceway
 - o Where Outlets are installed in areas where the walls cannot be fished, the Station Cabling serving these outlets shall be covered with raceways. No exposed wire shall be permitted within offices, laboratories, conference rooms, classrooms, etc.
 - o The base and cover of the raceway shall be of PVC have a screw applied base and have a snap on cover. Both the base and cover shall be manufactured of rigid natural PVC compounds. The raceway must be UL Listed and exhibit nonflammable self-extinguishing characteristics.
 - o The raceway shall originate from a surface mounted Outlet box, have a screw-applied base and terminate above the ceiling. A fitting designed for the raceway shall be used to conceal the ceiling penetration.

- o Surface mounting of an outlet intended for flush-mount installation shall be preceded by the installation of a Surface Box ("Back-box") onto which the outlet frame is mounted.
- o The contractor shall be responsible for all penetrations required to accommodate the raceway in making any transitions between office areas and hallways or other common areas through which the raceway may be routed. All cut molding sections shall be patched and painted upon completion of the raceway installation.
- o All cuts and penetrations must be patched and painted. Upon completion of installation, raceways must be cleaned of all fingerprints, soil, etc.
- Firestop Systems
 - o All penetrations through fire rated building structures, walls, and floors; shall be sealed with an appropriate Firestop system. The requirements applies-to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating items i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall be properly firestopped.
 - o All Firestop systems shall be installed in accordance with the manufacture's recommendations and shall be completely installed and available for inspection by the College.
- Bonding, Grounding and Electrical Protection
 - o All Telecommunications Equipment and raceways shall be properly grounded in accordance with TIA/EIA-607 the NFPA 70 (National Electrical Code), and all other applicable codes and regulations.
 - o The major components of the telecommunications grounding and bonding infrastructure are as follows:
 - The bonding conductor for telecommunications
 - The Telecommunications Main Grounding Busbar (TMGB)
 - The Telecommunications Grounding Busbar (TGB)
 - The Telecommunications Bonding Backbone (TBB)
 - The Telecommunications Bonding Backbone Interconnecting Bonding Conductor (TBBIBC). The conductors used to bond the components to the TMGB & the TGB's
 - o All bonding conductors and connectors shall be listed for the purpose intended and approved by a Nationally Recognized Testing Laboratory (NRTL).
 - o Route ground conductors to provide the shortest, most direct path from point to point.
 - o Splices in bonding or grounding conductors are not allowed. The minimum bend radius of the conductors shall be eight inches (8").
 - o The TMGB and the TGB's shall be electro-tin plated and insulated from the supporting structure by at least two inches.
 - o If an electrical sub-panel resides in a Telecommunications Room, that panel must have a #6 AWG bonding conductor from the TGB to electrical panel ground bar.
 - o All Telecommunication Closets (TC) shall be equipped with a ground bus bar capable of terminating multiple #6 AWG ground cable conductors. All TC's ground bus bars shall be labeled TGB (Telecommunications Grounding Bulbar). TGB shall have a #6AWG cable conductor continuously run to the TMGB (Telecommunications Main Grounding Bulbar). The TMGB shall be bonded to the Main Building Grounding Electrode.
 - o All racks, metallic backboards, cable sheaths, metallic strength members, splice cases, cable trays, ladder racks, etc. entering or residing in all Telecommunications Rooms. Shall be grounded to the respective TGM or TMGB using a minimum #6 AWG stranded copper bonding conductor and 2-hole compression connectors. Provide a ground bar at the base of each rack for equipment connections.
 - o All incoming outdoor cables shall be terminated on the appropriate sized protector, and all protectors shall be attached to the TMGB via a #6 AWG stranded conductor.
 - o All ground cables shall be labeled with the proper FROM - TO (Origination Point to Destination Point) designation.

SECTION 27 0005 – COMMUNICATIONS LABELING

- The Telecommunications Administration System shall meet or exceed TIA/EIA-606-A standards.
- All Telecommunications Outlets, Data Patch Panel, Voice Termination Blocks AND CABLES shall be clearly labeled using a Code identifying each Information Outlet location as unique throughout the COD Campus. This code, which will identify cabling and terminations at both IDF and Media Outlet locations, shall be as follows:
 - o BB-XCC-F-###A
 - BB= the designation to identify the specific building
 - XCC = the Telecommunications Closet (TC) serving that jack. The TC is designated by Floor (XX) and their geographic location on that floor (CC) (e.g. Northwest, Southeast, etc.).
 - F = the Floor on which the jack is located.
 - ### = a sequential number assigned to that jack.
 - A = Alpha designation used ONLY if multiple jacks of a given type (e.g. Voice or Data) are housed in the same Outlet assembly.
 - For example, "IC-2NW-3-123" designates the 123rd jack on the 3rd Floor served from the IDF in the Northwest area of the 2nd Floor of the IC building. If multiple Data cables would be contained in the outlet, they would be identified as "A", "B", "C", and so on.
- This numbering sequence plus a two (2) character Building Designator shall be utilized in the Cable Management System for identification of station cabling. Building designations are as follows:
 - o Arts Center = AR
 - o Instructional Center = IC
 - o K Building = KK
 - o L Building = LL
 - o M Building = MM
 - o Open Campus Center (OCC) = OC
 - o Physical Education = PE
 - o Seaton Computing Center = SC
 - o Student Resource Center (SRC) = SR
 - o Student Services Center (SSC) = SS
 - o WDCB Tower = JJ
 - o Westmont Center = WC
 - o Naperville Center = NC
 - o Davea (Addison) = AD
 - o Bloomingdale Center = BC
 - o Lisle Center = LC
 - o Carol Stream Community Education Center = CC
 - o West Chicago Community Education Center = WE
 - o H Building = HH
 - o BIC Annex = BA
 - o Early Childhood Education Center = EC
 - o Technical Education Center = TE
 - o Business & Community Education Center = BC
 - o Parking Structure = PG
 - o Health and Science Center = HS
 - o Culinary and Hospitality Center (CHC) = CH
 - o Homeland Security Education Center (HEC) = HE
- Where adding to an existing installation, cable identification numbering must be integrated into

- the established plan and must be approved by the Owner.
- Where adding to an installation, both voice and data numbering must remain in a “matched” sequence. Throughout the school, at each location has the “same” numbering on the faceplate ID for both voice and data. Example: If the 4th location in a series is a “voice only” location, then the data patch panel would be skipping number 4 in its sequence. Therefore, if the numbers are continuing, (assuming the “next” location is both voice and data) the data patch panel’s next number would be 5 (skipping # 4) with NO blank data jacks open on the data patch panel. By the same description, if a location in a series is a –data only”, the voice designation strip would represent a “skip” in its sequence. Again the arrangement of the added cables would leave NO blanks on the 110-voice frame.
- ALL labeling shall be machine generated (Panduit) in black ink on white background tags and be permanent. NO HAND WRITTEN LABELS SHALL BE ALLOWED.
- Cables
 - o ALL Cables shall be identified AT BOTH ENDS using a self-laminating tag wrapped around the cable (e.g. not a "flag"). The Contractor shall use labeler. Cable labels shall indicate cable designation and destination. In Station cables, for example, this designation shall be the Telecommunications Outlet identification.
- Telecommunications Outlets
 - o Telecommunications Outlets are to be labeled (1) on the cover of the assembly, (2) on the base of the assembly (if applicable) and (3) on each cable terminated at that location.
 - o Where multiple cables of a given type (e.g. "Data") are contained in a single outlet, the alpha-designator ("A", "B", "C", and so on) those jack positions shall be so labeled.
- Data Patch Panels
 - o Data Patch panels shall be clearly labeled as to the destination and position of each cable terminated on that panel. Cables shall be positioned in sequence of Outlet I.D.
 - o The TC designator may be omitted on each jack position provided that the panel itself includes the TC designator.
 - o Station cables shall be labeled within 4-inches of the cable choke at Data Patch Panels.
- Voice Termination Block
 - o Each horizontal row (in pairs) of the Voice Termination Block shall be labeled with "Designation Strips" which identify the destination and position of each cable terminated on that block.
 - o Designation Strips shall be color coded to indicate the block's application. Color-coding shall be as follows:
 - Inter-Building Cable (e.g. IC-PE or OCC-"K") = Brown
 - Intra-Building Cable (MDF-IDF) = White
 - Station Cable = Blue
 - o Blocks on which "Station" Cabling is terminated will be labeled as to identify Telecommunications Outlet I.D.s. Voice termination blocks on which "Backbone" or "Tie" Cabling is terminated will be labeled to identify Pair Count are identified (e.g. 1-25, 26-50, etc.). Assignment of Pair Count(s) shall consider the existing count and must be approved by Owner.

SECTION 270006 – COMMUNICATIONS TESTING

- Upon completion of installation work, the contractor shall visually inspect all cabling and terminations to insure that they are complete and conform to the requirements defined herein.
- The contractor shall provide to the College a written certification that this inspection has been made.
- All cable sub-systems (e.g. Inter-building, Intra-Building and Station) must be tested independently. Testing of these sub-systems cannot be combined (e.g. through interconnection).
- Contractor shall conduct acceptance testing according to a schedule coordinated with the College. Representatives of the College may be in attendance to witness the test procedures. The contractor shall offer adequate advance notice to the College as to allow for such participation.
- The Contractor is responsible for supplying all test equipment and personnel to conduct acceptance test.
If any link is found to be outside the specification defined herein, that cable and the associated terminations (if applicable) shall be replaced at the expense of the contractor. The applicable tests shall then be repeated.
- All backbone fiber must be tested bidirectional using OTDR. OTDR graphs and lengths of run must be included. Results shall be provided to Owner.
- Voice Backbone Testing
 - All testing shall include the installed termination hardware as part of the test path. Length of the run must be given on test results. Backbone cables shall be tested between TC's and include termination blocks.
 - All cable pairs shall be verified for pair validity, continuity (opens/shorts), and polarity (tip/ring). Split or miss-positioned pairs must be identified and corrected.
 - Inter- and Intra-Building copper cables may have a maximum failure rate of 3% based on total pair count. All bad pairs must be identified and documented.
- Voice UTP Station Cable Testing
 - The Specification of Field Test Requirements for a Balanced Twisted-Pair Cabling System.
 - Cat 5e Installation: field test requirements upon completion of the installation
 - Every cabling link in the installation shall be tested in accordance with the
 - Telecommunications Industry Association (TIA) standard ANSI/TIA/EIA-568-B.1 (most current version).
 - Optional Requirements
 - Upon Owner request, a representative of the end-user may select a random sample of 5% of the installed links. The representative (or his authorized delegate) shall test these randomly selected links and the results are to be stored in accordance with the prescriptions in Section I.C. The results obtained shall be compared to the data provided by the installation contractor. If more than 2% of the sample results differ in terms of the pass/fail determination, the installation contractor under supervision of the end user representative shall repeat 100% testing and the cost shall be borne by the installation contractor.
- Data UTP Station Cable Testing
 - Cat 6 Installation: field test requirements upon completion of the installation.
 - Every cabling link in the installation shall be tested in accordance with the Telecommunications Industry Association (TIA) standard ANSI/TIA/EIA-568-B.1 (most current version). Length of the run must be given on test results.
 - Optional Requirements:
 - A representative of the end-user may select a random sample of 5% of the installed links. The Owner shall test these randomly selected links and the results shall be stored.

- o Field Test Specifications to the data provided by the installation contractor. If more than 2% of the sample results differ in terms of the pass/fail determination, the installation contractor under supervision of the end-user representative shall repeat 100% testing and the cost shall be borne by the installation contractor.
- Station Coaxial Cable Testing
 - o Station Coaxial Cable Testing shall be tested to verify cable length and to test for cable faults and breaks. A step-function high resolution Time Domain Reflectometer shall be employed for this test, such as the Tektronix 1502C or the Hewlett Packard 1415A. The results shall be automatically plotted on an X-Y plotter with a Y-axis voltage reflection coefficient resolution of .001 per division. The X-axis will resolve down to 1" of cable. The TDR will sweep the cable at a rate no greater than 50' per second, or such lower rate as necessary to resolve cable faults to the 1" and .001 VRC level.
 - o The cables shall be terminated with its characteristic impedance. Where required, an appropriate matching pad shall be used to match the analyzer to the cable.
 - o A Cable shall be rejected if any single fault is observed of amplitude greater than 0.003 voltage reflection coefficient. Characteristic impedance shall also be measured at 5%
- Optical Fiber and Air Blown Fiber Testing
 - o All fiber testing shall be performed on all fibers in the completed end to end system.
 - o Testing shall consist of a bi-directional end to end OTDR trace performed per EIA/TIA 455-61 or a bi-directional end to end power meter test performed per EIA/TIA 455-53A.
 - o The system loss measurements shall be provided at 850 and 1310 nanometers for multimode fibers and 1310 and 1550 for single mode fibers.
 - o Pre-installation cable testing
 - The Contractor shall test all lightguide cable prior to the installation of the cable.
 - The Contractor shall assume all liability for the replacement of the cable should it be found defective at a later date.
 - o Loss Budget
 - Fiber links shall have a maximum loss of:
 - Allowable cable loss per km) (km of fiber in link) + (.4dB) (number of connectors) = maximum allowable loss
 - A mated connector to connector interface is defined as a single connector.
 - Loss numbers for the installed link shall be calculated by taking the sum of the bi-directional measurements and dividing that sum by two.
 - Any link not meeting the requirements of the standard shall be brought into compliance by the contractor, at no charge to Owner.
 - Documentation shall be provided in both hard copy and electronic, in a format as agreed by the Owner.
 - o Air Blown Fiber Tube Cable Tests (Refer to Master Format Division 1-33-26)
 - Pressure Tests and Obstruction Tests shall be submitted to the Owner's Representative on appropriate forms. Forms are included in certified contractor's manual. The form must be completed, signed and turned over to the Owner.
 - Sumitomo Electric - Bundled Fiber Optics Testing shall be submitted to the engineer and copies to the Owner's Representative. Submit manufacturer's test reports for each reel of fiber bundle provided prior to installation.
 - Submit Contractors on-reel test results at 850 and 1300 nm for multi-mode and 1310 and 1550nm for Single-mode.

- Submit Contractor's test results after bundled fiber terminations are installed.
 - Submit soft copy bundled fiber optic cable OTDR test results on compact disc (CD). The test results will need to include all results including the fiber map (graph). Provide proprietary software on the CD to enable viewing of the soft-copy test results.
- of nominal value.
- o Cyclic faults (such as cable reel stress and die draw-down) shall be limited to a voltage reflection coefficient of 0.005.

TEST RESULT DOCUMENTATION AND FOLLOW UP

- In system documentation, contractor shall provide test results and describe the conduct of the tests. Test documentation shall include a record of test frequencies or wavelengths, cable type, conductor pair and cable I.D. (e.g. Outlet I.D.), measurement direction, test equipment type, model and serial number, date, reference setup, and crewmember name(s) and the length of the run. Where applicable, printouts generated for each cable by the wire test instrument (e.g. *Fluke DSP4300*) shall be submitted as part of the documentation package.
- At the request of the Owner, the contractor shall provide copies of original test results.
- The Owner may request that a 10% random field re-test be conducted on the cable system - at no additional cost - to verify documented findings. If findings contradict the documentation submitted by the Contractor, additional testing can be requested to the extent determined necessary by the Owner, including a 100% re-test. This re-test shall be at no additional cost to the Owner.
- Should it be determined by the Owner or A/E that the materials or any portion thereof furnished and installed fail to comply with the specifications defined herein, these materials and the related installation shall be rejected and replaced by the Contractor. All work disturbed by changes necessitated in consequence of said defects or imperfections shall be made good at the Contractor's expense. All replaced components shall be re-tested.

SECTION 27 0007 – COMMUNICATIONS DOCUMENTATION AND CLOSEOUT

- Upon completion of cable plant installation, the contractor shall provide a complete set of cable records documentation including:
 - o Test Data as defined above
 - o As-Built Drawings (where applicable)
 - o Input Data for Facilities Management System
- As built drawings
 - o Also see Division 01 of the Design and Engineering Criteria
 - o Contractor shall provide accurate as-built construction drawings.
 - o The drawing package shall include one or more of the following:
 - Floor plans showing (1) the location of all Telecommunications Outlets as installed and (2) paths by which all cables are routed.
 - Cable lengths as obtained through review of sheath footage markings.
 - Termination field, equipment rack and frame layouts.
 - o Numbering and drawing conventions used shall be consistent throughout all documentation provided and comply with established standards at the College. Telecommunications Outlet locations shall be identified by their sequential number as defined elsewhere in this document and include the Building Designator.
 - o All documentation, including hard copy and electronic forms (if applicable) shall become the property of the Owner.
 - o Documentation shall be submitted within ten (10) working days of the completion of testing.

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SECTION 27 0008 – COMMUNICATIONS ACCEPTABLE MATERIAL LIST

The following products are acceptable to the Owner. Any variation shall be subject to review and acceptance by Owner.

Mfgr	Mfgr PN	Description
Panduit	PUP5504IG-UY	Category 5e plenum (CMP) 4-pair UTP copper cable. Conductors are 24 AWG construction with HDPE insulation. Conductors are twisted in pairs and placed in a flame-retardant PVC jacket.
Panduit	PUR5504IG-UY	Category 5e riser (CMR) UTP 4-pair cable. Conductors are 24 AWG construction and protected in a flame-retardant PVC jacket.
Panduit	PUP6004BU-UY	High performance Category 6 plenum (CMP) 4-pair UTP copper cable. Copper conductors are 23 AWG construction with FEP insulation. Conductors are twisted in pairs, separated by an integrated pair divider, and placed in a low smoke, flame- retardant PVC jacket.
Panduit	PUR6004BU-UY	High performance Category 6 riser (CMR) 4-pair UTP copper cable. Copper conductors are 23 AWG construction with HDPE insulation. Conductors are twisted in pairs, separated by an integrated pair divider, and placed in a flame- retardant PVC jacket.
Panduit	CFPL2EI	CLASSIC FACEPLATE W/LABEL
Panduit	CFPL4EI	CLASSIC FACEPLATE W/LABEL
Panduit	CFPL6EI	CLASSIC FACEPLATE W/LABEL
Panduit	CF1062EIY	106 FRAME - DATA - 2 PORT
Panduit	CF1064EIY	MINI-COM 106 FRAME
Panduit	JB1DEI-A	1 PCS DEEP JUNCTION BOX**
Panduit	CFPL4BL	FURN. FACEPLATE 4 POS. W/LABEL&LABEL COV
Panduit	CJ5E88TGEI	MINICOM CAT5E JACK MODULE
Panduit	CJ688TGEI	MINICOM CAT6 JACK MODULE
Panduit	P110BW300-X	110 WIRING BLOCK W/LEGS
Panduit	P110CB4-X	110 CONNECTING BLOCK 4PR
Panduit	P110CB5-X	110 CONNECTING BLOCK 5PR
Panduit	P110JTW-X	GIGA PUNCH JUMPER TROUGH
Panduit	DP485E88TGY	48 PORT FLAT DP5E DATA
Panduit	DP48688TGY	48 PORT FLAT DP6 DATA
Panduit	DP24688TGY	24 PORT FLAT DP6 DATA
Panduit	DP245E88TGY	24 PORT FLAT DP5E DATA

Panduit	CMPHH2	PANNET 2 RU HORZ. 3X5" D-RINGS FRONT
Panduit	NFR84	PANNET NETFRAME RACK, 7FT
Panduit	NFDR4X6K	PANNET 4X6 D-RING KIT OF 8, PLASTIC
Panduit	HLT2I-X0	TAK-TY LOOP TIE

Mfgr	Mfgr PN	Description
Panduit	DPLF	KIT- FRONT LABEL HOLDER
Panduit	DPLT	KIT - TOP LABEL HOLDER
Panduit	FRME1	PANNET OPTICOM 1 RU BLACK ENCL
Panduit	FRME2	PANNET OPTICOM 2 RU BLACK ENCL
Panduit	FRME3	PANNET OPTICOM 3 RU BLACK ENCL
Panduit	FAPB	FIBER ADAPTER PANELS
Panduit	FAP6WBUDSCZ	FIBER ADAPTER PANEL W/6BU
Work Station Hardware		
Panduit	CFPL2EI	Single gang, vertical faceplate accepts two <i>Mini-Com</i> ® Modules
Panduit	CFPL4EI	Single gang, vertical faceplate accepts four <i>Mini-Com</i> ® Modules
Panduit	CFPL6EI	Single gang, vertical faceplate accepts six <i>Mini-Com</i> ® Modules
Panduit	CFPF12EI-2G	Double gang, vertical faceplate frame and six flat inserts (two module spaces each). Accepts twelve <i>Mini-Com</i> ® Modules.
Panduit	JB1EI-A	Single gang one-piece outlet box with adhesive backing
Panduit	KWP5EY or KWP6PY	Stainless steel phone plate with <i>Giga-TX</i> ™ Style Category 5e or cat 6 Keystone Jack Module
Panduit	CFFP4BL	Faceplate snaps into industry standard knockouts found on modular furniture
Panduit	CJ5E88TGWH	Category 5e, RJ45, 8-position, 8-wire universal module
Panduit	CJ5E88TGBL	Category 5e, RJ45, 8-position, 8-wire universal module
Panduit	CMBEI-X	1-position, reserves space for future use

**COLLEGE OF DUPAGE
SMALL PROJECTS AGREEMENT
BETWEEN COLLEGE OF DUPAGE AND CONTRACTOR**

THIS AGREEMENT ("Agreement") is made as of _____ by and among COLLEGE OF DUPAGE ("COD") and _____ ("Contractor").

COD and Contractor desire to enter into this Agreement, pursuant to which Contractor shall perform certain work in connection with the Project, as hereinafter provided. In consideration of the performance of work by Contractor and the payment for such work by COD, the parties agree as follows:

1. Scope of Project. Contractor shall perform work for COD in connection with the Project, including specifically, the matters set forth on Exhibit 1. Contractor shall perform all work with the highest standards of workmanship and materials. Contractor shall maintain a sufficient staff to perform all work in the most expeditious manner consistent with the interests of COD. Contractor shall promptly notify COD immediately in writing: (i) of any information required from COD so Contractor can complete its work in a timely manner; and (ii) of any work requested by COD that is not included in the scope of work provided in Exhibit 1.

The Contractor understands that COD may engage other Contractors or COD personnel to work in areas near the Contractor's work. Contractor shall cooperate with such others so that work is not disrupted or delayed.

The Contractor shall be solely responsible for means and methods selected in performing the Work. Contractor shall supervise all work so that it is performed in a safe and expeditious manner. Contractor shall be solely responsible for the safe work of its employees and its subcontractor's employees.

The work shall be completed in ____ calendar days. Time is of the essence under this Agreement.

2. Payment to Contractor. COD shall pay Contractor for Contractor's work properly performed under this Agreement. Contractor's work shall be billed as set forth in Exhibit 2 and in no event shall the total amount due to Contractor under this Agreement exceed the total contract sum following, without COD's prior written approval:

Total Contract Sum: \$ _____ (numbers and words)

3. Defective Work and Guarantee. Contractor shall promptly correct any defective work. Payment by COD for any work otherwise determined to be defective shall not relieve Contractor of its obligation to correct. Contractor shall warrant and guarantee all work to be free from defect for one year following substantial completion of the work.

4. Indemnification and Insurance. Contractor hereby agrees to indemnify and hold COD, its trustees, officers, agents, employees and any other parties designated by COD (COD, its trustees, officers, agents, employees any other parties designated by COD hereinafter collectively called the "**Indemnitees**") harmless from all losses, claims, liabilities, injuries, damages and expenses, including but not limited to, all attorneys' fees, defense and court costs and expenses, that the Indemnitees may incur arising out of, or occurring in connection with, the acts, omissions, or breaches by Contractor of its duties and obligations under or pursuant to this Agreement. This indemnification obligation shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

Contractor shall procure, at no expense to COD, the insurance coverages set forth in Exhibit 3. Contractor shall adhere to all provisions of Exhibit 3.

5. Performance and Payment Bond. This is an installation project, therefore performance and payment bond is not required. Prior to commencement of any work on the Project, Contractor shall submit insurance. Any provisions contained within the bonds abrogating COD's rights or remedies, otherwise available in contract or law, are void.

6. Termination. COD may terminate this Agreement at any time, in whole or in part, with or without cause, upon written notice to Contractor. In the event this Agreement is terminated for convenience, Contractor shall be compensated for work properly rendered through the date of termination, as can be documented to the reasonable satisfaction of COD. COD shall have no liability to Contractor beyond the date of termination. In no event shall contractor be compensated for anticipated profit or lost opportunity.

7. Liens. Upon COD's request, contractor shall submit mechanics' lien waivers in form acceptable to COD with each statement for work rendered or request for payment. Should liens be placed on the project by any subcontractor, contractor shall indemnify COD for all costs, expenses and attorneys fees incurred in the defense of such lien.

8. Materials. All materials incorporated into the work shall be new and of high quality. Contractor shall adhere to all manufacturer's recommendations. If requested by COD or otherwise set out in the contract documents, Contractor shall, before purchase of such material, submit to COD for COD's review, and in a format acceptable to COD, all product data and literature. All manufacturer's warranties shall be forwarded to COD prior to substantial completion of the work.

9. Changes in Scope of Work. COD may, without invalidating this Agreement, request changes in the scope of the work, whether taking the form of additions, deletions, or other revisions. No such work shall be performed unless and until such change is agreed in writing by COD and Contractor. If the change in work will result in a change in contract price, the change in price shall be calculated by 1) lump sum, 2) agreed unit rates, or 3) time and material reimbursable plus mark-up. COD shall solely select the method of pricing.

10. Successors and Assigns. Contractor shall not assign any rights under or interest in this Agreement without the prior written consent of the COD. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns.

11. Controlling Law. This Agreement is to be governed by the laws of the State of Illinois. Each party has reviewed and approved this Agreement and the rule of construction that resolves ambiguities against the drafting party shall not be employed in the interpretation of this Agreement.

12. Entire Agreement; Conflict. This Agreement incorporates COD's bid instruction and request documents and Contractor's bid. This Agreement represents the entire agreement between Contractor and COD and supersedes all prior negotiations or agreements, written or oral, which are not included herein. This Agreement may only be amended by written instrument executed by COD and Contractor. In the event of a conflict between this Agreement and a proposal from Contractor or any exhibits hereto, this Agreement shall control, followed by COD's bid instruction and request documents, and finally, by Contractor's bid.

13. 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.*

14. Human Rights Act. To the extent required by law, contractor shall abide by the Illinois Human Right Act, 775 ILCS 10/0.01 *et seq.*

15. 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 *er seq.*

16. 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).

This Agreement has been executed the day and year provided above.
COLLEGE OF DUPAGE Contractor:

By: _____
Name: _____
Title: _____

By: _____
Name: _____
Title: _____

SCOPE OF WORK

This area will describe the general scope of work as provide and install everything shown in the bid documents, which will be attached to the back of this document as Attachment 1.

EXHIBIT 2

Contractor shall submit monthly statements for work rendered. The statements will be based upon Contractor's work completed at the time of billing on the basis of actual work performed. COD shall make payments to Contractor thirty (30) days after receipt of Contractor's statements properly submitted. Monthly statements shall detail Amount Currently Due, Previous Amount Billed, and Balance of Contract Outstanding. In the event of termination for convenience by COD as herein provided, Contractor shall be paid for work properly rendered prior to termination, or as otherwise provided herein.

Requests for Payment shall be submitted no more than once per month in a format acceptable to COD.

Any terms or payment provisions, such as penalties or interest, contained on Contractor's invoices shall be of no effect.

COD may withhold payment from monies otherwise due to the Contractor to compensate the COD for the cost of repairing defective work or completing incomplete work in case of Contractor default.

If COD selects agreed unit rates as the method of payment for base scope work or change order work, the agreed unit rates are as set forth below:

UNIT RATE SCHEDULE

Description	Unit	Rate (\$)

Contractor shall be allowed 10% mark-up on change order work when time and material reimbursable method of pricing is selected.

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 COD with two (2) original Certificates of Insurance, with College of DuPage named as an additional insured for Commercial General and Automobile Liability, showing the following minimum coverage with an insurance company acceptable to the College. Further, the Certificate of Insurance shall state that coverage provided is primary to any other coverage available to College of DuPage. The foregoing Certificates shall contain a provision that coverage afforded under the policies will not be cancelled or non-renewed until at least thirty (30) 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: \$1,000,000/\$2,000,000

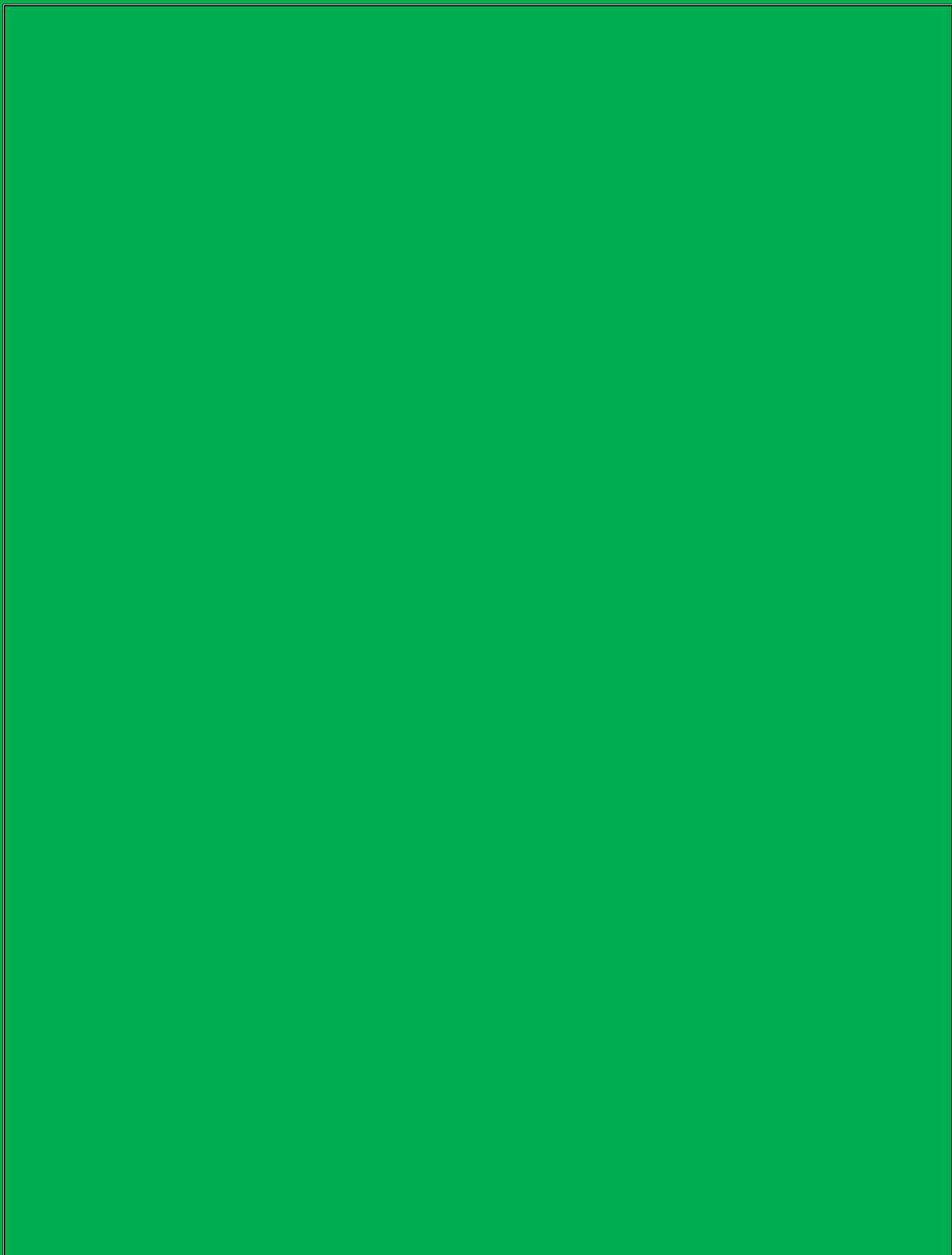
1. Premises - Operations
2. Explosion, Underground and Collapse Hazard
3. Products/Completed Operations
4. Contractual Insurance
5. Broad Form Property Damage
6. Independent Contractors
7. Bodily Injury

Automobile Liability
Owned, Non-owned, or Rented \$1,000,000/\$2,000,000

Workers' Compensation and Occupational Diseases As Required by Applicable Laws

Employer's Liability \$1,000,000

Professional Liability (if performance specifications) \$3,000,000/\$3,000,000



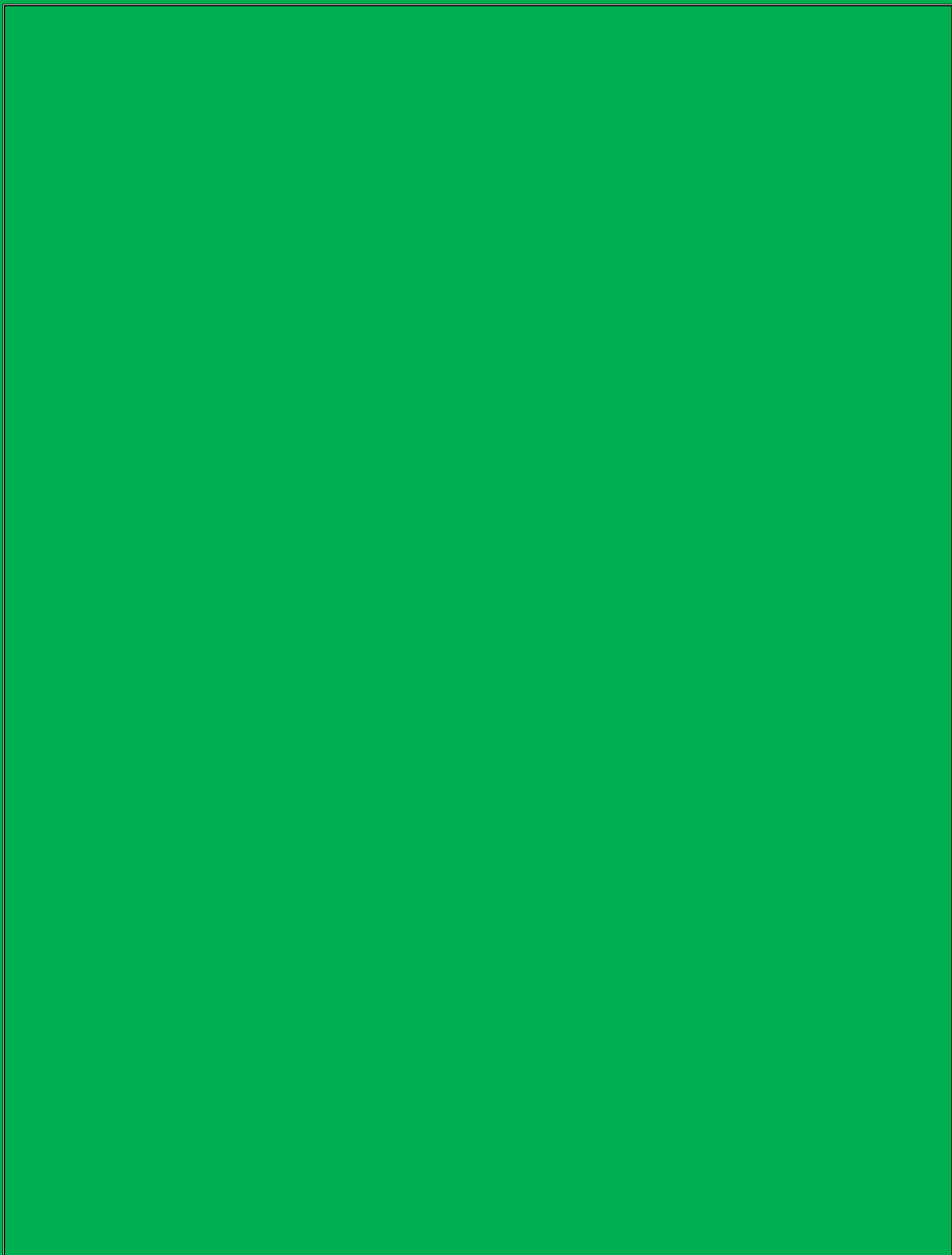


COLLEGE OF DuPAGE

APPENDIX – VOLUME II

Regular Board of Trustees Meeting

May 18, 2017



APPENDIX

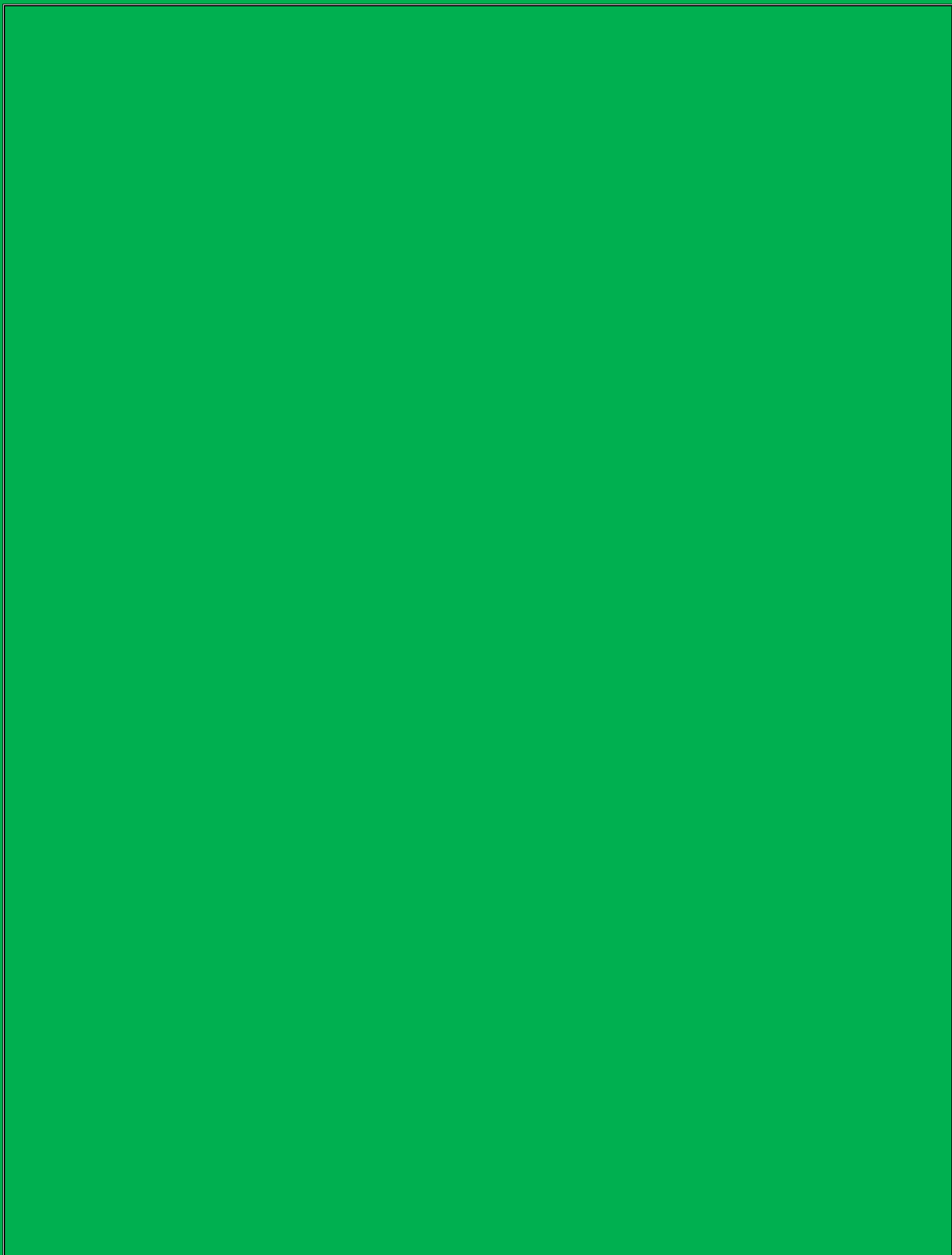
Requests for Proposals:

- i. Consent Agenda Item 8g:
Studio Control Room Upgrade for the
MPTV Television Studio**

- ii. Consent Agenda Item 8k:
Public Safety Desk and Student Tech
Gallery**

- iii. Agenda Item 11:
Contract for McAninch Arts Center (MAC)
Marketing and Public Relations
Consultant for FY2018-2020**

- iv. Agenda Item 13:
Contract for the HSC Cadaver Lab
Renovation**



May 18, 2017

- iii. **Agenda Item 11:**
Contract for McAninch Arts Center (MAC)
Marketing and Public Relations
Consultant for FY2018-2020

RESPONDENT: _____



COMMUNITY COLLEGE DISTRICT NO. 502

Request for Proposal

Marketing and Public Relations Services for the McAninch Arts Center (MAC)

RFP NUMBER.: 2017-R0016

PROPOSALS DUE: Thursday, April 20, 2017 at 11:00 a.m. CST

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

SEND RESPONSES TO:

**COLLEGE OF DuPAGE
PURCHASING DEPARTMENT
BIC BUILDING, ROOM 1540
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

3/31/2017

REQUEST FOR PROPOSAL

Sealed Proposals for **Marketing and Public Relations Services for the McAninch Arts Center (MAC)** will be received by the College of DuPage, District 502, at the office of the Purchasing Manager, Berg Instructional Center (BIC) Building, Room 1540, 425 Fawell Blvd., Glen Ellyn, IL 60137, until **11:00 a.m. CST, Thursday, April 20, 2017**, at which time the names of the respondents will be read publicly.

A pre-proposal meeting will be held on Monday, April 10, at 11:00 a.m. ~~in the College of DuPage Purchasing Conference Room, 425 Fawell Blvd, Glen Ellyn IL 60137, Berg Instructional Center (BIC Building) room 1540.~~ Attendance is not required but is strongly recommended. **(See Addendum #1 for update to location)**

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

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

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

LEGAL NOTICE

RFP NOTICE

No. 2017-R0016

The College of DuPage is accepting proposals for Marketing and Public Relations Services for the McAninch Arts Center (MAC). RFP documents may be downloaded from the Purchasing Website at <https://www.cod.edu/about/purchasing/requests/> by clicking on the link for this RFP and following the instructions.

A pre-proposal meeting will be held on Monday, April 10, 2017 at 11:00 a.m. ~~in the College of DuPage Purchasing Conference Room, 425 Fawell Blvd, Glen Ellyn IL 60137, Berg Instructional Center (BIC Building) room 1540.~~ Attendance is not required but is strongly recommended. (**See Addendum #1 for updated location**)

Responses are due to the Purchasing Department up to and no later than **11:00 a.m. CST April 20, 2017**, at which time the Respondents names will be read publicly. 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.



Purchasing Department

425 Fawell Boulevard
Glen Ellyn, Illinois 60137-6599
<http://www.cod.edu>
PHONE (630) 942-2576
FAX (630) 942-3750

**2017-R0016
Marketing and Public Relations Services for the McAninch Arts Center
(MAC)**

ADDENDUM 1

3/30/17

After release of the Legal Notice, the location for the pre-proposal meeting has been changed.

The correct location for the pre-proposal meeting scheduled for Monday, April 10, 2017 at 11:00 a.m. is:

**College of DuPage
McAninch Arts Center Room 203
425 Fawell Blvd, Glen Ellyn II, 60137**

Attendance is not required but is strongly recommended.

This signed Addendum is required to be returned with your Proposal no later than the due date set forth in the Request for Proposal.

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

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

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

I HAVE RECEIVED ADDENDUM #1 _____
Authorized Signature

FIRM NAME & ADDRESS:

Sincerely,
*Purchasing Department
College of DuPage
425 Fawell Blvd. BIC 1540
Glen Ellyn, IL 60137
630-942-2576*

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PROPOSAL SUBMISSION CHECKLIST

Things to Remember When Submitting a Proposal to the College of DuPage

1. **Read the *entire* document.** In your review, note critical items such as: pre-proposal conference information, 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 is the single point of contact for this Request for Proposal and is the only person with whom you are allowed to communicate regarding this project. This person is an excellent source of information for any questions you may have. Please review the section entitled *Blackout Period* for more information on communications during the RFP process.
3. **Take advantage of the “question and answer” period.** Submit your questions to the Purchasing Department by the date in the RFP and view the answers given in the formal addenda issued for this project. All addenda issued for an RFP will be emailed to each company that downloaded the RFP documents and will include all questions asked and answered concerning the project. Please ensure when downloading the RFP documents, you use a valid email address.
4. **Do not alter, add to, or delete and part of the RFP documents without prior approval.** Please refer to the section titled *Exceptions* for instruction on how to request a deviation to the original RFP.
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 RFP. If so, you must submit a signed copy of the addenda along with your proposal.
6. **Review and read the RFP 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. The copies are provided to the Evaluation Team members and will be used to score your response. Proposals 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).
7. **Submit your response on time.** Note the date and time listed on the front page of the RFP 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 and sealed. Please allow adequate time for delivery to the Purchasing Department.
8. **Important dates to know:**
 - RFP Publication Date – 3/31/2017
 - Pre-proposal meeting: 4/10/2017 11:00 a.m.
 - Questions Due – 4/11/2017 11:00 a.m.
 - Proposals Due – 4/20/2017 at 11:00 a.m.
 - Target Board Approval Date – 5/18/2017
 - Purchase Order Issued once contract is finalized and all required documentation is on file.

1.0 GENERAL INFORMATION

1.1 DEFINITIONS

- A. RESPONDENT** shall mean the individual or business entity submitting Proposal to supply any or all of the services or goods required by the Contract Documents.
- B. RESPONSE** shall mean the RFP Documents as completed by the Respondent which constitutes the Respondent's proposal.
- C. CONTRACT** shall mean the agreement between the College and Contractor as set forth in the resulting Contract Documents and as awarded by the College of DuPage Board of Trustees.
- D. CONTRACTOR** shall mean the individual or business entity submitting a response and to whom the College of DuPage Board of Trustees awards the resulting 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. PURCHASING MANAGER** shall mean the Purchasing Manager of the College of DuPage.
- H. 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 Contract Documents.

1.2 PROPOSALS TO CONFORM TO REQUIREMENTS OF LEGAL ADVERTISING

The College will not entertain or consider any proposal: (i) received after the exact time specified in the legal advertisements; (ii) not accompanied by the required 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 Request for Proposal 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 respondent and be provided as part of the submitted proposal. Failure to provide complete documentation of the product compliance with specifications required may result in proposal rejection.

1.4 COMPLIANCE WITH LAWS - PUBLIC CONTRACTS

This Contract is a competitive public contract of the College of DuPage subject to laws and ordinances governing public contracts. The respondent 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 proposal or the performance of the Contract. If the respondent observes that any of the RFP 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 AWARD OF CONTRACT

The award of the contract will be made within ninety (90) calendar days after the opening of proposals to the most qualified respondent as determined by a Evaluation Committee and pre-determined evaluation criteria. The successful respondent will be notified by electronic mail that their proposal 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 proposal 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 proposals, a respondent may file a written request with the Purchasing Manager on the withdrawal of their proposal and the Purchasing Manager will permit such withdrawal.

1.7 CONSIDERATION OF PROPOSALS

The College reserves the right to reject or accept any or all proposals, to extend the proposal period, to waive technicalities in the documents and/or to direct that the project be abandoned or re-released prior to award of the Contract.

1.8 COMPETENCY OF RESPONDENT

No proposal will be accepted from or Contract awarded to a respondent 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.

1.9 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 respondent. 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.

1.10 CASH BILLING DISCOUNTS

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

1.11 LOCAL BUSINESS PREFERENCE

When two (2) or more responsible respondent proposals that result in equal scoring by the project Evaluation Committee, the contract award will be determined by drawing lots in a public meeting unless one respondent is a local business within the District boundaries and one is a non-local business, in which event the local business will be awarded the contract.

1.12 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.

1.13 TAX EXEMPTION

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

1.14 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.

1.15 INSURANCE

When work is being performed on-site, The College of DuPage requires a Certificate of Insurance in compliance with the following:

I) Workmen's Compensation Insurance shall be carried for all employees employed in carrying out the work contemplated under this agreement. The insurance shall comply with all State of Illinois and Federal requirements as may relate to Worker's Compensation Insurance. Employer's Liability Insurance shall also be provided for both bodily injury and disease that may arise out of the employment of any person involved in work under this agreement. Limits: \$500,000 Each Accident \$500,000 Each Disease \$500,000 Policy limit on disease

II) Automobile Liability Insurance shall be carried to cover any liability arising out of the use of any automobile. This insurance shall cover owned, non-owned, leased and hired automobiles to protect claims for bodily injury or property damage which may arise from the use of motor vehicles engaged in various operations under this Contract. Combined Single Limit of \$1,000,000 for both bodily injury and property damage.

III) General Liability Insurance shall include: Bodily Injury, Property Damage, Personal Injury, Explosion, Collapse and Underground Damage Liability Endorsements (commonly called X, C, and U hazards), Products and Completed Operations, Blanket Contractual and Broad Form Property Damage coverage, with: Limits: \$1,000,000 Per occurrence \$2,000,000 General Aggregate \$1,000,000 Personal and advertising injury liability \$2,000,000 Products and completed operations aggregate.

Include College of DuPage, its director's & officers, employees and agents as additional insured's on the policy. Stipulate that such insurance is primary and is not in addition to, or contributing with, any other insurance carried by, or for the benefit of College of DuPage. Waive any and all right of subrogation against College of DuPage. Contain separation of insured's endorsement. The aggregate limit must be written per Project or per location limit

IV) Umbrella/Excess Liability Insurance shall be carried to cover any liability in excess of the limits of coverage already required and provided through the primary liability policies. Limits: \$2,000,000 per occurrence.

\$2,000,000 Aggregate Umbrella Excess Liability Insurance must be in excess of the Employer's Liability Insurance, Automobile Liability Insurance, and General Liability Insurance.

V) Property Insurance shall be carried to protect all owned property brought on the premises relative to this agreement.

VI) Terms and Conditions

Prior to the commencement of the agreement, a valid/original Certificate of Insurance evidencing that all required insurance is in force, executed by an authorized representative of the insurance company, must be sent to College of DuPage, Attn: Purchasing Manager. Such Certificates shall identify the specific project/contract and location.

All Insurance companies shall be rated A VI or better by the current Best's Rating Guide and approved by the College.

All policies of insurance must be endorsed to contain a provision giving College of DuPage a thirty-day (30) prior written notice by registered mail of any cancellation of that policy or material change in coverage.

Receipt and review by the College or the College's Representative of any copies of insurance policies or insurance certificates shall not relieve the party to this agreement of his obligation to comply with the insurance provisions of the Agreement.

The insurance provisions of this Agreement shall not be construed as a limitation of the responsibilities and liabilities pursuant to the terms and conditions of this Agreement, including but not limited to liability for claims in excess of the insurance limits and coverage's set forth herein.

All policies shall be written with insurance companies licensed to do business in the State of Illinois. The College reserves the right to verify any information with the carrier.

The College has the right to request a certified copy of any insurance policy. Certificates must be filed with the College at least 30 days before the scheduled date of performance. You are required to add the College to its General Liability insurance policy with the following wording: "College of DuPage, including its current and former

trustees, officers, employees, volunteer workers, agents, assigns and students, is added to this policy as additional insured.

1.16 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 RESPONDENTS

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 respondents to obtain digital copies of RFP documents. It is the responsibility of each prospective respondent to verify the completeness of their printed RFP documents and accompanying executed addenda acknowledgement, and other required forms before submitting a proposal.

2.2 BLACKOUT PERIOD

Under no circumstances are respondents to contact or discuss this RFP, 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 document. 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 RFP 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.

2.3 REQUESTS FOR INFORMATION/CLARIFICATION AND REQUESTS FOR DEVIATIONS/EXCEPTIONS

If any firm submitting a response for this project is in doubt as to the true meaning of the specifications or other documents or any part thereof, respondent 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 no later than Tuesday, April 11, 2017 at 11:00 a.m. CST.

Questions for which answers are provided will be communicated to all registered recipients of RFP documents via addendum. All issued addenda must be signed and returned to the College as per the instructions in the addenda or proposal will not be accepted.

If any Respondent intends to take any deviations or exceptions from the Specifications or other Documents, Respondent shall submit to the Purchasing Manager/Buyer a written request for a deviation or exception by **April 11, 2017 at 11:00 a.m. CST**. 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 addressing this exception, 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 RFP Documents. Respondent shall acknowledge receipt of each Addendum issued via a signed addendum. Failure to acknowledge receipt of addenda may result in disqualification of the submitted Proposal. All written requests for deviations or exceptions shall be sent to purchasing@cod.edu.

2.4 SUBMISSION OF RESPONSES

All Respondents shall submit:

- One (1) original copy of the completed RFP;
- Three (3) copies of the completed RFP;
- and one (1) flash/thumb drive containing all completed documents.

These shall be in a sealed envelope/box and shall be delivered to:

Purchasing Manager
College of DuPage, BIC Building - Room 1540
425 Fawell Blvd.,
Glen Ellyn, Illinois 60137
RE: RFP 2017-R0016

Proposals must be received in the proposal (bid) box located in Purchasing by the date and hour of the RFP deadline as shown in the legal advertisement. The sealed envelope submitted by the Respondent shall carry the following information on the face of the envelope: Respondent's name, address, subject matter of RFP, advertised date of RFP deadline and the hour designated for RFP deadline as shown in the legal advertisement. Unless otherwise stated, all blank spaces on the forms shall be fully completed. Respondent bears all responsibility for error or omissions in their submission.

2.5 ERROR IN PROPOSAL

Where a respondent 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 proposals. Within forty-eight (48) hours of the proposal opening, respondent 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 respondent from withdrawing its proposal 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 respondent be allowed to withdraw its proposal.

2.6 WITHDRAWAL OF PROPOSALS

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

2.7 ACCEPTANCE OF PROPOSALS

The Purchasing Manager shall notify the successful Respondent, in writing, of the award of the Contract by the College within ninety (90) days from the Proposal Opening date. Upon receipt of the Notice of Award, the Contractor shall promptly secure, execute and deliver to the Purchasing Manager any documents required herein.

2.8 CASH BILLING DISCOUNTS

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

2.9 COMPETENCY OF RESPONDENT

No response will be accepted from or Contract awarded to a Respondent 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.

2.10 NOTICES

All communications and notices between the College and Respondents regarding the RFP Documents shall be in writing and hand delivered or delivered via United States mail, postage prepaid, or via email. Notices to the Respondents shall be addressed to the name and address or email address provided by the Respondents; notices to the Purchasing Manager shall be addressed to Purchasing Department, College of DuPage, BIC Building - Room 1540, 425 Fawell Blvd., Glen Ellyn, Illinois 60137, or purchasing@cod.edu.

2.11 CONFIDENTIALITY

The Purchasing Department shall examine the responses to determine the validity of any written requests for nondisclosure of trade secrets and other proprietary data identified. After award of the contract, all responses, documents, and materials submitted by the Respondent pertaining to this RFP will be considered public information and will be made available for inspection, unless otherwise determined by the Purchasing Department. All data, documentation and innovations developed as a result of these contractual services shall become the property of the College. Based upon the public nature of these RFPs, a Respondent must inform the College, in writing, of the exact materials in the offer which cannot be made a part of the public record in accordance with the Illinois Freedom of Information Act.

2.12 RESPONDENT WARRANTIES

The submission of a Proposal shall constitute a warranty that: (i) Respondent has carefully and thoroughly reviewed the Contract Documents and has found them complete and free from ambiguities and sufficient to describe the Contract work; (ii) Respondent 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 Contract Documents; and (iii) neither the Respondent 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 Proposal.

END OF SECTION

3.0 PROJECT SUMMARY

3.1 SCOPE OF WORK/BACKGROUND

College of DuPage, Illinois Community College District Number 502 (the "College") is requesting proposals from qualified specialists in performing arts/live entertainment marketing to public relations, advertising, subscription campaigns, social media and web updates for the MAC at the College of DuPage.

The McAninch Arts Center (MAC) houses three performance spaces: 800-seat Belushi Performance Hall, 200-seat Playhouse Theatre and 60+ seat Studio Theatre. It is home to two resident professional ensembles: Buffalo Theatre Ensemble and New Philharmonic; gallery space for professional, faculty and student exhibits and supports productions for COD College Dance, Music and Theater Departments. In an average week, the MAC hosts 5.1 public performances, 1.6 arts programs, 2.2 rental events, 10.25 rehearsals and one non-art College Department use, totaling more than 200 performances of plays, concerts, lectures and art exhibits per season.

3.2 SPECIFICATIONS/REQUIREMENTS

1. Agency must be specialists in performing arts center/live entertainment marketing with a minimum of five years' experience. Provide examples of past experience in creating comprehensive entertainment/art season brochure with more than 20 productions, including integrated subscription campaigns.
2. Agency must prove established relationships with Arts critics, Visual Art critics, Entertainment editors, Radio and TV producers and Online bloggers. Demonstrate relevant knowledge and experience in the Chicago Western suburbs. Demonstrate relationship with local and regional media outlets.
3. Provide detailed samples of the most significant projects completed in the past two years that are similar to the services and scope requested and the related outcomes of those projects.
4. Fully integrated agency with in-house Managers dedicated to the MAC account who specialize in (please notate in proposal each staff member who will be assigned):
 - a. MAC account coordination, budget development and implementation of a comprehensive marketing plan including advertising, publicity, promotion, email, website, digital and social media
 - b. Media placement and coordinate ad design and invoices
 - c. Public Relations – pitching interviews to critics, media and broadcast including handling talent for morning show press days; all print, radio and television media relations; writing and distribution of press releases and event copy; submission to event calendar listings; coordination of media events
 - d. Social and Digital Media – placement, analysis of best target sites/locations and effectiveness of plan
 - e. Website - annually populate with season events, manage and update event pages as needed
 - f. Grassroots marketing – support targeted events with unique promotions including but not limited to flyers, posters, list trades, program stuffers, etc.
 - g. Collateral and brochure coordination
 - h. Marketing analysis and audience surveys
 - i. Crisis management and press support for any issues that may arise.
5. Agency will handle bid process for brochure print order and mail house needs in excess of \$5,000. Agency must be proficient in acquiring and dealing with bid process and purchasing procedures.
6. Willingness to support MAC organization by attending major events-helping to host and coordinate press, promote on site.
7. Provide weekly reports and participate in weekly conference call team meetings as well as once a month face-to-face meetings to discuss: marketing, publicity, grassroots, online/social media, Google analytics, and all other efforts. Compile a year-end report within eight-weeks following the final performance of the season including analysis of what was accomplished and effectiveness of strategies.
8. Negotiate promotions and manage inventory to schedule and implement sales with third party discount ticket sellers.

3.3 EXPANDED SCOPE OF WORK

Marketing

- Oversee all aspects of marketing for the MAC Touring, Buffalo Theatre, National Theatre Live and New Philharmonic Performances.
- Create and implement individual show marketing campaigns including promotions, special offers and third party tie-ins.
- Develop targeted direct mail initiatives for individual shows as sales warrant and budget permits.

- Recommend and implement promotional activities as appropriate (i.e. partnerships with area restaurants, businesses and retail outlets).
- Develop targeted zip code analysis of MAC ticket buyers, review and seek out existing audience demographic data as available to create targeted databases.
- Research and recommend ways for expanding the reach of the marketing materials, such as zip code saturation, mailing list trades/rentals, email list purchases, exchanges and publication inserts, among others.

Advertising

- Develop and implement a season-long advertising schedule including broadcast, print, digital (including but not limited to Google and Facebook) and out-of-home media.
- Seek and negotiate media partnerships/sponsorships.
- Design and execute a retargeting campaign through Google including embedding a code in the MAC website, as well as, Facebook pages, others as appropriate.
- Write copy, reserve ad space, submit artwork, oversee designer and forward necessary paperwork to the MAC for direct payment.
- Place and negotiate all advertising buys, including cable, print, digital radio, outdoor.

Public Relations

- Oversee all aspects of publicity for the MAC Touring performances, Buffalo Theatre Ensemble productions, National Theatre Live Series, New Philharmonic performances, (10) College Productions and (4) Cleve Carney Gallery Openings.
- Maintain a customized media database to include local arts, entertainment and lifestyle journalists, feature reporters, columnists, bloggers and family editors from print, broadcast, internet and niche media outlets.
- Write and distribute press materials, including biographies, event releases, pitch letters, fact sheets, media advisories and the like.
- Pitch feature stories, live television and radio appearances, interview and column items.
- Submit press materials to long lead outlets three months in advance of each event, and follow up to pitch coverage, feature stories, photo placements or listings.
- Submit production information for consideration for season, fall and/or holiday preview sections.
- Secure listings and editorial on websites, blogs and online newsletters/eblasts, etc.
- Coordinate and oversee execution of press events, public appearances, broadcast shoots and photo opportunities.
- Staff performances with important media attendance.
- Distribute photos and videos.
- Work with television reporters to include footage of productions in "Weekend Picks" round-ups.
- Provide spokesperson with written talking points and interview confirmations.
- Draft and distribute event invitations, track responses and follow up to encourage attendance at performances.
- Provide weekly updates on all events in progress and include tear sheets whenever possible.
- Compile a final publicity report within eight weeks following the final performance of the season.

Digital Communications & Website

- Develop and implement a targeted season-long digital communications plan to include email, season campaign, Facebook and Twitter strategies, blog content and website messaging.
- Create and implement a social networking/communications strategy that is integrated across all platforms (Facebook, Twitter and blog) yet still employs the appropriate tone for each unique platform.
- Update and maintain a Facebook page and other digital platforms and create strategy content for building followers and Facebook fans.
- Create Facebook contests using a third party application on Facebook to manage contests and work with the programmer to create contest landing pages.
- Create, populate and maintain events pages for the website
- Design and strategize revolving sliders for home page
- Provide breaking news and last minute changes for weather or artist changes

Grassroots

- Develop and implement gorilla marketing efforts, including but not limited to fliers, posters for specific targeted groups with unique promotions
- Coordinate trades with organizations for show promotion utilizing program stuffers, eblasts, lists, table toppers, check stuffers, etc.
- Monitor grassroots effectiveness and provide recommendations for future opportunities.

3.4 MARKETING AND ADVERTISING OVERVIEW (ESTIMATED NUMBERS)

To help the candidate understand the scope and expectations we have outlined the anticipated number of times the agency will be required to do each of the following:

Marketing

Shows: 37 plus 3 series Develop overarching marketing plan, identifying target markets, sponsorship and press opportunities and advertising outlets for each touring show. Write descriptive show copy, Lakeside (LS), Global Flicks (GF), National Theatre Live (NTL), make contact with publicist/agents to secure marketing materials, request artist promo giveaways, social media and marketing assets.

Direct Mail

Pieces: 10-12 Coordinate, write copy, design, produce, bid and print: 32 Page Season Brochure (Qty. 100,000 Slim Jim), 11 x 17 Tri-fold Holiday mailer (17,000), 12 panel Mid-Season Mailer 75,000, 14x7 12 panel Baseball Schedule (9,000), 6 - 5.5 x 8.25 Postcards

Advertising

Advertising Plans: 37 Coordinate, negotiate pricing, place all digital, print, radio, cable and outdoor advertising and leverage sponsorship opportunities. Create respective assets. Develop advertising budget and advertising plan for each of 37 shows/events and overall season.

3rd Party Tix Sellers: 30 Manage inventory and negotiate price, promotion and placement

Track and monitor 3rd party ticket vendors and make adjustments of offers as needed.

Media Plans: 37 Plan, negotiate ad buys and place ads for each of 37 shows, to include: print, radio, TV, outdoor

Public Relations

Press Releases: 50 Research, interview, write and distribute for 37 shows and 3 series

10 College Productions and 4 Gallery, send B-roll as available

Additional PR: 50 Research, interview, write and distribute for special announcements and events, update press releases as needed based on changes of artists or schedules or new information

Calendar Listing: 108 Submit all events for calendar listings

Press Pitches: 40 Pitch press opportunities, arrange and coordinate in-studio, radio interviews, press coverage, press packets, attend shows where press will be in attendance. Pitch features on Season, New Philharmonic, Buffalo Theatre, National Theatre Live, Lakeside, Gallery, Global Flicks and individual shows.

Digital/Eblasts

Events: 108 Populate websites and website listings. Includes Touring, Student, Lakeside, National Theatre Live, Art Gallery, New Philharmonic, Buffalo Theatre Ensemble, Global Flicks, SchoolStage, Rental Season Rollout

Digital Ads: 37 + 3 series Design and resize digital ads per media plan

Email Blasts: 104 Avg. two per week; create and pull targeted market lists from ticketing system. Design and write content using MAC Software.

Website Design and update homepage slides weekly; weekly maintenance;

Web Updates: 52- weekly* *breaking MAC news as needed

Social Media

Events: 70 Utilize social media through Facebook posts, blogs, websites, calendar listings, tweets etc. for 70 events or about 6-9 posts/week

Grass Roots Mktg

Events: 30 Fliers, posters, email blasts to show specific targeted groups, list trades with other organizations, program staffers, promotions. Email exchanges, restaurant table toppers, check staffers and other brilliant ideas for gorilla marketing, including but not limited to parades. Work with area shopping malls to find partnerships and advertising opportunities.

Meetings/Planning

Conference Calls: 50 Prepare meeting agendas; Weekly team strategy conference calls to review and discuss marketing plans and adjust as needed based on ticket sales, etc.

In Person Mtgs: 12 Monthly team strategy sessions held at the MAC with press rep, strategy rep, social media rep and five MAC division leaders.

Special Events: 6-8 Attend major events, assist as needed/appropriate

Wrap Up Reports: 52 Report on weekly activities; analysis of advertising/marketing effectiveness

Strategy events Tix on sale, Cyber Monday, Mid-season, special sales

Season Campaign

Implement annual artist survey to subscribers

and Announcement

Develop season subscription strategy and marketing plan for presale, onsale, cyber onsale and tickets on sale

Write descriptive show copy

Plan and coordinate timeline and execution of season brochure

Coordinate, write copy, design, produce, bid and print: 32 Page Season Brochure (Qty. 100,000 Slim Jim) and 14x7 12 panel Baseball Schedule (9,000)

Coordinate printing and mailing of brochure

Pitch feature story on MAC season announcement

Pitch feature story on Buffalo Theatre Ensemble season announcement

Pitch feature story on New Philharmonic season announcement

Pitch feature story on Gallery season announcement

Calendar listing for each show in entire season

Contact artist reps for digital and marketing assets

3.5 ADVERTISING AND MARKETING RESPONSIBILITY BY PROGRAM

Below is a summary of event programming and how the different programs are supported.

Season Campaign: Touring, New Philharmonic, Buffalo Theatre Ensemble and National Theatre Live: approx. 37 events

- Develop and implement a season marketing plan including publicity, marketing, advertising, promotions, email communications and social media strategy, includes placing advertising
- Develop strategic sales initiatives such as “tickets on sale party”, gift certificate campaign, Spring Break special, Black Friday, etc.
- Coordinate the season brochure including writing copy, negotiating list trades and rates with printer and mailing house, managing graphic design and overseeing distribution
- Write copy and oversee graphic design and printing of pocket-sized schedule for season
- Write and distribute the season press release and follow up with the media to secure season coverage in conjunction with the subscription campaign
- Coordinate a mid-season brochure including writing copy, negotiating rates with printer and mailing house, managing graphic design and overseeing production
- Develop mid-season and holiday brochure, including writing copy, managing graphic design and overseeing printing
- Manage the individual show budgets as well and the season brochure and mid-season brochure budgets
- Compile a master spreadsheet of Touring artists’ contact information, social media outlets and availability of collateral material
- Create, distribute and analyze up to three online surveys to the patron email database
- Manage the overall season marketing budget
- Post all events to website, update as needed

College Productions: 10 events (press/social media and minimal advertising plan for these events – press only)

Prior to the beginning of the season, the MAC staff will work with the College to identify a set number of shows for the Firm to promote. For those shows the Firm will:

- Write copy and include all shows in season brochure
- Include all performances in pocket-sized flier
- Manage budget
- Send out a monthly calendar listing and pursue listings\
- Write and distribute a press release for each show
- Pitch a feature story if there is an appropriate angle
- Write and post social media coverage
- Include each show/event in the MAC email newsletter
- Post events to website
- Incorporate college productions into email and social media campaign

Cleve Carney Art Gallery: 4 openings (press only/social media & minimal advertising)

The MAC staff will work with the Art Gallery staff to identify which exhibitions to promote. For these exhibitions, the Firm shall:

- Write copy and include all exhibitions in season brochure
- Include all exhibitions in pocket-sized flier
- Include Art Gallery logo in print advertising campaign as space permits
- Incorporate all exhibitions in mid-season brochure
- Manage budget
- Send out a monthly calendar listing and pursue listings
- Write and distribute a press release for each show – pitch feature stories
- Develop and implement a modest advertising campaign
- Seek coverage on the artists' sites, if available
- Write and post social media content in support of each exhibition's opening
- Include each show/event in the MAC eblast campaign
- Send dedicated eblast to Cleve Carney's own email list

Lakeside Pavilion Concert Series (Summer): marketed as one series

- Write and distribute a season announcement press release encompassing all summer shows in the season (concerts, movies and college productions), as well as releases on each concert featured in the series
- Pitch feature stories
- Pursue calendar listings for all concerts
- Incorporate into email and social media campaign

School Stage: marketed as one series

- Include in fall brochure
- Feature on website slider as appropriate (such as upon season announcement)
- Include in related materials (such as family series postcard) as needed

College of DuPage Foundation Benefit: one annual event

- Write pre- and post-event press release
- Post event to website
- Promote event via social media
- Secure photographer, if desired
- Staff event to work with photographer and any media in attendance
- Include event in printed materials
- Incorporate event into advertising campaign as appropriate

Global Flicks: marketed as one series

- Include series in the fall brochure, pocket schedule and midseason brochure
- Post all eight events to website
- Include Global Flicks in eblast campaign

Rentals: 5-10 events

- Edit copy and include in fall brochure
- Post rental shows to website

3.6 WEBSITE MANAGEMENT

Touring Shows, New Philharmonic, Buffalo Theatre Ensemble, National Theatre Live, Lakeside, Global Flicks, SchoolStage and Rentals

- Develop strategy for key messaging throughout the year, to be featured on home page sliders
- Work with graphic designer and/or MAC staff to create slider artwork for seasonal messages, such as "subscriptions now on sale," "single tickets on sale," and "gift certificates available"
- Create sliders for all featured performances
- Post season brochures, study guides, programs, etc.
- Work with programmers as needed to make minor updates

College and Art Gallery

- Write copy, obtain photos and videos as available and create pages for every performance or event (not just the featured events)

3.7 CONTRACT PERIOD/SCHEDULE OF EVENTS

A three-year contract is contemplated, subject to the annual review and recommendation of the College of DuPage Board of Trustees, the satisfactory negotiation of terms, including a price acceptable to both College of DuPage and the selected firm and the concurrence of the Board of Trustees. The contract shall also contain a unilateral cancelation clause for the College of DuPage any time within the first sixty (60) days of the contract, and a unilateral cancelation clause for the College at any time during the contract period with sixty (60) days written notice.

3.8 EVALUATION CRITERIA

College of DuPage will appoint a Selection Committee whose responsibility will be to review all responses to this RFP. The following criteria will be used in the evaluation of all proposals. The evaluation of each response to this RFP will be based on its demonstrated competence and compliance.

After the initial evaluation, the top finalists may be requested to make a phone, webinar or in-person presentation, or to further negotiate the terms and conditions of the contract. If notified, the firm must be prepared to present with three (3) business days from the date of e-mail notification. Specific instructions regarding the presentation will be included in the notification.

Evaluation Criteria		Percent of Weighting
Overall Experience in Live Performance/Event Marketing	Our evaluation will include an assessment of the history of your company, your experience as it relates to the requirements within this RFP, evidence of past performance, quality and relevance of past work, sample brochures references, and related items.	On File
Familiarity with Government and Entertainment Industry	Our evaluation will include our assessment of your understanding of our organization and the Performing Arts and Live Entertainment Marketing industry and how you integrated this knowledge into your proposal. Experience in Gov't agency purchasing ethics & procedures	On File
Qualifications of Personnel	Our evaluation will include an assessment of the qualifications and experience of your managerial team, staff, and subcontractors, and related items and how many staff people are assigned to the project	On File
Strategy and Creativity	Our evaluation will include an assessment of the quality and viability of proposed strategies and creativity to increase revenue and build audience. Ideas presented to take the MAC to the next level.	On File
Approach	Our evaluation will include an assessment of the extent to which the agency plan aligns with the MAC's stated needs. Proposed level of engagement by the agency representatives.	On File
Budget Approach/Cost Effectiveness	Effective and efficient delivery of quality services is demonstrated in relation to the budget allocation. The allocation is reasonable and appropriate. Approach to compensation structure is balanced and structured to maximize marketing investment.	On File

4.0 PROPOSAL FORM

2017-R0016 Marketing and Public Relations Services for the McAninch Arts Center

Firm Name: _____

Estimated Breakdown of Costs

Your proposal shall contain all pricing information relative to performing the requested services as outlined in this RFP. The total all-inclusive maximum price below contains all direct and indirect costs including all out-of-pocket expenses. Firms must include with proposal their full terms and conditions, including fees for cancelations and show/event additions, billing schedules, markups, etc. The top two or three firms may be contacted to provide a presentation and be available for Q&A.

Marketing	\$ _____
Direct Mail	\$ _____
Advertising	\$ _____
Public Relations	\$ _____
Digital/Eblasts	\$ _____
Website Updates	\$ _____
Social Media	\$ _____
Grass Roots	\$ _____
Meeting/Planning	\$ _____
Other fees*	\$ _____
Subtotal	\$ _____

(*Other fees" should be listed in detail in proposal submission)

Season Campaign:

Season Retainer	\$ _____
Season Campaign/Strategy/Announcement/Press/ Brochure/Coordination & Execution	\$ _____

Subtotal (Year 1) \$ _____

This is a three-contract. Please provide pricing for succeeding years.

Total (Year 2) \$ _____

Total (Year 3) \$ _____

4.0 PROPOSAL FORM (Continued)

2017-R0014 Telephone System Maintenance/Support Services & Upgrades

Firm Name: _____

Pricing Proposal

Your proposal shall contain all pricing information relative to performing the requested services as described in this RFP for proposal. The total all-inclusive maximum price below contains all direct and indirect costs including all out-of-pocket expenses. Firms must include with Proposal their full terms and conditions, including fees for cancelations and show/event additions, billing schedules, markups, etc. The top two or three firms may be contacted to provide a presentation and be available for Q&A.

Touring Shows (25 shows)(incl Student Christmas Carol)	\$ _____
Family Shows (4 shows)	\$ _____
BTE Shows (3 shows)	\$ _____
New Philharmonic Concert (5 concerts)	\$ _____
Lakeside Pavilion Concerts (1 series)	\$ _____
Global Flicks (1 series)	\$ _____
National Theatre Live (1 series)	\$ _____
College Student Shows (10 shows)	\$ _____
Carney Art Gallery (4 Openings)	\$ _____
Website Maintenance (12 months)	\$ _____
Digital Communications & Eblasts	\$ _____
Other fees*	\$ _____
Subtotal	\$ _____

(* "Other fees" should be listed in detail in proposal submission)

Season Campaign:

Season Retainer	\$ _____
Season Campaign/Strategy/Announcement/Press/ Brochure/Coordination & Execution	\$ _____
Subtotal (Year 1)	\$ _____

This is a three-year contract. Please provide pricing for succeeding years.

Total (Year 2)	\$ _____
Total (Year 3)	\$ _____

5.0 PROPOSAL SUBMISSION REQUIREMENTS

Proposals should be prepared simply and economically, providing a straightforward, concise description of the Respondent's capabilities to satisfy the requirements of the RFP.

Proposals must be typewritten, single spaced, space-and-a-half or double-spaced, using both sides of the paper. All pages must be numbered. Margins must be at least ½ inch on all sides. Font size can be no smaller than 10. Proposals using smaller font sizes or smaller margins may be rejected.

Attachments and supporting documents not specifically required by the RFP will not be evaluated. Requested sample documents, if applicable, do not count against the page limit. Supporting materials submitted with the proposal, if any, will not be returned.

Firms must respond to all the items listed under **Section IV Proposal Requirements**. Restate each item, use the same numbering and letter sequence as found in this Request for Proposal and then provide your response.

Responses must be on the forms provided by College of DuPage where applicable.

Emphasis should be on completeness and clarity of content.

Please submit your hard copy proposals in the following order.

Section 1: Required forms- Complete

- a. Section 6.0 Certifications
- b. Section 7.0 Signature Page
- c. Section 8.0 Conflict of Interest Disclosure and Non-Collusion Form
- d. Any issued addenda, signed (if applicable)

Section 2: Qualifications

- a. General information
 - a. **Cover Letter**- The transmittal letter will express the firm's interest in undertaking this project with College of DuPage. The letter will summarize the firm's qualifications for being selected and express any special factors that the firm believes College should consider in selecting the firm. Finally, the letter shall indicate the name, title, direct address and direct telephone number of the Firm's main contact person for responding to any question, or for negotiating any contract.
- b. Qualifications
 - a. **Overall Experience** - The proposal shall demonstrate that the firm has been in business for over five (5) years and has experience in performing arts center or live entertainment marketing. Demonstration of quality and relevance of past work with examples/samples. Indicate the scope of work, date, engagement partners, and the name and telephone number of the principal client contact.
 - b. **License to Practice in Illinois** - An affirmative statement should be included indicating that the firm and all assigned key professional staff are properly licensed to practice in the State of Illinois, and are currently in Good Standing with the State of Illinois, whenever applicable.
 - c. **Firm Qualifications** - The proposal should state the size of the firm, the size of the firm's staff, the location of the office from which the work on this engagement is to be performed and the number and nature of the staff to be so employed on a part- time basis. In addition, the firm shall provide information on the circumstances and status of any disciplinary action taken or pending against the firm during the past three (3) years with state regulatory or professional organizations. Experience in Government agency purchasing ethics and procedures.
 - d. **Staff Qualifications and Experience** - The firm should identify the principal supervisory and management staff who would be assigned, including any sub-contractors. In addition, the firm should provide qualifications, experience, training (specifically community college performing Arts and Entertainment experience) of the staff. The firm also should indicate how the quality of staff over the term of the agreement will be assured. Personnel may change with the expresses prior written permission of the College. However, in either case, the College retains the right to approve or reject replacements. Other personnel may be changed at the discretion of the proposer provided that replacements have substantially the

- same or better qualifications or experience.
- e. **References-** Provide at least five (5) references on the College-provided form. (Attach Exhibit A)

Section 3: Approach, Strategy, and Creativity

- a. The firm will prove capability describing strategies to use and meet the needs of the MAC, and the nature of services described in this RFP. The Firm will provide strategies and creative ideas to increase revenue and build audiences, and take us to the next level.

Section 4: Cost Proposal Form

- a. Submit College-provided *Estimated Breakdown of Costs* form for Years 1, 2 and 3
 - a. The Firm shall provide a proposed fee based on functions of work. The total maximum price shall include all direct and indirect costs and all applicable out-of-pocket expenses
- b. Submit College-provided *Pricing Proposal* form for Years 1, 2, and 3.
 - a. The Firm shall provide a proposed fee based on the estimated number of events listed. The total maximum price shall include all direct and indirect costs and all applicable out-of-pocket expenses.

Section 5: Contract(s)

Provide sample contract for the term of the agreement for College review.

6.0 CERTIFICATIONS

IMPORTANT: All Respondents are required to complete and sign this form. Completed form must be returned with response by the RFP deadline. Failure to return this completed form may result in disqualification of response.

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.* (If Applicable)
- 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. When required by law, the Respondent and all Respondent'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

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

STATE NEGOTIATED COOPERATIVE AGREEMENT: YES _____ NO _____ Contract No. _____

Name of Certifying Entity: _____

Certification #: _____ Expiration Date: _____

7.0 SIGNATURE PAGE

IMPORTANT: All Respondents are required to complete and sign this form. Completed form must be returned with response by the RFP deadline. Failure to return this completed form may result in disqualification of response.

Check One:

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

The undersigned acknowledges receipt of a full set of RFP 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 response will not be accepted.**

The undersigned makes the foregoing response to RFP subject to all of the terms and conditions of the RFP 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 response are true and correct.

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 _____, 2015. 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

RFP #: _____ DATE: _____

CONFLICT OF INTEREST DISCLOSURE

College of DuPage (COD) reserves the right, at its sole discretion, to reject any and all responses, 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 response submitted. Contact with any employee of the College of DuPage during the pre-award period, except as noted in the RFP documents, is strictly forbidden and is considered sufficient grounds for dismissal from the 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 a contract and that this company, corporation, firm, partnership or individual has not prepared this response in collusion with any other Respondent, and that the contents of said response 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 response.

Company Name: _____ Owners/Principal(s)
Name(s)/Title(s): _____

Vendor Address: _____ City, State, Zip: _____

Phone Number: _____ Fax Number: _____

Email Address: _____

Signature

Respondent/Company Official: _____ Date: _____

IMPORTANT: All Respondents are required to complete and sign this form. Completed form must be returned with response by the RFP deadline. Failure to return this completed form may result in disqualification of response.

APPENDIX A: REFERENCES

Reference 1:

Name of Individual: _____ Name of Organization _____

Address of Organization: _____

Telephone # _____

Email Address: _____

Project Name and length of business relationship with your company: _____

Reference 2:

Name of Individual: _____ Name of Organization _____

Address of Organization: _____

Telephone # _____

Email Address: _____

Project Name and length of business relationship with your company: _____

Reference 3:

Name of Individual: _____ Name of Organization _____

Address of Organization: _____

Telephone # _____

Email Address: _____

Project Name and length of business relationship with your company: _____

Reference 4:

Name of Individual: _____ Name of Organization _____

Address of Organization: _____

Telephone # _____

Email Address: _____

Project Name and length of business relationship with your company: _____

Reference 5:

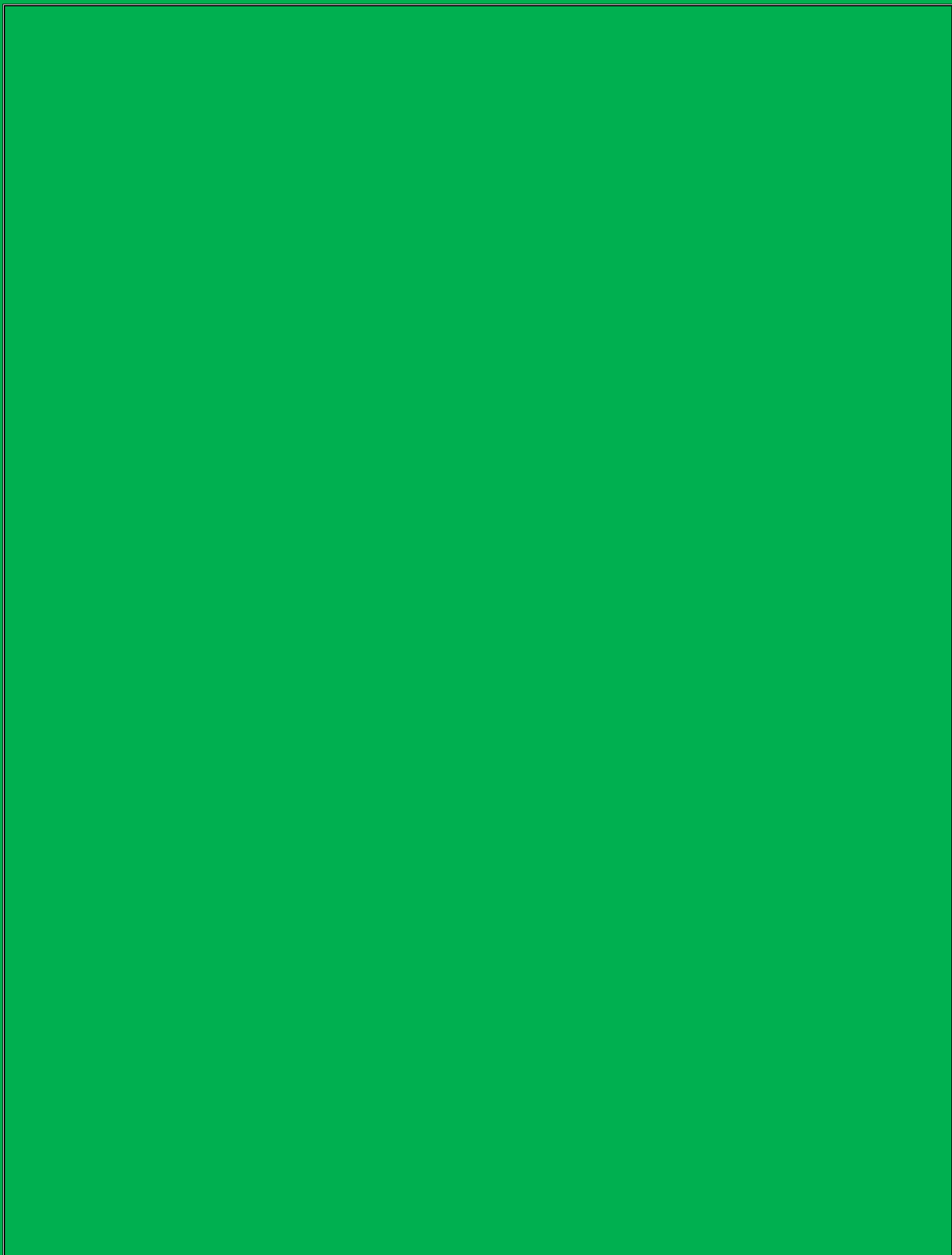
Name of Individual: _____ Name of Organization _____

Address of Organization: _____

Telephone # _____

Email Address: _____

Project Name and length of business relationship with your company: _____



May 18, 2017

iv. **Agenda Item 13:**
**Contract for the HSC Cadaver Lab
Renovation**

BIDDER: _____



COMMUNITY COLLEGE DISTRICT NO. 502

BID NUMBER: 2017-B0045

Cadaver Lab Renovation for the Health and Science Center (HSC)

BIDS DUE: Friday, April 7, 2017 at 2:00 p.m. CST

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 1540
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

March 22, 2017

INVITATION TO BID

Sealed bids for **Cadaver Lab Renovations for the Health and Science Center (HSC)** will be received by the College of DuPage, District 502, at the office of the Purchasing Manager, Berg Instructional Center (BIC) Building, Room 1540, 425 Fawell Blvd., Glen Ellyn, IL 60137, until **2:00 p.m. CST, Friday, April 7, 2017**, 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 bid deposit in the amount of 15% of the total base bid in the form of a cashier's check, bid bond, or certified check 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 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. 2017-B0045

The College of DuPage is accepting sealed bids for **Cadaver Lab Renovations for the Health and Science Center (HSC)**. Bid documents may be downloaded from the Purchasing Website at www.cod.edu/about/purchasing/requests/ by clicking on the link for this bid and following the instructions.

A bid deposit in the amount of 15% of the total base bid in the form of a cashier's check, bid bond, or certified check is required for this project.

Bids are due to the College of DuPage Purchasing Department in the Berg Instructional Center (BIC) Building, Room 1540, 425 Fawell Blvd., Glen Ellyn, IL 60137 up to and no later than **2:00 p.m. CST Friday, April 7, 2017**, at which time they will publicly opened. 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; bid deposit information, submittal dates, submission requirements, etc.
2. **Note the contact information provided.** The Purchasing Office Buyer at 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 5, 6, and 7 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 – 3/23/2017
 - Questions Due – on or before 11 a.m. on 3/31/2017
 - Bids Due – 4/07/2017 at 2:00 p.m.
 - Target Board Approval Date – 5/18/2017
 - Purchase Order Issued once contract is finalized and all required documentation is on file.

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 INSURANCE

Please refer to Sample Small Projects Contract, (Exhibit B) for insurance requirements for this project.

1.19 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 no later than **March 31, 2017 at 11:00a.m. CST**. 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 flash drive containing all completed documents

Bids must be in a sealed envelope and delivered to:

Purchasing Manager
College of DuPage
BIC Building - Room 1540
425 Fawell Blvd.
Glen Ellyn, Illinois 60137
RE: 2017-B0045

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, subject matter of Bid, 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.

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 1540, 425 Fawell Blvd., Glen Ellyn, Illinois 60137, or 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 V 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.

2.10 PERFORMANCE AND PAYMENT BOND

The successful Bidder shall furnish a Performance and Payment Bond in the full amount of the Contract on the College Bid Form, a specimen of which is provided herein. 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 EXHIBIT B: SCOPE OF WORK

Scope of work shall include but is not limited to:

This contractor and /or his sub-subcontractor(s) shall provide necessary Design/ Engineering and all labor, material, equipment and supervision, incidental or reasonably inferred to complete all items for this scope of work and related work in accordance with this Exhibit "B", project drawings, specifications & Exhibit "C" Bid form.

It is understood that this contractor shall provide shop drawings and specifications that indicate the design and construction intent of these documents. The contractor also understands that no adjustment to the bid price will be increased for design changes required by this CONTRACTOR. Any changes required by the College of Du Page outside the scope of work will be added to the cost of the bid through COD 's Change Order process.

General Scope of Work for Pre-Purchased Equipment

Equipment Purchased by COD installed by this Contractor

1. The College will furnish (4) Anatomy tables with down draft exhaust. It will be this contractor's responsibility to place and hook up the exhaust ducts as indicated on the contract drawings.
2. The College will furnish (4) Procedure lights which are to be mount at the ceiling level above the Anatomy tables. It will be this contractor's responsibility to install the lights, provide power and the required supports for the lights.
3. The College will furnish (1) Eye glass Ultraviolet Sterilization Cabinet. It will be this contractor's responsibility to provide the power required and install the cabinet. This contractor shall provide the required blocking.
4. The college will furnish dishwasher this contractor to install.

Equipment Purchased by COD installed by COD Contractor

1. Stainless steel casework and teaching bunker. COD will purchase all casework shown on the documents and identify in the specifications. This contractor shall coordinate the installation and work as required to complete this project. Shop drawing will be provided for coordination. This contractor shall coordinate all plumbing and HVAC work.

IT Equipment Purchased by this Contractor but Awarded Under Separate Contract

This bid package list several pieces of IT equipment that is to be purchase under a different College funding source. This equipment is identified in the Bid Form. To maintain continuity, for the equipment and installation COD will issue two contracts. One contract will be awarded for the work described in this Scope of work and one contract will be awarded for various pieces of equipment. COD will not split the work between two contractors.

1. (4) TV Monitors and support brackets. This contractor shall receive and install all necessary blocking, conduits wire/ cabling for these units and final hook up per the construction documents
2. (4) cameras which will be located above the Anatomy tables. It will be this contractor's responsibility to receive and install the cameras. This contractor will provide the structure to support the cameras and supply all conduits wire/ cabling for these units and final hook up per the construction documents.
3. Other equipment includes DM Matrix, multi window processor, wireless mic receiver, Crestron equipment,

video recorder.

General Scope of Work for Cadaver Lab

Demo

1. This contractor shall remove the existing VCT flooring and prep the floor for the new epoxy floor.
2. This contractor shall remove exist vinyl wall base.
3. This contractor shall remove existing Casework identified on D-100. The existing lab sink is to remain as noted on the documents.
4. This contractor shall remove all existing indirect lighting as indicated on ED-100. Contractors shall disconnect and remove conduit back to nearest junction box to be reused new lighting. Light fixtures are to be returned to the College.
5. This contractor shall partially demo east wall for new window. See drawing A100 for location.
6. This contractor shall remove (2) existing sinks noted on PD-100. This contractor shall cap water and waste lines for new sinks in the new case work.
7. This contractor shall room all existing ceiling tile. This contractor to provide an alternate price to remove existing ceiling grid.
8. This contractor shall remove existing duct sections as noted on MD-100. The existing ceiling maybe removed as necessary and reinstalled to complete work. This contract shall cap existing duct as required per specifications.
9. Fire sprinkler system is to remain. Remove and reuse or provide new escutcheon's needed for new ceiling tiles.
10. This contractor shall remove drywall as necessary for relocated data and electrical outlets to be relocated. See ED-200 for extent of work.
11. Remove exiting HVAC north wall exhaust grill as note on D-100.
12. Remove existing wall mounted fixtures and return to the owner. These items include clock, whiteboards, and paper towel and soap dispensers. If owner does not wish to reuse them this contractor shall dispose of them.
13. Cadavers are to remain; do not dispose of.

Demo Alt Price

14. Provide alternate price to remove all of the exiting grid. See bid form.

Carpentry

1. Provide new ceiling tile as specified on documents and specifications.
2. Provide new partitions to enclosed anatomy table exhaust vents. Provide blocking for monitors as needed.
3. Provide supports for cameras, procedure lights, electrical retractable cord reels, to existing deck or existing structure.
4. Provide metal strapping to the existing walls for casework anchoring. Coordinate with Casework manufacture.
5. Patching existing walls where data / electrical outs were relocated, where exhaust duct was removed, and where new window was installed.
6. Provide new window with integral shade. Shade mechanism to be operated from classroom 2304.
7. Provide hands free paper towel and soap dispenser as specified. Coordinate with COD standards.
8. Provide misc. ceiling grid required to support new tile at anatomy exhaust enclosures.
9. Install owner furnished Eyeglass Ultraviolet Sterilization Cabinet.
10. Provide required blocking and new marker boards as shown on a-200
11. Patch hole from relocated Fire alarm on south wall see e-200 for location.

Carpentry Alt Price

1. Provide new ceiling grid to match existing. See Bid Form.

Painting

1. Prep and repaint all walls in Cadaver lab and existing frames. See specifications for type of paint and color. Provide drawdowns of all paint for approvals. Repaint west wall of room 2304 after window and walls have been completed. East and west walls of cadaver room are to match Sherwin Williams, Monorail Silver SW 7663, all other walls are to match Sherwin Williams' OC 18, Dovewing.

Flooring

1. This contractor shall prep the existing concrete flooring for new epoxy flooring. Submit samples of finish flooring for approval. Floor color is based on Sherwin Williams, General polymers, Decorative Mosaic, CU11 ,1/16 "D" size. This contract shall provide an approved equal.
2. This contractor shall prep existing walls to receive new epoxy base.
3. Protect floor after this contractor's work is complete from damage by other trades.

4. Before proceeding with floor prep examine room for dust control. Ducts and adjacent spaces.

Mechanical

1. This contractor shall provide temporary filters on all return grilles during construction. This contractor shall change them at least once during the work.
2. Remove existing duct work as noted on MD-100. Patch duct work as required. Test duct work for leaks.
3. Provide new exhaust duct work for anatomy tables, coordinate connection with COD for tables. Provide all required supports. Ceiling supports maybe removed, coordinate with Contractor on installation of duct work and ceiling work.
4. This contractor may elect to remove portions of the ceiling grid to demo existing duct work and install new duct work. This contractor to coordinate with General Contractor.
5. Remove existing thermostat on the south wall tie AT 2318 A and 2218B together. Set box temperature to 65 degrees. Provide alarm on BAS system to alert engineering reaches 67 degrees.
6. Clean existing diffuser and return when all work is completed.
7. Provide test and balance report when work is complete.
8. Review specification for complete scope of work.

Electrical / AV

1. Provide new lighting as noted on sheet E100
2. Relocate existing outlets and data as indicated on sheet E200.
3. Provide (4) electrical retractable cord reels as indicated on E200
4. Provide conduit and wire and data for cameras, monitors, bunkers and IT equipment. Install all equipment. IT closet is located approx. 100 feet away from cadaver lab. Coordinate pipe run and access with COD.
5. Provide all cameras, monitors, and associated IT equipment as indicated on the drawings and specifications. Coordinate support requirements with general contractor. Supports may be part of this contractor's work.
6. Provide new receptacle and hook up dish washer. Coordinate with plumber. Dishwasher provide by COD.
7. Provide new outlet for owner furnished Eye Glass Ultraviolet Sterilization Cabinet.

8. Relocate fire alarm audio visual as indicated on E200 note 3 to the ceiling.
9. Provide new GFI receptacles under counter for new sensor faucets 2 total. Coordinate with COD and casework fabricator.
10. Provide new electrical and data floor box for new bunker. Coordinate with A/V contractor. Coordinate conduit installation with COD.
11. Provide A/V training as outlined in the specifications. Training of camera and controls to be held at two different sessions on the same day. Coordinate time with COD project manager and staff.

Alt price (Electrical / AV)

12. Relocate teaching bunker in Advance A & P Lab 12'-0" to the south. Provide new floor outlet and data ports for the existing bunker. Install to match existing floor outlet.

Plumbing

1. Provide new emergency eye / shower station as indicated P-000. Provide hot and cold water connections above ceiling. Unit to be surface mounted to existing wall. Provide blocking as needed to support unit and piping. Provide mixing valve as specified. Provide all piping supports as necessary. Provide insulation as required. Coordinate with COD on any required shut down.
2. Provide new floor drain at emergency eye wash/ shower station. Coordinate with COD for access to lower level. Work may be required to complete in off hours for access to area underneath floor. Coordinate with flooring contractor prior to beginning work. Provide water proofing as required.
3. Provide all new faucets for case works sinks coordinate with casework manufacture. See drawings for specification P-000.
4. Install dishwasher provided by the COD. Provide all supply piping and waste lines. Coordinate with case work contractor.
5. Disconnect existing sinks and cap water and waste lines until new casework is installed. Connect existing water and waste service for each sink.
6. All water shut downs for work to be coordinated with COD. Class schedules cannot be disrupted.

Fire protection.

1. Provide new or reinstall existing escutcheons after new ceiling work is completed. If sprinkler is to be shut down this contractor shall coordinate with COD prior to any work. System must be turned back on at the end of each work day.

Work / Equipment provide by others

1. Casework will be furnished and installed by others, this contractor shall coordinate with COD, casework manufacture and his own trades for installation of work.

2. COD will pre purchase eye glass stylization cabinet, dishwasher, and procedure lights. Miscellaneous supports

Other Requirements.

1. This contractor shall provide as- built drawings and all closeout documentation for each trade prior to submitting final invoice.
2. Permits cost is the responsibility of COD. All inspection and re-inspection fees shall be by this contractor.
3. Coordinate this contractors and subcontractors work with COD and casework manufacture.
4. This contractor shall provide waste dumpster for all work. Location of dumpster to be coordinated with COD. This contractor shall allow debris from COD purchased items and casework contractor to use dumpsters for removal of their waste.
5. This contractor shall provide elevator protection for the delivery and removal of waste to dumpsters.

Supplemental General Conditions

1. All Work is to be performed during normal project working hours. Days / Hours of operation are as follows: Monday Through Friday, 7:00 am –3:30 pm. Request for Overtime or Weekend or Holiday work hours is to be reviewed / approved by College of DuPage project manager prior to implementation.
2. This contractor shall also provide in separate cover all suppliers and subcontractors with contact information and approximate schedule of values before the first pay application. Subcontractor and supplier lien waivers will be required for each payment application.
3. Provide a copy of all subcontractor contracts for COD files.
4. This contractor shall perform all on campus work, per local union agreements and /or Illinois Prevailing wages Act. This contractor shall provide appropriate labor forces necessary for performing its work and cleanup of its work.

WORK NOT INCLUDED

(List any exclusion)

REMARKS

MISCELLANEOUS DOCUMENTS AND SKECTHES

None

SCHEDULE (commencing on date of notice to proceed)

Shop drawings/ Submittals: _____ days

Material Fabrication/Procurement: _____ Weeks

Delivery date: _____ weeks

Installation time _____ days

CLOSE-OUT & WARRANTY REQUIREMENTS

Provide final as- built drawings and 2-year warranty on all products and work or as noted in specifications whichever is greater.

4.0 EXHIBIT E: BID FORM

2017-B0045 Cadaver Lab Renovations

FIRM NAME, CONTACT NAME and PHONE NUMBER

Schedule of Prices

For the faithful performance of the Work, CONTRACTOR will pay to SUBCONTRACTOR the Contract Price amount identified herein. The unit prices and alternates identified below will be utilized in determining increases or decreases in the Contract Price.

Item	Item Description	Qty.	Unit Price	Total Price
1	Demo work	1	LS	
2	Carpentry work	1	LS	
3	Painting work	1	LS	
4	Flooring work	1	LS	
5	Mechanical work	1	LS	
6	Electrical & A/V work	1	LS	
7	Plumbing work	1	LS	
8	Fire protection work	1	LS	
9	Insurance	1	LS	
10	Bond	1	LS	
11	General Conditions	1	LS	
12	Fee	1	LS	
	Total Cost of above			\$
7	Time frame completed in Scope of work	Yes	No	
	Alternates (Do Not include in Total Contract Price)			
	Remove entire ceiling grid and replace with new (match existing grid)	Add	Deduct	

	Relocate teaching bunker in room advance A&P lab 2304. Provide new floor outlet and A/V to match existing.	Add	Deduct	
	Relocate existing A/V bunker floor box A/V and electrical (as described in scope of work)	Add	Deduct	
	2 year warranty	Yes	No	
	Received exhibits "B" Scope of work	Yes	No	N/A
	Received exhibits "C" bid form	Yes	No	N/A
	Received Addendum (if issued)	Yes	No	N/A
	No Tax (tax exempt)	x	x	x
		Total Contract Price	\$	
	Equipment cost (Material Only)			
	Cameras	4	total	
	TV monitors	4	total	
	A/ V equipment (As noted in scope of work)	1	LS	

Submitted by: _____ (printed)

Submitted by: _____ (signed)

5.0 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 33-E-4 of Public Act 86-150, 720ICLS 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

STATE NEGOTIATED BID/ COOPERATIVE AGREEMENT: YES _____ NO _____ Contract No. _____

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: _____

6.0 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 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 _____, 2016. 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.**

7.0 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: _____

**COLLEGE OF DUPAGE
SMALL PROJECTS AGREEMENT
BETWEEN COLLEGE OF DUPAGE AND CONTRACTOR**

THIS AGREEMENT ("Agreement") is made as of **XXXX, XX, XXXX** by and among COLLEGE OF DUPAGE ("COD") **XXXX** ("Contractor").

COD and Contractor desire to enter into this Agreement, pursuant to which Contractor shall perform certain work in connection with the Project, as hereinafter provided. In consideration of the performance of work by Contractor and the payment for such work by COD, the parties agree as follows:

1. Scope of Project. Contractor shall perform work for COD in connection with the Project, including specifically, the matters set forth on, **Exhibit "B" Scope of work Dated March 22, 2017, Exhibit "C" payments, Exhibit "D" Insurance requirements, Exhibit "E" bid form**. Contractor shall perform all work with the highest standards of workmanship and materials. Contractor shall maintain a sufficient staff to perform all work in the most expeditious manner consistent with the interests of COD. Contractor shall promptly notify COD immediately in writing: (i) of any information required from COD so Contractor can complete its work in a timely manner; and (ii) of any work requested by COD that is not included in the scope of work provided in Exhibit "B".

The Contractor understands that COD may engage other Contractors or COD personnel to work in areas near the Contractor's work. Contractor shall cooperate with such others so that work is not disrupted or delayed.

The Contractor shall be solely responsible for means and methods selected in performing the Work. Contractor shall supervise all work so that it is performed in a safe and expeditious manner. Contractor shall be solely responsible for the safe work of its employees and its subcontractor's employees.

The work shall be completed in **90** calendar days of receiving signed contract. Time is of the essence under this Agreement.

2. Payment to Contractor. COD shall pay Contractor for Contractor's work properly performed under this Agreement. Contractor's work shall be billed as forth in Exhibit "C" and in no event shall the total amount due to Contractor under this Agreement exceed the total contract sum following, without COD's prior written approval:

Total Contract Sum: **XXXXXXXX**

3. Defective Work and Guarantee. Contractor shall promptly correct any defective work. Payment by COD for any work otherwise determined to be defective shall not relieve Contractor of its obligation to correct. Contractor shall warrant and guarantee all work to be free from defect for one year following substantial completion of the work.

4. Indemnification and Insurance. Contractor hereby agrees to indemnify and hold COD, its trustees, officers, agents, employees and any other parties designated by COD (COD, its trustees, officers, agents, employees any other parties designated by COD hereinafter collectively called the "**Indemnitees**") harmless from all losses, claims, liabilities, injuries, damages and expenses, including but not limited to, all attorneys' fees, defense and court costs and expenses, that the Indemnitees may incur arising out of, or occurring in connection with, the acts, omissions, or breaches by Contractor of its duties and obligations under or pursuant to this Agreement. This indemnification obligation shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

Contractor shall procure, at no expense to COD, the insurance coverages set forth in Exhibit D-Contractor shall adhere to all provisions of **Exhibits, A,B, C, and D, E & F**

5. Performance and Payment Bond. For every Small Project greater than Five Thousand Dollars (\$5,000), Contractor shall procure, at the additional expense of COD, a performance and payment bond with a surety with a Best Rating of A, VI. Prior to commencement of any work on the Project, Contractor shall submit insurance and bonds. Any provisions contained within the bonds abrogating COD's rights or remedies, otherwise available in contract or law, are void.
6. Termination. COD may terminate this Agreement at any time, in whole or in part, with or without cause, upon written notice to Contractor. In the event this Agreement is terminated for convenience, Contractor shall be compensated for work properly rendered through the date of termination, as can be documented to the reasonable satisfaction of COD. COD shall have no liability to Contractor beyond the date of termination. In no event shall contractor be compensated for anticipated profit or lost opportunity.
7. Liens. Upon COD's request, contractor shall submit mechanics' lien waivers in form acceptable to COD with each statement for work rendered or request for payment. Should liens be placed on the project by any subcontractor, contractor shall indemnify COD for all costs, expenses and attorneys fees incurred in the defense of such lien.
8. Materials. All materials incorporated into the work shall be new and of high quality. Contractor shall adhere to all manufacturers' recommendations. If requested by COD or otherwise set out in the contract documents, Contractor shall, before purchase of such material, submit to COD for COD's review, and in a format acceptable to COD, all product data and literature. All manufacturers' warranties shall be forwarded to COD prior to substantial completion of the work.
9. Changes in Scope of Work. COD may, without invalidating this Agreement, request changes in the scope of the work, whether taking the form of additions, deletions, or other revisions. No such work shall be performed unless and until such change is agreed in writing by COD and Contractor. If the change in work will result in a change in contract price, the change in price shall be calculated by 1) lump sum, 2) agreed unit rates, or 3) time and material reimbursable plus mark-up. COD shall solely select the method of pricing.
10. Successors and Assigns. Contractor shall not assign any rights under or interest in this Agreement without the prior written consent of the COD. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns.
11. Controlling Law. This Agreement is to be governed by the laws of the State of Illinois. Each party has reviewed and approved this Agreement and the rule of construction that resolves ambiguities against the drafting party shall not be employed in the interpretation of this Agreement.
12. Entire Agreement; Conflict. This Agreement incorporates COD's bid instruction and request documents and Contractor's bid. This Agreement represents the entire agreement between Contractor and COD and supersedes all prior negotiations or agreements, written or oral, which are not included herein. This Agreement may only be amended by written instrument executed by COD and Contractor. In the event of a conflict between this Agreement and a proposal from Contractor or any exhibits hereto, this Agreement shall control, followed by COD's bid instruction and request documents, and finally, by Contractor's bid.
13. 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.*
14. Human Rights Act. To the extent required by law, contractor shall abide by the Illinois Human Right Act, 775 ILCS 10/0.01 *et seq.*
15. 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 *er seq.*
16. 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).

This Agreement has been executed the day and year provided above.

COLLEGE OF DUPAGE

Contractor:

By: _____

By: _____

Name: _____

Name: _____

Title: _____

Title:

EXHIBIT C

Contractor shall submit monthly statements for work rendered. COD may elect to withhold 10% of the contract value until work has been accepted. The statements will be based upon Contractor's work completed at the time of billing on the basis of actual work performed. COD shall make payments to Contractor thirty (30) days after receipt of Contractor's statements properly submitted. Monthly statements shall detail Amount Currently Due, Previous Amount Billed, and Balance of Contract Outstanding. In the event of termination for convenience by COD as herein provided, Contractor shall be paid for work properly rendered prior to termination, or as otherwise provided herein.

Requests for Payment shall be submitted no more than once per month in a format acceptable to COD.

Any terms or payment provisions, such as penalties or interest, contained on Contractor's invoices shall be of no effect.

COD may withhold payment from monies otherwise due to the Contractor to compensate the COD for the cost of repairing defective work or completing incomplete work in case of Contractor default.

Contractor shall be allowed 10% mark-up on change order work when time and material reimbursable method of pricing is selected.

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 COD with two (2) original Certificates of Insurance, with College of DuPage named as an additional insured for Commercial General and Automobile Liability, showing the following minimum coverage with an insurance company acceptable to the College. Further, the Certificate of Insurance shall state that coverage provided is primary to any other coverage available to College of DuPage. The foregoing Certificates 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:	\$3,000,000/\$3,000,000
1. Premises - Operations	
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	\$3,000,000/\$3,000,000
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Workers' Compensation and Occupational Diseases	As Required by Applicable Laws
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Employer's Liability	\$3,000,000
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Professional Liability (if performance specifications)	\$3,000,000/\$3,000,000
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College of DuPage HSC Cadaver Lab Renovation

Project No. 15044-15-03

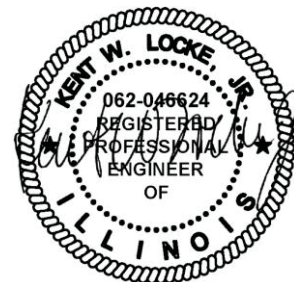
ISSUED FOR BID

March 16, 2017

College of DuPage
Health and Science Center
425 Fawell Blvd.
Glen Ellyn, IL 60137

BY:

Bailey Edward Design
35 E Wacker Drive, Suite 2800
Chicago, IL 60601-2314
t 312.440.2300
f 312.440.2303





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- EA102 AV SYSTEMS, SYSTEM BLOCK DIAGRAMS

SPECIFIERS:

- General: Michael Petti, Bailey Edward (312) 789-4009, mpetti@baileyedward.com
- Mechanical: Matt Montalbano, Bailey Edward
- Electrical: Neil Nigos, Bailey Edward

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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.
 - 9. Miscellaneous provisions.

1.3 PROJECT INFORMATION

- A. Project Identification: College of DuPage Cadaver Lab Renovation
 - 1. Project Location: HSC Building, 425 Fawell Boulevard, Glen Ellyn, IL 60137.
- B. Owner: College of DuPage 425 Fawell Boulevard, Glen Ellyn, Illinois 60137.
 - 1. Owner's Representative: David Lesniak.
- C. Architect: Bailey Edward 35 East Wacker Drive, Chicago Illinois, 60601.
- D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:
 - 1. A/V Design.
- E. Other Owner Consultants: The Owner has retained the following design professionals who have prepared designated portions of the Contract Documents:
 - a. None

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
 - 1. The project includes the renovation of the existing 1128 square foot Cadaver Lab in the Health and Science Center building (HSC). The scope includes, but is not limited to: partial demolition,

partitions, interior finishes, casework, furnishings, and plumbing, mechanical ventilation, controls, electrical power, data, fire alarm, also A/V systems and controls. The scope also includes installation of Owner provided equipment.

B. Type of Contract:

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

1.5 WORK UNDER SEPARATE CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

1.6 OWNER-FURNISHED PRODUCTS

- A. Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products.
- B. Owner-Furnished Products:
1. Cadaver Tables
 2. Metal Casework
 3. Miscellaneous Equipment
 4. As indicated in the Drawings and Specifications and equipment schedule in the drawings.

1.7 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.
- B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
1. Limits: Confine construction operations to the single room renovation.
 2. Driveways, Walkways and Entrances: Keep driveways and entrances serving site clear and available to emergency vehicles at all times. Do not use these areas for parking or storage of materials.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.8 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. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to acceptable hours for the C.O.D.
- C. Nonsmoking Building: Smoking is not permitted within the building or within 100 feet of entrances, operable windows, or outdoor-air intakes.
- D. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.9 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 as 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 01 10 00

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. Requests for Information (RFIs).
 - 4. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
 - 1. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. RFI: Request from Owner, Construction Manager, 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, and telephone number 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 telephone numbers, including home, office, 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, and by each temporary telephone. Keep list current at all times.

1.5 COORDINATION DRAWINGS

- A. Coordination Drawings: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown 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. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
 - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - f. Indicate required installation sequences.
 - g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate 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 ceiling plenum to accommodate layout of light fixtures 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 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 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 changes as directed and resubmit.
 10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 013300 "Submittal Procedures."
 - 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 Preparation Format: DWG, Version AutoCAD 2013 , operating in Microsoft Windows operating system.
 3. File Submittal Format: Submit or post coordination drawing files using Portable Data File (PDF) format.
 4. 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 AutoCAD 2013.
 - c. Contractor shall execute a data licensing agreement in the form of AIA Document C106.
- 1.6 REQUESTS FOR INFORMATION (RFIs)
- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
 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 and Construction Manager.
 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:
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Architect's and Construction Manager's Action: Architect and Construction Manager will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Construction Manager 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 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 and Construction Manager in writing within 10 days of receipt of the RFI response.

1.7 PROJECT MEETINGS

- A. General: General Contractor will 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.
 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, Construction Manager, and Architect, within 5 days of the meeting.
- B. Preconstruction Conference: General Contractor will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect.
1. Conduct the conference to review responsibilities and personnel assignments.
 2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, , Construction Manager, 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.
 3. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Lines of communications.
 - f. Procedures for processing field decisions and Change Orders.
 - g. Procedures for RFIs.
 - h. Procedures for testing and inspecting.
 - i. Procedures for processing Applications for Payment.
 - j. Distribution of the Contract Documents.
 - k. Submittal procedures.
 - l. Preparation of record documents.
 - m. Use of the premises and existing building.
 - n. Work restrictions.
 - o. Working hours.
 - p. Owner's occupancy requirements.
 - q. Responsibility for temporary facilities and controls.
 - r. Procedures for moisture and mold control.
 - s. Procedures for disruptions and shutdowns.
 - t. Construction waste management and recycling.
 - u. Parking availability.
 - v. Office, work, and storage areas.
 - w. Equipment deliveries and priorities.
 - x. First aid.
 - y. Security.
 - z. Progress cleaning.
 4. 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 that requires 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, Construction Manager, 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.
 6. Work proceeding in advance of a pre-installation meeting, or without resolution of the minuted issues, may be subject to removal and reinstallation at no charge to the Owner.
- D. Project Closeout Conference: General Contractor will schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 30 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, Construction Manager, 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. Submittal of written warranties.
 - d. Requirements for preparing operations and maintenance data.
 - e. Requirements for delivery of material samples, attic stock, and spare parts.
 - f. Requirements for demonstration and training.
 - g. Preparation of Contractor's punch list.
 - h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - i. Submittal procedures.
 - j. Coordination of separate contracts.
 - 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: General Contractor will conduct progress meetings at weekly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
 2. Attendees: In addition to representatives of Owner 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 utilization.
 - 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: General Contractor will 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: In addition to representatives of Owner, Construction Manager, 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 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 utilization.
 - 8) Temporary facilities and controls.

- 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Change Orders.
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 01 31 00

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 requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Requirements:
 - 1. Section 01 78 23 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 2. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's and Construction Manager'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 and Construction Manager'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."
- C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule 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 Construction Manager 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. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. 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.
4. 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 and Construction Manager's final release or approval.
 - g. Scheduled date of fabrication.
 - h. Scheduled dates for purchasing.
 - i. Scheduled dates for installation.
 - j. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.
 1. Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.
 - a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
 - b. Digital Drawing Software Program: The Contract Drawings are available in AutoCAD Rev 2013.
 - c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.
 - d. The following digital data files will be furnished for each appropriate discipline:
 - 1) Floor plans.
 - 2) Reflected ceiling plans.
 - 3) Other Drawings as specifically requested.
- 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 different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect and Construction Manager reserve 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 10 business days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Construction Manager 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 10 business 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 15 business 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 10 business days for review of each submittal. Submittal will be returned to Construction Manager, through Architect, before being returned to Contractor.
- D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 2. Name file with submittal number or other unique identifier, including revision identifier.
 - a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).
 3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect and Construction Manager.
 4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner, containing the following information:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name of Construction Manager.
 - e. Name of Contractor.
 - f. Name of firm or entity that prepared submittal.

- g. Names of subcontractor, manufacturer, and supplier.
 - h. Category and type of submittal.
 - i. Submittal purpose and description.
 - j. Specification Section number and title.
 - k. Specification paragraph number or drawing designation and generic name for each of multiple items.
 - l. Drawing number and detail references, as appropriate.
 - m. Location(s) where product is to be installed, as appropriate.
 - n. Related physical samples submitted directly.
 - o. Indication of full or partial submittal.
 - p. Transmittal number, numbered consecutively (paper submittals must be included in numbering system).
 - q. Submittal and transmittal distribution record.
 - r. Other necessary identification.
 - s. Remarks.
 5. Metadata: Include the following information as keywords in the electronic submittal file metadata:
 - a. Project name.
 - b. Number and title of appropriate Specification Section.
 - c. Manufacturer name.
 - d. Product name.
- E. Paper Submittals: Place a permanent label or title block on each submittal item for identification.
 1. Electronic submittals are preferred.
 2. Indicate name of firm or entity that prepared each submittal on label or title block.
 3. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect and Construction Manager.
 4. Include the following information for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Construction Manager.
 - e. Name of Contractor.
 - f. Name of subcontractor.
 - g. Name of supplier.
 - h. Name of manufacturer.
 - i. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
 - j. Number and title of appropriate Specification Section.
 - k. Drawing number and detail references, as appropriate.
 - l. Location(s) where product is to be installed, as appropriate.
 - m. Other necessary identification.
5. Copies:

- a. Submit four copies of submittal to Construction Manager for concurrent review.
6. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Construction Manager will return without review submittals received from sources other than Contractor.
 - a. Transmittal Form for Paper Submittals: Provide locations on form for the following information:
 - 1) Project name.
 - 2) Date.
 - 3) Destination (To:).
 - 4) Source (From:).
 - 5) Name and address of Architect.
 - 6) Name of Construction Manager.
 - 7) Name of Contractor.
 - 8) Name of firm or entity that prepared submittal.
 - 9) Names of subcontractor, manufacturer, and supplier.
 - 10) Category and type of submittal.
 - 11) Submittal purpose and description.
 - 12) Specification Section number and title.
 - 13) Specification paragraph number or drawing designation and generic name for each of multiple items.
 - 14) Drawing number and detail references, as appropriate.
 - 15) Indication of full or partial submittal.
 - 16) Transmittal number, numbered consecutively, in same numbering system as electronic submittals.
 - 17) Submittal and transmittal distribution record.
 - 18) Remarks.
 - 19) Signature of transmitter.
- F. Options: Identify options requiring selection by Architect.
 - G. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect and Construction Manager on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
 - H. 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 and Construction Manager's action stamp.
 - I. 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.
 - J. 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 and Construction Manager's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Post electronic submittals as PDF electronic files directly to General Contractor's system.
 - a. Architect, through General Contractor, will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 2. Submit electronic submittals via email as PDF electronic files.
 - a. Architect, through General Contractor, will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 3. Action Submittals: Submit four paper copies of each submittal unless otherwise indicated. Architect, through General Contractor, will return two copies to General Contractor, with one for Contractor.
 4. Informational Submittals: Submit three paper copies of each submittal unless otherwise indicated. Architect and General Contractor will not return copies.
 5. Certificates and Certifications Submittals: Provide 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.
 - a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
 - b. Provide a notarized statement on original paper copy certificates and certifications where indicated.
- B. 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 not suitable 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 showing 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 or concurrent with Samples.
 6. Submit Product Data in the following format:
 - a. PDF electronic file.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
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.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 24 by 36 inches.
 3. Submit Shop Drawings in the following format:
 - a. PDF electronic file.
 - b. Four opaque (bond) copies of each submittal. Architect, through Construction Manager, will return two copies, one of which goes to Contractor.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 - e. Specification paragraph number and generic name of each item.
 3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.

- b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit four full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect, through General Contractor, 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 five sets of Samples. Architect and General Contractor will retain two (one for office and one to keep on site) Sample sets; one set will be returned.
 - 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 five sets of paired units that show approximate limits of variations.
- E. 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.
 5. Submit product schedule in the following format:
 - a. PDF electronic file.
- F. Coordination Drawing Submittals: Comply with requirements specified in Section 013100 "Project Management and Coordination."
- G. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."
- H. Maintenance Data: Comply with requirements specified in Section 017823 "Operation and Maintenance Data."
- I. 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.

- J. 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.
- K. 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.
- L. 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.
- M. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- N. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- O. 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.
- P. 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.
- Q. 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:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.
 - 6. Test procedures and results.
 - 7. Limitations of use.
- R. 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.
- S. 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.
- T. 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.

- U. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect and General Contractor.
- B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S AND CONSTRUCTION MANAGER'S ACTION

- A. Action Submittals: Architect and Construction Manager will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect and General Contractor will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- B. Informational Submittals: Architect and General Contractor will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect and Construction Manager will forward each submittal to appropriate party.

- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect and General Contractor.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION 01 33 00

SUBMITTAL LOG

PROJECT: 10544-15-03 College of DuPage HSC Cadaver Lab Study
OWNER: College of DuPage

PROJECT NO:
CONTRACTOR:

DATE REC'D.	SPECIFICATION SECTION NO.	SUBMITTAL ITEM	NO. RECEIVED	OTHER REVIEWER				
				DATE SENT	RECIPIENT	NO. COPIES	DUE DATE	DATE REC'D.
	035400	CEMENT BASED UNDERLAYMENT						
		Product Data						
	054300	SLOTTED CHANNEL FRAMING-STRUT SYSTEMS						
		Shop Drawings						
		Product Data						
		Structural Calculations						
		Warranty						
	061000	ROUGH CARPENTRY						
		Product Data						
	078413	PENETRATION FIRESTOPPING						
		Product Data						
		Product Schedule						
	079200	JOINT SEALANTS						
		Product Data						
		Joint Sealant Schedule						
		Qualification Statements						
	081213	HOLLOW METAL FRAMES						
		Product Data						
		Shop Drawings						
		Schedule						
		Test Report						
		Oversize Construction Certification						
	088816	VISION CONTROL GLASS						
		Product Data						
		Samples						
		Close-out						
	088000	GLAZING						
		Manufacturer's Data, Glass						
		Manufacturer's Data, Glazing Materials						
	092216	NON-STRUCTURAL METAL FRAMING						
		Product Data						
	092900	GYPSUM BOARD						
		Product Data						
	095113	ACOUSTICAL CEILINGS						
		Product Data						

SUBMITTAL LOG

PROJECT: 10544-15-03 College of DuPage HSC Cadaver Lab Study
OWNER: College of DuPage

PROJECT NO:
CONTRACTOR:

DATE REC'D.	SPECIFICATION SECTION NO.	SUBMITTAL ITEM	NO. RECEIVED	OTHER REVIEWER				
				DATE SENT	RECIPIENT	NO. COPIES	DUE DATE	DATE REC'D.
		Samples						
	096513	RESILIENT BASE & ACCESSORIES						
		Product Data						
		Samples						
	096723	DECORATIVE MOSAIC RESINOUS FLOORING						
		Product Data						
		Samples						
		Material Test Reports						
	099123	INTERIOR PAINTING						
		Product Data						
		Samples						
	123553.13	STAINLESS STEEL LABORATORY CASEWORK						
		Product Data						
		Shop Drawings						
		Samples						
	220518	ESCHUTCHEONS FOR PLUMBING PIPING						
		Product Data						
	220523.12	BALL VALVES FOR PLUMBING PIPING						
		Product Data						
	220529	HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT						
		Product Data						
		Shop Drawings						
		Delegated-Design Submittal						
		Welding Certificates						
	220553	IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT						
		Product Data						
		Samples						
	220719	PLUMBING PIPING INSULATION						
		Product Data						
		Shop Drawings						
		Field Quality-Control Reports						
	221116	DOMESTIC WATER PIPING						
		Product Data						

SUBMITTAL LOG

PROJECT: 10544-15-03 College of DuPage HSC Cadaver Lab Study
OWNER: College of DuPage

PROJECT NO:
CONTRACTOR:

DATE REC'D.	SPECIFICATION SECTION NO.	SUBMITTAL ITEM	NO. RECEIVED	OTHER REVIEWER				
				DATE SENT	RECIPIENT	NO. COPIES	DUE DATE	DATE REC'D.
		Field Quality-Control Reports						
	221119	DOMESTIC WATER PIPING SPECIALTIES						
		Product Data						
		Operation and Maintenance Data						
		Field Quality-Control Reports						
	221316	SANITARY WASTE AND VENT PIPING						
		Product Data						
		Field Quality-Control Reports						
	221319	SANITARY WASTE PIPING SPECIALTIES						
		Product Data						
		Operation and Maintenance Data						
	224216.16	COMMERCIAL SINKS						
		Product Data						
		Maintenance Data						
		Coordination Drawings						
	224500	EMERGENCY PLUMBING FIXTURES						
		Product Data						
		Shop Drawings						
		Field Quality Control Reports						
	226600	CHEMICAL-WASTE SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES						
		Product Data						
		Operation and Maintenance Data						
		Coordination Drawings						
		Field Quality-Control Reports						
	233113	METAL DUCTS						
		Product Data						
		Shop Drawings						
		Delegated-Design Submittal						
		Welding Certificates						
	233300	AIR DUCT ACCESSORIES						
		Product Data						
		Operation and Maintenance Data						
	260519	LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES						

SUBMITTAL LOG

PROJECT: 10544-15-03 College of DuPage HSC Cadaver Lab Study
OWNER: College of DuPage

PROJECT NO:
CONTRACTOR:

DATE REC'D.	SPECIFICATION SECTION NO.	SUBMITTAL ITEM	NO. RECEIVED	OTHER REVIEWER				
				DATE SENT	RECIPIENT	NO. COPIES	DUE DATE	DATE REC'D.
		Product Data						
		Qualification Statements						
		Field Quality-Control Reports						
	260526	GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS						
		Product Data						
	260529	HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS						
		Product Data						
		Coordination Drawings						
		Seismic Qualification Certificates						
		Welding Certificates						
	260533	RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS						
		Product Data						
		Seismic Qualification Data						
		Coordination Drawings						
		Qualification Statements						
	260544	SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING						
		Product Data						
	262726	WIRING DEVICES						
		Product Data						
	265119	LED INTERIOR LIGHTING						
		Product Data						
		Shop Drawings						
		Coordination Drawings						
		Qualification Statements						
		Seismic Qualification Certificates						
		Product Test Reports						
		Warranty						

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Furnish all labor, materials, equipment and services necessary or incidental to the completion of all work of this section and herein specified, including:
 - 1. Schedule elements of remodeling and renovation work to expedite completion.
 - 2. In addition to demolition, cut, move or remove existing construction to provide access or to allow remodeling and new work to proceed. Include:
 - a. Repair or remove hazardous or unsanitary conditions.
 - b. Remove abandoned piping, conduit and wiring.
 - c. Remove unsuitable or extraneous materials not marked for salvage, such as abandoned furnishings and equipment, and debris such as rotted wood, rusted metals and deteriorated concrete.
 - d. Clean surfaces. Remove surface finishes to install new work and finishes.
 - 3. Patch, repair and refinish existing items to remain, to the specified condition for each material, with a neat transition to adjacent new construction.
 - 4. Note or record existing project conditions before beginning work to minimize later disputes.

1.2 RELATED REQUIREMENTS

- A. Specified elsewhere:
 - 1. 01 74 19 - Construction Waste Management and Disposal
 - 2. 01 77 00 - Closeout Procedures

1.3 SEQUENCE AND SCHEDULES

- A. Submit separate detailed sub-schedule for alterations work, coordinated with Construction Schedule. Show:
 - 1. Each stage of work; occupancy dates of areas.
 - 2. Date of Substantial Completion for each area of alteration work.
 - 3. Crafts and subcontractors employed in each stage.

1.4 ALTERATIONS, CUTTING AND PROTECTION

- A. Cut finish surfaces such as masonry, tile, plaster or metals, by methods to terminate surfaces in a straight line at a natural point of division.
- B. Protect existing and new work from weather and temperature extremes.
 - 1. Maintain existing interior work above (*60) degrees F.
 - 2. Provide weather protection, waterproofing, heat and humidity control to prevent damage to remaining existing work and to new work.
- C. Provide temporary enclosures to separate work areas from existing building and from areas occupied by Using Agency, and to provide weather protection.

PART 2 - PRODUCTS

2.1 SALVAGED MATERIALS

- A. Salvage sufficient quantities of cut or removed materials to replace damaged work, when material is not readily obtainable on current market.
 - 1. Use particular care in removal and salvage of:
 - a. Doors/Frames
 - b. Equipment Mounts
 - c. Any items indicated to be salvaged on Drawings and Specifications.
 - 2. Store salvaged items in a dry, secure place on site.
 - 3. Designated items not specified for use in repair work remain College of DuPage's property.
 - 4. Do not use salvaged or used material in new construction except with prior written authorization from Architect/Engineer.

2.2 MATERIALS FOR PATCHING, EXTENDING AND MATCHING

- B. Ensure that work is complete:
 - 1. Provide same materials or types of construction as that in existing structure, to patch, extend or match existing work.

PART 3 - EXECUTION

3.1 REMOVE EXISTING CONSTRUCTION

- A. Temporary Removals:
 - 1. Remove existing pencil sharpeners, signage, etc
 - 2. Store all items indicated to be removed.
 - 3. Recondition items damaged by removal.
 - 4. Recondition items as designated.
 - 5. Reinstall in locations indicated.
- B. Remove and relocate: doors and hardware designated for reuse.
 - 1. Remove and dispose of: Dispose of items noted to be demolished.

3.2 PERFORMANCE.

- A. Patch and extend existing work using skilled craftsmen capable of matching existing quality of workmanship. For patched or extended work, provide quality equal to that specified for new work.

3.3 ADJUSTMENTS

- A. Where partitions are removed, patch floors, walls and ceilings with finish materials to match existing as closely as possible.
 - 1. Where removal of partitions results in adjacent spaces becoming one, rework floors and ceilings to provide smooth planes without breaks, steps or bulkheads.

2. Where extreme change of plane of (*two inches) or more occurs, request instructions from Architect/Engineer.

B. Trim and refinish existing doors to clear new floors.

3.4 DAMAGED SURFACES

- A. Patch and replace all portions of existing finished surfaces found to be damaged, lifted, discolored or showing other imperfections, with matching material.
 1. Provide adequate support prior to patching the finish.
 2. Refinish patched portions of painted or coated surfaces in a manner to produce uniform color and texture over entire surface.
 3. When existing surface cannot be matched, refinish entire surface to nearest logical break as determined by Architect.

3.5 TRANSITION FROM EXISTING TO NEW WORK

- A. When new work abuts or finishes flush with existing work, make a smooth transition. Patched work shall match existing adjacent work in texture and appearance as closely as possible.
 1. When finished surfaces are cut in such a way that a smooth transition with new work is not possible, terminate existing surface in a neat manner along a straight line at a natural line of division, and provide trim appropriate to finished surface.

3.6 CLEANING

- A. Perform construction cleaning as specified.
 1. Clean User occupied areas daily.
 2. Clean all spillage, overspray or heavy dust collections in User occupied areas immediately.
- B. At completion of work of each craft, clean area and make surfaces ready for work of successive crafts.
- C. At completion of alterations work in each area, provide final cleaning and return space to a condition suitable for use of User.

END OF SECTION 01 35 16

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Contractor: Supervise and perform construction procedures to promote adequate indoor air quality during and after construction.

1.2 RELATED WORK

1.3 DESCRIPTIONS

A. Dust and Airborne Particulates: Prevent deposition of dust and other particulates in HVAC ducts and equipment.

- 1. Contractor shall bear the cost of cleaning required due to failure to protect ducts and equipment from construction dust.

B. Airborne Contaminants:

- 1. Avoid construction practices that could result in contamination of installed products leading to indoor air pollution.

1.4 SUBMITTALS

A. Submit Indoor Air Quality Management Plan: Describe in detail measures to be taken to promote adequate indoor air quality upon completion; use SMACNA IAQ Guideline for Occupied Buildings Under Construction.

- 1. Submit IAQ Plan at pre-construction meeting.
- 2. Identify potential sources of odor and dust.
- 3. Identify construction activities likely to produce odor or dust.
- 4. Identify areas of project potentially affected, especially occupied areas.
- 5. Evaluate potential problems by severity and describe methods of control.
- 6. Describe construction ventilation to be provided, including type and duration of ventilation, use of permanent HVAC systems, types of filters and schedule for replacement of filters.
- 7. Describe cleaning and dust control procedures.
- 8. Describe coordination with commissioning procedure.

B. Interior Finishes Installation Schedule: Identify each interior finish that either generates odors, moisture, or vapors or is susceptible to absorption of odors and vapors, and indicate air handling zone, sequence of application, and curing times.

D. Provide a Letter Template, signed by the General Contractor declaring that a Construction IAQ Management Plan has been developed and implemented, and listing each air filter used during construction and at the end of construction. Include the MERV value, manufacturer name and model number.

E. Provide 18 photographs – six photographs taken on three different occasions during construction – along with identification of the SMACNA approach featured by each photograph, in order to show consistent adherence to the credit requirements.

- 1. As an alternative of providing photographs, declare the five Design Approaches of SMACNA IAQ Guideline for Occupied Buildings under Construction, Chapter 3, which were used during building construction. Include a brief description of some of the important design approaches employed.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide materials required by the Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases.

PART 3 - EXECUTION

3.1 IMPLEMENTATION

- A. Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows:
 - 1. During construction, meet or exceed the recommended Design Approaches of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, Chapter 3.
 - 2. Protect stored on-site or installed absorptive materials from moisture damage.
 - 3. If air handlers must be used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 must be used at each return air grill.
 - 4. Replace all filtration media immediately prior to occupancy. Provide filtration media having a Minimum Efficiency Reporting Value as scheduled.
- B. Prevent the absorption of moisture and humidity by absorptive materials by:
 - 1. Sequencing the delivery of such materials so that they are not present in the building until wet work is completed and dry.
 - 2. Delivery and storage of such materials in fully sealed moisture-impermeable packaging.
 - 3. Provide sufficient ventilation for drying within reasonable time frame.
- C. When working in a portion of an occupied building, prevent movement of air from construction area to occupied area.
- E. HVAC equipment and supply air ductwork may not be used for ventilation during construction without meeting the following criteria as specified in the IAQ.
 - 1. Operate HVAC system on 100 percent outside air, with 1.5 air changes per hour, minimum.
 - 2. Ensure that air filters are correctly installed prior to starting use; replace filters when they lose efficiency.
 - 3. Do not use return air ductwork for ventilation.
 - 4. Seal return air inlets or otherwise positively isolate return air system to prevent recirculation of air; provide alternate return air pathways to the maximum extent possible.
- F. Do not store construction materials or waste in mechanical or electrical rooms.
- G. Prior to permanent use of return air ductwork without intake filters, clean up and remove dust debris generated by construction activities using a HEPA vacuum cleaning system.
- H. Do not perform dusty or dirty work after starting use of return air ducts without intake filters.
- I. Use other relevant recommendations of SMACNA IAQ Guideline for Occupied Buildings Under Construction for avoiding unnecessary contamination due to construction procedures.

END OF SECTION 01 73 40

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 demolition and construction waste.
 - 2. Recycling nonhazardous demolition and construction waste.
 - 3. Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements:
 - 1. Section 02 41 19 "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.

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. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. 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.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. 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, including the following:
 - 1. Demolition Waste:
 - a. Gypsum board.

- b. Acoustical tile and panels.
- c. Plumbing fixtures.
- d. Piping.
- e. Supports and hangers.
- f. Lighting fixtures.
- g. Lamps.
- h. Ballasts.

2. Construction Waste:

- a. Wood sheet materials.
- b. Metals.
- c. Gypsum board.
- d. Piping.
- e. Electrical conduit.
- f. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
 - 1) Paper.
 - 2) Cardboard.
 - 3) Boxes.
 - 4) Plastic sheet and film.
 - 5) Polystyrene packaging.
 - 6) Wood crates.
 - 7) Plastic pails.

1.5 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 30 days from Notice to Proceed.

1.6 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use Form CWM-7 for construction waste and Form CWM-8 for demolition waste 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. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- E. 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.
- F. 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.
- G. Qualification Data: For waste management coordinator and refrigerant recovery technician.
- H. 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. Waste Management Coordinator Qualifications: Experienced firm, with a record of successful waste management coordination of projects with similar requirements. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Waste Management Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
 - 1. Review and discuss waste management plan including responsibilities of waste management coordinator.
 - 2. Review requirements for documenting quantities of each type of waste and its disposition.
 - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - 5. Review waste management requirements for each trade.

1.8 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing and construction waste generated by the Work. Use Form CWM-1 for construction waste and Form CWM-2 for demolition waste. Include estimated quantities and assumptions for estimates.

- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Use Form CWM-3 for construction waste and Form CWM-4 for demolition waste. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
 2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
 3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

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 specifications.
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.
- C. 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.
- D. 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 specifications for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - 3. Store items in a secure area until installation.
 - 4. Protect items from damage during transport and storage.
 - 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

- B. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area on-site and off-site as designated by Owner.
 - 5. Protect items from damage during transport and storage.

- C. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

- D. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

- E. Plumbing Fixtures: Separate by type and size.

- F. Lighting Fixtures: Separate lamps by type and protect from breakage.

- G. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.

- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

- C. 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.

- D. 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.

3.4 RECYCLING DEMOLITION WASTE

- A. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
- B. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- C. Metals: Separate metals by type.
 1. Structural Steel: Stack members according to size, type of member, and length.
 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- D. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- E. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
- F. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.
- G. Carpet Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
 1. Store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.
- H. Carpet Tile: Remove debris, trash, and adhesive.
 1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.
- I. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- J. Conduit: Reduce conduit to straight lengths and store by type and size.

3.5 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.

3.6 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. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION 01 74 19

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.
- B. Related Requirements:
 - 1. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 2. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 ACTION SUBMITTALS

- A. Product Data: For cleaning agents.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

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

1.6 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, final completion construction photographic documentation, 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 Construction Manager. Label with manufacturer's name and model number where applicable.
 - 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 Construction Manager's signature for receipt of submittals.
5. Submit test/adjust/balance 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 heat and other utilities.
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, including touchup painting.
 10. Touch up 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 and General Contractor 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. Re-inspection: Request re-inspection 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.

1.7 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.
- 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 General Contractor 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. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 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, through Construction Manager, will return annotated file.
 - b. PDF electronic file. Architect, through Construction Manager, will return annotated file.
 - c. Three paper copies. Architect, through Construction Manager, will return one copy.

1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
 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.
 4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

- D. 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 neither planted nor 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 Standard 1992-01. 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. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste disposal requirements in 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 01 77 00

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.
 - 2. Emergency manuals.
 - 3. Operation manuals for systems, subsystems, and equipment.
 - 4. Product maintenance manuals.
 - 5. Systems and equipment 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. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect and Commissioning Authority will comment on whether content of operations and maintenance submittals are acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operations and maintenance manuals in the following format:
 - 1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
 - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.

- b. Enable inserted reviewer comments on draft submittals.
2. Three paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect, through General Contractor, will return two copies.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect and Commissioning Authority will comment on whether general scope and content of manual are acceptable.
- D. 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 and Commissioning Authority will return copy with comments.
 1. Correct or revise each manual to comply with Architect's and Commissioning Authority's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's and Commissioning Authority's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
 1. List of documents.
 2. List of systems.
 3. List of equipment.
 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. 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.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- 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."

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization: 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 General Contractor.
 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. 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: Enable bookmarking of 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.
- F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch 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 content, 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.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch 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.

2.3 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
 1. Type of emergency.
 2. Emergency instructions.
 3. Emergency procedures.
- B. 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.
- C. 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.
- D. 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.

2.4 OPERATION MANUALS

- A. 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.
- B. 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.
- C. 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.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUALS

- A. 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.
- B. 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.
- C. 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.
- D. 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.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. 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.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. 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 warranty and bond information, as described below.
- B. 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.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins.
 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.
- D. 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.
- E. 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.
- F. 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.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. 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 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. 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.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - 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.

- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, 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.
 - 1. 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.

- F. 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 operation and maintenance manuals.
 - 2. Comply with requirements of newly prepared record Drawings in Section 017839 "Project Record Documents."

- G. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 78 23

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 Specifications.
 - 3. Record Product Data.
 - 4. Miscellaneous record submittals.
- B. Related Requirements:
 - 1. Section 017700 "Closeout Procedures" for general closeout procedures.
 - 2. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set(s) of marked-up record prints.
 - 2. 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.
 - 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 Specifications: Submit one paper copy and annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one paper copy and 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.

- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy and annotated PDF electronic files and directories of each submittal.
- E. Reports: Submit written report weekly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

PART 2 - PRODUCTS

2.1 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 archive 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 below first floor.
 - 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 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. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
 - 1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 - 2. Consult Architect and General Contractor for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.

- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
 - 1. Record Prints: Organize record prints and newly prepared record Drawings 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. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 - 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect and General Contractor.
 - e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Record the name of manufacturer, supplier, installer, and other information necessary to provide a record of selections made.
 - 4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
 - 5. Note related Change Orders, record Product Data, and record Drawings where applicable.

- B. Format: Submit record Specifications as scanned PDF electronic file(s) of marked-up paper copy of Specifications.

2.3 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 scanned PDF electronic file(s) of marked-up paper copy of Product Data.
1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

2.4 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 scanned PDF electronic file(s) of marked-up miscellaneous record submittals.
1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. 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.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples 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.

END OF SECTION 01 78 39

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Base Bid: General Contractor shall furnish all labor, materials, equipment and services necessary or incidental to the completion of all work of this section as shown on the drawings and herein specified, including:
 - 1. Selective demolition as noted on D-series sheets.
 - 2. Coordination of demolition of work of other trades.

1.2 PROTECTION

- A. Protect adjacent materials and surfaces to remain.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Dust control barriers.

PART 3 - EXECUTION

3.1 DEMOLITION

- A. Proper coordination for the shut-off of utility services and control measures for dust and noise must occur prior to commencement of any demolition work. In confined areas of selective demolition, install and maintain dust and noise control barriers to keep dirt, dust, and noise from being transmitted to adjacent areas. Remove these protection measures after demolition operations are complete. Where placed adjacent to new finishes in contract, protect new finishes, and repair any damage to like-new condition.
- B. Maintain and protect existing building services which transit the area affected by selective demolition.
- C. Completely remove all equipment noted on the drawings for removal including all associated devices, controls, conduit, wiring, etc. Remove all exposed conduit and wiring back to the panel from which it is served. Provide flush, clean termination where conduit extends into existing wall or floor construction. Mark all disassociated breakers "spare". Unless otherwise noted, the General Contractor shall fill and patch all wall, floor, and ceiling openings resulting from this demolition work with materials and finishes identical to adjacent materials and finished.
- D. Unless otherwise noted, remove all wiring devices, fixtures, controls, circuitry (conduit and wiring), etc., made obsolete by the demolition within or around the building.
- E. The respective Contractor shall relocate all existing piping, circuitry (conduit and wiring), ductwork, etc., which impedes the installation of new materials and equipment of their own trade, unless otherwise noted.
- F. Demolish, remove, demount, and disconnect the following:
 - 1. Inactive and obsolete piping, fitting and specialties, equipment, ductwork, controls, fixtures, and insulation.
 - 2. Piping and ducts embedded in floors, wall, and ceiling may remain if such materials do not interfere with new installation. Remove materials above accessible ceilings. Drain and cap piping and ducts allowed to remain.

3.2 DISPOSAL OF EQUIPMENT AND MATERIALS

- A. The Contractor shall remove all generated trash, recyclables and debris from site, and dispose of in an environmentally friendly manner. The Contractor may not place this trash and debris in building-related dumpsters. The Contractor will comply with all requirements as outlined in 01 41 00 Regulatory Requirements.

3.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to Using Agency ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

3.4 REMOVED AND SALVAGED ITEMS:

- A. Clean salvaged items.
- B. Pack or crate items after cleaning. Identify contents of containers.
- C. Store items in a secure area until delivery to Using Agency.
- D. Transport items to storage area designated by Using Agency.
- E. Protect items from damage during transport and storage.

3.5 REMOVED AND REINSTALLED ITEMS:

- A. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
- B. Pack or crate items after cleaning and repairing. Identify contents of containers.
- C. Protect items from damage during transport and storage.
- D. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

3.6 EXISTING ITEMS TO REMAIN:

- A. Protect construction indicated to remain against damage and soiling during selective demolition.
- B. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

END OF SECTION 02 41 19

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Base Bid: General Contractor shall furnish all labor, materials, equipment and services necessary or incidental to the completion of all work of this section as shown on the drawings and herein specified, including:
 - 1. Topping as required to install new flooring (100% skim coat).
 - 2. Toppings as required to level existing concrete floor slabs. In addition to skim coat required above, for bidding purposes, assume not less than ten percent (10%) additional floor area in the work area required for deeper depths of leveling of the spaces renovated.
- B. Related Requirements: Section 09 67 23, "Resinous Flooring" for scheduled flooring and adhesives

1.2 SUBMITTALS

- A. Product Data: Submit complete printed data and installation recommendations.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer (applicator) who is acceptable to manufacturer, who has completed cement-based underlayment applications similar in material and extent to that required for this Project, and whose work has resulted in construction with a record of successful in-service performance.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage, mixing with other components, and application.
- B. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written recommendations for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting underlayment performance.
- B. Protection: Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURER'S

- A. Products subject to compliance with requirements and recommendations of manufacturer for thickness required and substrate condition. Provide one of the following:
 - 1. K-15 Self-Leveling Underlayment Concrete; Ardex.
 - 2. 300 Premium Underlayment; Burke.
 - 3. Levelayer I; Dayton Superior.

4. Sonoflo; Degussa Bldg. Systems
5. Thoro Underlayment, Self-Leveling; Degussa Bldg. Systems
6. Ultraplan 1 Plus, Mapei

2.2 PRODUCTS AND MATERIALS

- A. Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in uniform thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
- B. Cement Binder: ASTM C 150, Portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C 219.
- C. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M
- D. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer formulated for use with underlayment when applied to substrate and conditions indicated.
- E. Water: Potable and at a temperature of not more than 70° F.
- F. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for conditions affecting performance underlayment including substrate moisture content. Begin underlayment application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare and clean substrate according to manufacturer's written instructions for substrate indicated. Provide clean, dry, neutral-pH substrate for underlayment application.
- B. Treat nonmoving substrate cracks to prevent cracks from telegraphing (reflecting) through underlayment according to manufacturer's written recommendations.
- C. Fill substrate voids to prevent underlayment from leaking.
- D. Mechanically remove laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond according to manufacturer's written instructions.
- E. Nonporous Substrates: For ceramic tile substrates, remove waxes, sealants, and other contaminants that might impair underlayment bond according to manufacturer's written instructions.
- F. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions. Report test results to Architect, University Project Manager, prior to proceeding with installation.

3.3 APPLICATION

- A. Mix and apply underlayment components according to manufacturer's instructions.
- B. Coordinate application of components to provide optimum underlayment-to-substrate and intercoat adhesion.
- C. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
- D. Apply primer or prepared substrate at manufacturer's recommended spreading rate.
- E. Apply underlayment to produce uniform, level surface.
- F. Apply a final layer without aggregate if required to produce smooth surface.
- G. Feather edges to match adjacent floor elevations.
- H. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.
- I. Do not install finish flooring over underlayment until after time period recommended by underlayment manufacturer.
- J. Remove and replace underlayment areas the evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.4 PROTECTION

- A. Protect from concentrated and rolling loads for remainder of construction period.

END OF SECTION 03 54 00

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Base Bid: General Contractor and each trade contractor shall furnish all labor, materials, equipment and services necessary or incidental to the completion of all work of this section as shown on the drawings and herein specified, including:
 - 1. Continuous slot, bolted metal framing channels and all associated fittings and hardware for equipment support of procedure light.

1.2 RELATED WORK

- A. Section 26 51 19 – LED Interior Lighting
- B. Appendix 1, for Basis of Design procedure light F-3, pre-installation package.

1.3 REFERENCES

- A. ASTM A123 - Specification for Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip
- B. ASTM A653 - General Requirements for Steel Sheet, Zinc-Coated Galvanized by the Hot-Dip Process
- C. ASTM A1011 - Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability (*Formerly ASTM A570*)
- D. ASTM F1136 – Standard Specification for Chromium/Zinc Corrosion Protective Coatings for Fasteners
- E. ASTM A907 - Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Carbon, Hot-Rolled, Structural Quality
- F. ASTM B633 - Specification for Electrodeposited Coatings of Zinc on Iron and Steel
- G. MFMA - Metal Framing Manufactureres Association
- H. AISI - American Iron and Steel Institute

1.4 QUALITY ASSURANCE

- A. Manufacturers: Firms regularly engaged in the manufacture of bolted metal framing of the types required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. MFMA Compliance: Comply with the latest revision of MFMA Standards Publication Number MFMA-3, "Metal Framing Standards Publication".
- C. Bolted framing channels and fittings shall have the manufacturers name, part number, and material heat code identification number stamped in the part itself for identification. Material certification sheets and test reports must be made available by the manufacturer upon request.

- D. Work shall meet the requirements of the following standards:
 - 1. Federal, State and Local codes.
 - 2. American Iron and Steel Institute (AISI) Specification for the Design of Cold-Formed Steel Structural Members 2001 Edition.
 - 3. American Society for Testing and Materials (ASTM).
 - 4. Metal Framing Manufacturer's Association (MFMA).

1.5 SUBMITTALS

- A. Submit shop drawings of strut and accessories including clamps, brackets, hanger rods, and fittings. Include details of assembly and attachment/anchorage.
- B. Submit manufacturer's product data on strut channels including, but not limited to, types, materials, finishes, gauge thickness, and hole patterns. For each different strut cross-section, submit cross sectional properties including Section Modulus (S_x) and Moment of Inertia (I_x).
- C. Structural calculation by a Registered Professional or Structural Engineer in the State of the Project's location for approval by the Professional of Record. Calculations may include, but are not limited to:
 - 1. Description of design criteria.
 - 2. Stress and deflection analysis.
 - 3. Selection of framing members, fittings, and accessories.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver strut systems and components carefully to avoid breakage, denting, and scoring finishes. Do not install damaged equipment.
- B. Store strut systems and components in original cartons and in clean dry space; protect from weather and construction traffic.

1.7 WARRANTY

- A. Manufacturer shall warrant for 2 year's from the shipment date that products will be free from defects in material or manufacturer. In the event of any such defect in violation of the warranty, manufacturer shall have the option to repair or replace any such defective product.
- B. Installer shall warrant for 2 year's from the date of completion of work that the work will be free of defects in installation. In the event of any such defect in violation of the warranty, installer shall have the option to repair or replace any such defective product.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Manufacturer: Subject to compliance with these specifications, strut systems to be installed shall be as manufactured by:
 - 1. Cooper B-Line, Inc.
 - 2. Unistrut
 - 3. Alternate as acceptable to the Architect.

2.2 STRUT CHANNELS AND COMPONENTS

- A. General: Strut shall be 1-5/8 inches wide in varying heights and welded combinations as required to meet load capacities and designs indicated on the drawings.
- B. Materials and Finish: Material and finish specifications for each strut type are as follows:
 - 1. Pre-galvanized Steel: Strut shall be made from steel meeting the minimum mechanical properties of ASTM A653 SS, Grade 33, and mill galvanized in accordance with coating designation G90. Fittings shall be manufactured from steel meeting the minimum requirements of ASTM A907 SS, Grade 33. All fittings and hardware shall be zinc plated in accordance with ASTM B633 (SC3 for fittings, SC1 for threaded hardware).

PART 3 EXECUTION

3.1 INSTALLATION

- A. The installer shall inspect the work area prior to installation. If work area conditions are unsatisfactory, installation shall not proceed until satisfactory corrections are completed. Review existing structure, existing and new utilities above ceiling.
- B. Installation shall be accomplished by a fully trained manufacturer authorized installer.
- C. Set Strut System components into final position true to line, level and plumb, in accordance with approved drawings.
- D. Anchor material firmly in place, and tighten all connections to their recommended torques.
- E. Adjust and supplement struts and anchorages as required for above ceiling conditions.
- F. Install strut in accordance with MFMA-102 'Guidelines for the Use of Metal Framing'; in accordance with equipment manufacturer's recommendations, and with recognized industry practices.
- G. All nuts and bolts shall be tightened to the following values:

<u>Bolt Size</u>	<u>Torque (ft-lbs)</u>
1/4 - 20	6
5/16 - 18	11
3/8 - 16	19
1/2 - 13	50

END OF SECTION 05 43 00

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Base Bid: General Contractor shall furnish all labor, materials, equipment and services necessary or incidental to the completion of all work of this section and herein specified, including:
1. Wood blocking and nailers
 2. Wood furring
 3. Back boards

1.2 DEFINITIONS

- A. Exposed Framing: Framing not concealed by other construction.
- B. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- C. Lumber grading agencies, and the abbreviations used to reference them, include the following:
1. NeLMA: Northeastern Lumber Manufacturers' Association.
 2. NLGA: National Lumber Grades Authority.
 3. RIS: Redwood Inspection Service.
 4. SPIB: The Southern Pine Inspection Bureau.
 5. WCLIB: West Coast Lumber Inspection Bureau.
 6. WWPA: Western Wood Products Association.

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.
- B. Submittals:
1. For adhesives, documentation including printed statement of VOC content.
 2. For composite wood products, documentation indicating that product contains no urea formaldehyde.
 3. For adhesives, 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."

1.4 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.
 - 2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 - 3. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness.

2.2 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
- B. For items of dimension lumber size, provide Standard, Stud, or No. 3 grade lumber of any species.
- C. For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:
 - 1. Mixed southern pine; No. 3 grade; SPIB.
 - 2. Hem-fir or hem-fir (north); Standard or No. 3 Common grade; NLGA, WCLIB, or WWPA.
 - 3. Spruce-pine-fir (south) or spruce-pine-fir; Standard or No. 3 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
 - 4. Northern species; No. 3 Common grade; NLGA.
- 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.

2.3 PLYWOOD BACKING PANELS

- A. Backing Panels: DOC PS 1, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.
 - 1. Plywood 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. Use stainless steel screws to attach all fire-retardant treated wood.

2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. For fire retardant wood, use stainless steel fasteners.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Install plywood backing panels by fastening to substrate; coordinate locations with utilities requiring backing panels. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view, using stainless steel fasteners.
- D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- E. Sort and select lumber so that natural characteristics will 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.
- F. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.

2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for 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.

3.3 PROTECTION

- A. Protect rough carpentry from weather.

END OF SECTION 06 10 00

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 WORK INCLUDES

- A. Base Bid: General Contractor and each trade contractor shall furnish all labor, materials, equipment and services necessary or incidental to the completion of all work of this section as shown on the drawings and herein specified, including:
 - 1. Penetrations in horizontal assemblies.
- B. Penetration firestopping in openings smaller than or equal to 4" shall be by the trade making the penetration.
- C. Penetration firestopping for utilities openings greater than 4" and other openings shall be by the General Trades Contractor.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of qualified firestop systems to be used and manufacturer's installation instructions to comply with Section 01 33 00.
- B. Manufacturer's engineering judgment identification number and drawing details when no qualified tested system is available for an application. Engineering judgment must include both project name and contractor's name who will install firestop system as described in document.
- C. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

1.5 COORDINATION

- A. Coordinate construction of openings, penetrations and construction joints to ensure that the fire stop systems are installed according to specified requirements.

- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration fire stop systems. Coordinate construction and sizing of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
- C. Coordinate fire stopping with other trades so that obstructions are not placed in the way prior to the installation of the fire stop systems.
- D. Do not cover up through-penetration fire stop and joint system installations that will become concealed behind other construction until each installation has been examined by the authority having jurisdiction, per requirements of Section 109, International Building Code 2000, ed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 - 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency:
 - 1) UL Underwriters Laboratory, per "Fire Resistance Directory."

2.2 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with through penetration firestop systems (XHEZ), joint systems (XHBN), and perimeter firestop systems (XHDG) listed in Volume 2 of the UL Fire Resistance Directory; provide products of the following manufacturers as identified below
 - a. Basis of Design: Hilti, Inc.
 - b. 3M Fire Protection Products
 - c. Specified Technologies, Inc.
 - 1. Substitution requests shall be considered in accordance with contract provisions and the performance requirements outlined in this document and Division 01.

2.3 MATERIALS

- A. Use only firestop products that have been UL 1479, ASTM E 814 or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.

- B. Pre-installed firestop devices for use with noncombustible and combustible pipes (closed and open systems), conduit, and/or cable bundles penetrating concrete floors and/or gypsum walls, the following basis of design products are acceptable:
 - 1. Hilti Cast-In Place Firestop Device (CP 680-P)
 - a. Add Aerator Adaptor when used in conjunction with aerator system.
 - 2. Hilti Tub Box Kit (CP 681) for use with tub installations.
 - 3. Hilti Cast-In Place Firestop Device (CP 680-M) for use with noncombustible penetrants.
 - 4. Hilti Firestop Speed Sleeve (CP 653) for use with cable penetrations.
 - 5. Hilti Firestop Drop-In Device (CFS-DID) for use with noncombustible and combustible penetrants.
 - 6. Hilti Firestop Block (CFS-BL)

- C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following basis of design products are acceptable:
 - 1. Hilti Intumescent Firestop Sealant (FS-ONE)
 - 2. Hilti Fire Foam (CP 620)
 - 3. Hilti Flexible Firestop Sealant (CP 606)
 - 4. Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
 - 5. Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)

- D. Sealants or caulking materials for use with sheet metal ducts, the following basis of design products are acceptable:
 - 1. Hilti Silicone Sealant Gun Grade (CFS-S SIL GG)
 - 2. Hilti Flexible Firestop Sealant (CP 606)
 - 3. Hilti Intumescent Firestop Sealant (FS-ONE)

- E. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal profile deck; as a backer for spray material, the following basis of design products are acceptable:
 - 1. Hilti Speed Plugs (CP 777)
 - 2. Hilti Speed Strips (CP 767)

- F. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following basis of design products are acceptable:
 - 1. Hilti Intumescent Firestop Sealant (FS-ONE)

- G. Foams, intumescent sealants, or caulking materials for use with flexible cable or cable bundles, the following basis of design products are acceptable:
 - 1. Hilti Intumescent Firestop Sealant (FS-ONE)
 - 2. Hilti Fire Foam (CP 620)
 - 3. Hilti Flexible Firestop Sealant (CP 606)
 - 4. Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
 - 5. Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)

- H. Non-curing, re-penetrable intumescent putty or foam materials for use with flexible cable or cable bundles, the following basis of design products are acceptable:
 - 1. Hilti Firestop Putty Stick (CP 618)
 - 2. Hilti Firestop Plug (CFS-PL)

- I. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.

- J. Provide a firestop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction joint assembly.
- K. Accessories: Provide all components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
 - 1. Permanent forming/damming/backing materials.
 - 2. Substrate primers.
 - 3. Collars.
 - 4. Steel sleeves.
 - 5. Labels.

2.4 MIXING

- A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.
 - 1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet.
- B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 - 1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Designation of applicable testing and inspecting agency.
 - 4. Date of installation.
 - 5. Manufacturer's name.
 - 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2174.

- B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.
- C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

3.7 PENETRATION FIRESTOPPING SYSTEM SCHEDULE

CONCRETE FLOORS		
TYPE OF PENETRANT	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM
CIRCULAR BLANK OPENINGS	1	F-A-0006, C-AJ-0055, C-AJ-0090
	2	F-A-0006, C-AJ-0055, C-AJ-0090
	3	F-A-0006, C-AJ-0055, C-AJ-0086,
SINGLE METAL PIPES OR CONDUIT	1	C-AJ-1226, F-A-1028, F-A-1017
	2	C-AJ-1226, F-A-1028, F-A-1017
	3	C-AJ-1226, F-A-1017
	4	C-BJ-1037, C-BJ-1034
SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, FRP, ENT)	1	F-A-2053, F-A-2025, C-AJ-2109, C-AJ-2098, C-AJ-2271, C-AJ-2167,
	2	C-AJ-2098, C-AJ-2271, C-AJ-2167, C-BJ-2021, C-AJ-2371, C-AJ-2342
	3	F-A-2054, C-AJ-2109, C-AJ-2098, C-AJ-2371, C-AJ-2342
	4	C-BJ-2016, C-AJ-2017
SINGLE/CABLE BUNDLES	1	F-A-3007, C-AJ-3095, C-AJ-3180, C-AJ-3283
	2	F-A-3007, C-AJ-3095, C-AJ-3334, F-A-3060
	3	F-A-3007, C-AJ-3095, C-AJ-3285
CABLE TRAY	1	C-AJ-4034, C-AJ-4035
	2	C-AJ-4034, C-AJ-4035
	3	C-AJ-4034, C-AJ-4035
SINGLE INSULATED PIPES	1	F-A 5015, F-A 5017, C-AJ-5090, C-AJ-5091, C-AJ-5090, C-AJ-5048
	2	F-A 5015, F-A 5017, C-AJ-5090, C-AJ-5091, C-AJ-5090
	3	F-A 5016, C-AJ-5090, F-A-5018
	4	C-BJ-5006
ELECTRICAL BUSWAY	1	C-AJ-6006, C-AJ-6017, F-A-6002, C-AJ-6036
	2	C-AJ-6006, C-AJ-6017, F-A 6042, C-AJ-6036
	3	C-AJ-6006, C-AJ-6017
MECHANICAL DUCTWORK WITHOUT DAMPERS	1	C-AJ-7046, C-AJ-7051, C-AJ-7084
	2	C-AJ-7046, C-AJ-7051, C-AJ-7085
	3	C-AJ-7046, C-AJ-7051

NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS INSULATED	N/A**	N/A**
MIXED PENETRANTS	1	C-AJ 8099, C-AJ-8056, C-AJ-8143
	2	C-AJ-8099, C-AJ-8056, C-AJ-8143
	3	C-AJ-8099, C-AJ-8056
	4	C-AJ-8095

END OF SECTION 07 84 13

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 WORK INCLUDES

- A. Base Bid: General Contractor shall furnish all labor, materials, equipment and services necessary or incidental to the completion of all work of this section as shown on the drawings and herein specified, including: Work includes all labor and material for the following:

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.

1.6 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 - 1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 - 2. Disintegration of joint substrates from causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 MILDEW-RESISTANT JOINT SEALANTS

- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- B. Silicone, Mildew Resistant, Acetoxy Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acetoxy-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

2.3 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.4 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, 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. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
 - 4. Provide flush joint profile to suit location otherwise, according to Figure 8B in ASTM C 1193.
 - 5. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates.
- B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 1. Manufacturers:
 - a. Tremco Incorporated Tremseal 200
 - b. DAP Silicone Plus
 - c. Pecora Corporation 860
 - 2. Joint Locations:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control, expansion and perimeter joints where indicated.
 - c. Joints at the window perimeter and interior finish.
 - d. Joints at the window sill.
 - e. Joints at counters, back splashes and side splashed.
 - f. Other joints as indicated on drawings.
 - 3. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
 - 4. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 07 92 00

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 WORK INCLUDES

- A. Base Bid: General Contractor shall furnish all labor, materials, equipment and services necessary or incidental to the completion of all work of this section as shown on the drawings and herein specified, including: Work includes all labor and material for the following:
 - 1. Hollow-metal frames.
- B. Related Requirements:
 - 1. Section 08 88 16 – Vision Control Glass
 - 2. Section 09 22 16 – Non-Structural Metal Framing
 - 3. Section 09 29 00 – Gypsum Board

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.
- B. Shop Drawings: Include the following:
 - 1. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 2. Locations of reinforcement and preparations for hardware.
 - 3. Details of each different wall opening condition.
 - 4. Details of anchorages, joints, field splices, and connections.
 - 5. Details of moldings, removable stops, and glazing.

6. Details of conduit and preparations for power, signal, and control systems.

C. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of frame assembly, for tests performed by a qualified testing agency.
- B. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
 - 1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each unit to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Ceco Door; www.cecodoor.com
 - 2. Curries Company; www.curries.com
 - 3. Steelcraft; us.allegion.com
- B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 INTERIOR FRAMES

- A. Construct interior frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Frames: SDI A250.8, Level 2. At all locations in the Door and Frame Schedule.
 - 1. Physical Performance: Level B according to SDI A250.4.
 - 2. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch.

3. Construction: Full profile welded.
4. Exposed Finish: Factory primed.
5. 16 gauge steel full welded unit construction with corner mitered, reinforced, continuously welded full depth and width of frame (wider than 4'-0", 14 gauge steel).

2.3 FRAME ANCHORS

- A. Jamb Anchors:
1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.

2.4 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- C. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- D. 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 hollow-metal frames of type indicated.
- E. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

2.5 FABRICATION

- A. Fabricate fully welded hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. No exposed fasteners.
 2. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor.
 3. Head Anchors: Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.
 4. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

- a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- C. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce frames to receive nontemplated, mortised, and surface-mounted hardware.
 2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

2.6 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Drill and tap frames to receive nontemplated, mortised, and surface-mounted hardware.

3.3 INSTALLATION

- A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
- B. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
4. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
5. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
6. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
7. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- C. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish according to manufacturer's written instructions.

- D. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 08 12 13

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Base Bid: General Contractor and each trade contractor shall furnish all labor, materials, equipment and services necessary or incidental to the completion of all work of this section as shown on the drawings and herein specified, including:
 - 1. Vision control glass with adjustable cordless louvers.
 - 2. Manual operators.
- B. Related Sections:
 - 1. Division 01: Administrative, procedural, and temporary work requirements.
 - 2. Section 08 11 13 - Hollow Metal Doors and Frames.

1.2 REFERENCES

- A. American National Standards Institute (ANSI) Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings.
- B. ASTM International (ASTM):
 - 1. C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
 - 2. C920 - Standard Specification for Elastomeric Joint Sealants.
 - 3. C1048 - Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT, Coated and Uncoated Glass.
 - 4. C1115 - Standard Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories.
 - 5. C1294 - Standard Test Method for Compatibility of Insulating Glass Edge Sealants with Liquid-Applied Glazing Materials.
 - 6. C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
- C. Consumer Product Safety Commission (CPSC) 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.
- D. Glass Association of North America (GANA) - Engineering Standards Manual.
- E. National Fire Protection Association (NFPA) 80 - Standard for Fire Doors and Fire Windows.
- F. Underwriters Laboratories of Canada (ULC) - Product Directories.
 - 1. Product Directories.
 - 2. 263 - Fire Tests of Building Construction and Materials.

1.3 SUBMITTALS

- A. Submittals for Review:
 - 1. Product Data: Descriptive data and performance attributes for vision control glass.
 - 2. Samples: 8-1/2 x 13-1/2 inch vision control glass samples, with internal blinds.
 - 3. Shop Drawings: Indicate details and sizes, coordinate with hollow metal frame shop drawings.
- B. Closeout Submittals:

1. Maintenance Instructions: Manufacturer's printed instructions for cleaning and maintenance of glazed units, including operators.

1.4 SYSTEM DESCRIPTION

- A. Vision Control Glass: Control vision through insulated glass unit assemblies by means of rotating, cordless, interlocking, horizontal, extruded aluminum louvers with rotation controlled manually. Rotation of louvers results in reduction in or elimination of vision through glazed assemblies.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements:
 1. Provide tempered safety glass for locations subject to human impact as required by Building Code.
 2. Safety glass: Tested and labeled to CPSC 16 CFR 1201.
- B. Perform Work in accordance with GANA Glazing Manual.
- C. Coordination:
 1. Coordinate work with hollow metal frames to assure proper fit, controls and installation.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store glass units in upright position, on blocks, in dry and safe location.
- B. Do not place units in direct sunlight.
- C. Handle units using corner protectors.

1.7 WARRANTIES

- A. Vision Control Glass in Interior Locations: Furnish manufacturer's 5 year warranty providing coverage against material obstruction of glass units by dust or film formation due to failure of hermetic seal.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Contract Documents are based on Vision Control by Unicel Architectural, 800-668-1580, www.unicelarchitectural.com.
- B. Substitutions: Under provisions of Division 01, Alternate acceptable to the Architect, pending review by the Architect.

2.2 MATERIALS - GLASS

- A. Clear Tempered Glass: ASTM C1048, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select, Kind FT fully tempered.

2.3 MATERIALS - LOUVERS, FRAMES, AND OPERATORS

- A. Louvers: Hollow extruded aluminum, interlocking profile, 1/4 inch thick x 1-3/8 inches deep; Duracron K-1285 Glossy White finish.
- B. Manual Operators: Thumb wheel type.

2.4 ACCESSORIES

- A. Setting Blocks: ASTM C864, neoprene or EPDM, or ASTM C1115, silicone; 70 to 90 Shore A durometer hardness.
- B. Spacers: ASTM C864, neoprene or EPDM, or ASTM C1115, silicone; 50 to 60 Shore A durometer hardness.
- C. Glazing Gaskets: ASTM C864, neoprene or EPDM, or ASTM C1115, silicone or thermoplastic polyolefin rubber, molded or extruded shape to fit glazing channel retaining slot.
- D. Glazing Sealant:
 - 1. ASTM C920, Type S, Grade NS, Class 25; single component silicone type, low modulus, non sag.
 - 2. Sealant backing: ASTM C1330, Type O, size and density to control glazing sealant depth and produce optimum glazing sealant performance.
 - 3. Compatible with glass unit edge seals; tested to ASTM C1294.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean glazing rabbets; remove loose and foreign matter.
- B. Remove protective coatings on metal surfaces.
- C. Clean glass just prior to installation.

3.2 INSTALLATION - GENERAL

- A. Install glass in accordance with glass manufacturer's instructions.
- B. Maintain manufacturer's recommended edge and face clearances between glass and frame members.

3.3 INSTALLATION - SEALANT GLAZING METHOD

- A. Apply sealant to full depth of permanent stops.
- B. Press glass into sealant with slight lateral movement to ensure adhesion.
- C. Apply sealant to full depth of removable stops. Secure stops in position, forcing contact with sealant bead and completely filling joint.

3.4 PROTECTION

- A. After installation, mark glass with an 'X' using removable plastic tape.

3.5 SCHEDULE

- A. Standard Vision Control Glass - Interior Glazed Wall Openings:
 - 1. Outer lite: ¼ inch clear tempered glass.
 - 2. Air space: 2 inches.
 - 3. Inner lite: ¼ inch clear tempered glass.

END OF SECTION 08 88 16

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 WORK INCLUDES

- A. Base Bid: General Contractor shall furnish all labor, materials, equipment and services necessary or incidental to the completion of all work of this section as shown on the drawings and herein specified, including: Work includes all labor and material for the following:
 - 1. Non-load-bearing steel framing systems for interior partitions.
 - 2. Wall reinforcement backing plates.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Studs and Runners: Provide documentation that framing members' certification is according to SIFA's "Code Compliance Certification Program for Cold-Formed Steel Structural and Non-Structural Framing Members."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Horizontal Deflection: For wall assemblies, limited to 1/240 of the wall height based on horizontal loading of 10 lbf/sq. ft..

2.2 FRAMING SYSTEMS

- A. Steel studs from North America conforming to the requirements of this section.
- B. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: , hot-dip galvanized unless otherwise indicated.
- C. Studs and Runners: ASTM C 645.
 - 1. Steel Studs and Runners:

- a. Minimum Base-Metal Thickness: 0.0329 inch.
 - b. Depth: As indicated on Drawings 3-5/8 inches, minimum.
- D. Slip-Type Head Joints: Where indicated, provide the following:
- 1. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing for support of mounted casework and equipment.
- 1. Minimum Base-Metal Thickness: 0.0598 inch.
- F. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
- 1. Minimum Base-Metal Thickness: 0.0329 inch.
 - 2. Depth: As required for application: 7/8 inch and 1-1/2 inches.

2.3 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
- 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide the following:
- 1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
- 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.3 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Single-Layer Application: As required by horizontal deflection performance requirements minimum 16 inches o.c. unless otherwise indicated.
 - 2. Multilayer Application: As required by horizontal deflection performance requirements minimum 16 inches o.c. unless otherwise indicated.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
 - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
- E. Direct Furring:
 - 1. Screw to framing.
- F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.
- G. Install wall backing plates to studs to support wall-supported items where indicated.

- H. Install multiple-stud, built-up stud and nested stud post sections where indicated.
- I. Install studs anchored to miscellaneous steel sections, where indicated.

END OF SECTION 09 22 16

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 WORK INCLUDES

- A. Base Bid: General Contractor shall furnish all labor, materials, equipment and services necessary or incidental to the completion of all work of this section as shown on the drawings and herein specified, including: Work includes all labor and material for the following:

- 1. Interior gypsum board.

1.3 ACTION SUBMITTALS

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

1.4 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.

1.5 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.
 - 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 INTERIOR GYPSUM BOARD

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

2. CertainTeed Corp.
3. Georgia-Pacific Gypsum LLC.
4. National Gypsum Company.
5. USG Corporation.

B. Gypsum Wallboard: ASTM C 1396/C 1396M.

1. Thickness: 1/2 inch unless noted otherwise.
2. Long Edges: Tapered for prefilling.

C. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch, Typical.
2. Long Edges: Tapered for prefilling.

2.2 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. L-Bead: L-shaped; exposed long flange receives joint compound.

2.3 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, 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 drying-type, all-purpose compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.

- 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.
- 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.

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.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- C. 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.
- D. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- E. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side. Install sound insulation blankets to infill existing to match where existing partitions patched.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Single-Layer Application:
 - 1. On partitions/walls, apply gypsum panels vertically (parallel 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.

2. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

B. 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 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.
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.

3.4 APPLYING TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile. Install with 1/4-inch gap where panels abut other construction or penetrations.
- B. Locate where tile finishes are indicated.

3.5 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 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.
 2. Bullnose Bead: Use at outside corners.
 3. LC-Bead: Use at exposed panel edges.
 4. L-Bead: Use where required.
 5. U-Bead: Use at exposed panel edges.

3.6 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, 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 4: At panel surfaces that will be exposed to view unless otherwise indicated and typically unless noted otherwise.
 - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
- E. Transitions to existing Gypsum board:
 - 1. Float both new and existing exposed surfaces full-height to align and make level. Transition outward from joint and feather finish to make un-noticeable.

3.7 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 09 29 00

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Base Bid: General contractor shall furnish all labor, materials, equipment and services necessary or incidental to the completion of all work of this section as shown on the drawings and herein specified, including:
 - 1. Acoustic panels provided in exposed grid suspension system.
 - 2. Exposed grid suspension systems.

1.2 RELATED WORK

- A. Specified elsewhere:
 - 1. Section 07 92 00 – Joint Sealants
 - 2. Section 09 22 16 - Metal Support Systems

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each type of acoustical component and suspension.
- B. Samples: Submit samples, in triplicate, of the following:
 - 1. 6" square samples of each acoustical panel pattern and color.
 - 2. Set of 12" long samples of exposed runners and molding for each suspension system type required.

1.4 QUALITY ASSURANCE

- A. Surface Burning Characteristics: As follows, tested per ASTM E 84:
 - 1. Flame Spread: 25 or less
 - 2. Smoke Developed: 50 or less
- B. Coordination of Work: Coordination layout and installation of acoustical ceiling units and suspension system components with other construction supported by, or penetrating through, ceilings, including light fixtures, HVAC equipment, partition system and similar elements.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.
- B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical ceiling units carefully to avoid chipping edges or damaging units in any way.

1.6 PROJECT CONDITIONS

- A. Space Enclosure: Do not install interior acoustical ceilings until space is enclosed and weatherproof, wet work in space is completed and nominally dry, construction above ceilings is complete, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Panels: Full-size panels equal to 4 percent of quantity installed, minimum six (6) panels.
 - 2. Suspension-System Components: Quantity of each exposed component equal to 4 percent of quantity installed.

PART 2 - PRODUCTS

2.1 ACOUSTICAL CEILING UNITS, GENERAL

- A. Standard for Acoustical Ceiling Units: Provide manufacturer's standard units of configuration indicated, which are prepared for the mounting method designated, and which comply with FS SS-S-118 requirements, including those indicated by reference to type, form, pattern, grade, light reflectance coefficient, edge detail and joint detail.
- B. Colors, Textures and Patterns: Provide products matching appearance characteristics of items selected or approved by the A/E, of quality designed.

2.2 ACOUSTICAL TILES

- A. Provide manufacturer's tile units complying with the following requirements under type and prepared for mounting system indicated.
- B. Acoustical Panel Ceilings:
 - 1. ACT 1: 1. as indicated on the finish legend, sheet G001.
 - 2. Alternate.
- C. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
- D. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordination: Furnish layouts for inserts, clips or other supports required to be installed by other trades for support of acoustical ceiling systems.
- B. Measure each ceiling area and establish layout of acoustical units to balance border width at opposite edges of each ceiling. Avoid use of less-than-half-widths units at borders, and comply with reflected ceiling plans carefully.

3.2 INSTALLATION

- A. Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations. Install hold-down clips in all areas, space as recommended by panel manufacturer, except as otherwise indicated or required.
- B. Prior to the beginning of ceiling work, the ceiling contractor and other contractors whose work is related to the ceiling installation shall identify all areas of potential interference between ceiling components and components from other trades. The ceiling contractor shall coordinate layout requirements with plumbing, heating, and ventilating and electrical contractors.
- C. All areas of the interference which arise following the beginning of ceiling construction shall be reported by the contractor involved to the general contractor as soon as the interference is observed. Such interference shall be resolved by the general contractor with the assistance of the contractors involved.
- D. In instances where unauthorized modification and/or loading of the ceiling causes unsatisfactory ceiling performance, the responsible party, as determined by the general contractor, will be financially responsible for correction of the condition in an acceptable manner.
- E. All mechanical equipment shall be self-supporting and shall not exert any detrimental loads on the ceiling assembly.
- F. Where duct work occurs, making it impossible to maintain spacing of hangers, provide additional hangers as required to support larger runners necessary for longer spans. Punching of ducts and extending hangers through ducts will not be permitted. Re-hang existing grid as may be required for new duct installations.

3.3 CLEANING

- A. Clean exposed surfaces of ceiling systems specified in this Section, including trim, edge moldings, and suspension members. Comply with manufacturers' instructions for cleaning and touch-up of minor finish damage. Remove and replace components which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. General Contractor shall provide all labor, materials, equipment and supplies necessary.
 - 1. Resilient base indicated and as specified.
 - 2. Transition strips in profiles as indicated on drawings and as specified.

1.2 RELATED DOCUMENTS

- A. Drawings.
- B. General provisions of the contract including General and Supplemental Conditions.
- C. Division 01 Specifications.
- D. Related Sections include the following:
 - 1. Section 09 67 23 – Resinous Flooring.
 - 2. Section 12 35 53.13 Stainless Steel Laboratory Casework.

1.3 SUBMITTALS

- A. Product Data: Product data for each type of product specified.
- B. Samples: Submit samples in manufacturer's standard sizes, but not less than 4 inches long, of each different color and pattern of product specified.

1.4 QUALITY ASSURANCE

- A. Conform to all recommendations for materials and installation from all authorities having jurisdiction. The references below are the current editions of the American Society for Testing and Materials, unless otherwise noted.
- B. Single-Source Responsibility for Products: Obtain each type and color of product specified from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
- C. Fire Performance Characteristics: Provide products with the following fire performance characteristics as determined by testing products per ASTM test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Critical Radiant Flux: 0.45 watts per sq. cm or more per ASTM E 648.
 - 2. Smoke Density: Less than 450 per ASTM E 662.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in original manufacturer's unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

- B. Store products in dry spaces protected from the weather with ambient temperatures maintained between 50 deg F (10 deg C) and 90 deg F (32 deg C).
- C. Move products into spaces where they will be installed at least 48 hours in advance of installation.

1.6 PROJECT CONDITIONS

- A. Maintain a minimum temperature of 70 deg F (21 deg C) in spaces to receive products specified in this Section for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. After this period, maintain a temperature of not less than 55 deg F (13 deg C).
- B. Do not install products until they are at the same temperature as that of the space where they are to be installed.
- C. Close spaces to traffic during installation of products specified in this Section.

1.7 SEQUENCING AND SCHEDULING

- A. Sequence installing products specified in this Section with other construction to minimize possibility of damage and soiling during remainder of construction period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Roppe
- B. Johnsonite
- C. Burke Mercer.

2.2 RESILIENT BASE

- A. 4" Rubber Wall Base: Complying with ASTM F 1861, Type TS, Group I, solid.
- B. Provide and install inside and outside corner pieces by same manufacturer.
- C. Colors: As indicated on the Finish Legend, sheet G001.

2.3 TRANSITIONS STRIPS

- A. Between new epoxy flooring and existing VCT flooring, and as indicated in the drawings.

2.4 ACCESSORIES

- A. Adhesives: Water-resistant type recommended by manufacturer to suit resilient flooring product and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas where installation of products specified in this Section will occur, with Installer present, to verify that substrates and conditions are satisfactory for installation and comply with manufacturer's requirements and those specified in this Section.

3.2 PREPARATION

- A. General: Comply with manufacturer's installation specifications for preparing substrates indicated to receive products indicated.
- B. Use trowelable patching compounds per manufacturer's directions to fill cracks, holes, and depressions in substrates.
- C. Clean substrates to be covered immediately before installing products specified in this Section. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.

3.3 INSTALLATION

- A. General: Install products specified in this Section using methods indicated according to manufacturer's installation directions.
- B. Apply resilient wall base to walls, columns, pilasters, casework, and other permanent fixtures in rooms and areas where base is required. Install wall base in lengths as long as practicable. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
 - 1. On irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
 - 2. Install inside and exterior corners before installing straight pieces.
 - 3. Use manufacturer's inside and outside corner pieces.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing installation:
 - 1. Remove visible adhesive and other surface blemishes using cleaner recommended by manufacturers of resilient product involved.
 - 2. Damp-mop resilient accessories to remove black marks and soil.
- B. Protect against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION 09 65 13

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Base Bid: General contractor shall furnish all labor, materials, equipment and services necessary of incidental to the completion of all work of this section as shown on the drawings and herein specified, including:

- 1. Section includes decorative resinous flooring systems.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For each type of exposed finish required, 4 inches by 6 inches.

1.3 INFORMATIONAL SUBMITTALS

- A. Material certificates.
- B. Material test reports.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of flooring systems required for this Project with not less than five (5) years experience.
- B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.
- C. Coordination
 - 1. Coordinate the work with existing and new work. Conditions, coordinate with built-ins indicated.
- D. Preinstallation Conference:
 - 1. Conduct conference at Project site.
 - 2. Include manufacturer's representatives.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application unless manufacturer recommends a longer period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- 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:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide Decorative Mosaic by Sherwin-Williams.
- C. Alternates: As acceptable to the Architect.

2.2 MATERIALS

- A. VOC Content of Liquid-Applied Flooring Components: Not more than 100 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
- B. Low-Emitting Materials: Flooring system 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 DECORATIVE RESINOUS FLOORING

- A. Resinous Flooring: Abrasion-, impact- and chemical-resistant, decorative-aggregate-filled, epoxy-resin-based, monolithic floor surfacing designed to produce a seamless floor and integral cove base.
- B. System Characteristics:
 - 1. Color and Pattern: As indicated on the Finish Legend, Sheet G-001 and the drawings.
 - 2. Wearing Surface: Textured for slip resistance and approved by Architect.
 - 3. Overall System Thickness: 25-30 Mills DFT minimum.
- C. Body Coats:
 - 1. Resin: Epoxy
 - 2. Formulation Description: High solids

3. Application Method: Self-leveling slurry with broadcast aggregates
 - a. Thickness of Coats: 6-8 mils DFT
 - b. Number of Coats: One
 4. Aggregates: Colored Paint Chips
- D. Topcoat: Sealing or finish coats.
1. Resin: Epoxy
 2. Formulation Description: High solids
 3. Type: Clear
 4. Finish: Gloss
 5. Number of Coats: Three
 6. Non-Skid Additive: 5191
- E. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:
1. Tensile Strength: 2,500 psi per ASTM C 307.
 2. Flexural Modulus of Elasticity: 10,000 psi per ASTM C 580.
 3. Impact Resistance: No chipping, cracking, or delamination and not more than 16 ft/lbs permanent indentation per MIL-D-3134.
 4. Resistance to Elevated Temperature: No slip or flow of more than 1/16 inch (1.6 mm) per MIL-D-3134.
 5. Abrasion Resistance: 90-100 mg maximum weight loss per ASTM D 4060.
 6. Flammability: Self-extinguishing per ASTM D 635.
 7. Hardness: 80, Shore D per ASTM D 2240.
 8. Bond Strength: 300 psi , 100 percent concrete failure per ACI 503R.

2.4 ACCESSORIES

- A. Primer: Type recommended by manufacturer for substrate and body coats indicated.
1. Formulation Description: High solids
- B. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Inspect surfaces to receive coatings prior to installation. Do not proceed if conditions are not appropriate for installation.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
 - 1. Roughen concrete substrates as follows:
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - b. Comply with ASTM C 811 requirements unless manufacturer's written instructions are more stringent.
 - 2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.
 - 3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
 - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application of resinous flooring only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. of slab area in 24 hours.
 - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 80 percent relative humidity level measurement.
 - 4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.
- D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
- E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.

3.2 APPLICATION

- A. Examine the project site prior to installation to identify acceptable conditions.

- B. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
 - 1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
 - 2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
 - 3. At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.
- C. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- D. Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.
 - 1. Integral Cove Base: 6" high.
- E. Apply self-leveling slurry body coats in thickness indicated for flooring system.
 - 1. Broadcast aggregates at rate recommended by manufacturer and, after resin is cured, remove excess aggregates to provide surface texture indicated.
- F. Apply grout coat, of type recommended by resinous flooring manufacturer, to fill voids in surface of final body coat and to produce wearing surface indicated.
- G. Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer.
- H. Protect resinous flooring from damage and wear during the remainder of construction period.

END OF SECTION 09 67 23

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 WORK INCLUDES

- A. Base Bid: General Contractor shall furnish all labor, materials, equipment and services necessary or incidental to the completion of all work of this section as shown on the drawings and herein specified, including: Work includes all labor and material for the following:

- 1. Surface preparation and application of paint systems on interior substrates:
 - a. Steel.
 - b. Gypsum board.

1.3 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.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Indicate VOC content.
- B. Color Samples: 9x10 pant draw-downs.

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

1.6 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.

1.7 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 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide all products by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. PPG Architectural Finishes, Inc.
 - 3. Sherwin-Williams Company (The).

2.2 PAINT, GENERAL

- A. 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.
- B. Colors: As indicated in the Finish Legend in the Drawings.

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. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- E. 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. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
 - 1. SSPC-SP 5.
- E. 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 for touching up shop-primed surfaces.

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. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 4. 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. Pipe hangers and supp Uninsulated metal piping.
 - b. Uninsulated plastic piping.
 - c. orts.
 - d. Metal conduit.
 - e. Plastic conduit.
 - f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - g. Mechanical Grilles.
 - h. Other items as directed by Architect.

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 completed and future 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. System I-1, Low-Lustre (Eggshell) Emulsion Finish: Apply to all gypsum wallboard where indicated.
 - 1. First Coat: Interior Latex Base Primer Coat .
 - a. Moore: Ultra Spec 500 Interior Primer
 - b. Pittsburgh: Speedhide Zero VOC 6-4900XI
 - c. Sherwin Williams: S-W Pro-Mar 200 Zero VOC Latex Wall Primer
 - 2. Second and Third Coats: Interior Eggshell Finish Latex Base Paint
 - a. Moore: Ultra Spec 500 Interior Latex Eggshell
 - b. Pittsburgh: Speedhide Zero VOC Eggshell
 - c. Sherwin Williams: ProMar 200 Zero VOC Interior Latex Egshel
- B. System 1-2, Waterborne PreCatalyzed Epoxy Finish: Apply to gypsum board surfaces called to be painted, unless some other finish is specifically designated.
 - 1. Prime Coat: Interior Latex Primer
 - a. Moore: Ultra Spec 500 Latex Primer
 - b. Pittsburgh: Speedhide Zero VOC Primer, 6-4900
 - c. Sherwin-Williams: ProMar 200 Zero VOC Primer
 - 2. First Coat: PreCatalyzed Epoxy Semi-Gloss
 - a. Moore: Corotech Pre-Catalyzed WB Epoxy Semi-Gloss
 - b. Pittsburgh: Pitt-Glaze WB1 Pre-Catalyzed S/G
 - c. Sherwin-Williams: Pro Industrial PreCatalyzed WB Epoxy, Semi-Gloss
 - 3. Second Coat: PreCatalyzed Epoxy Semi-Gloss
 - a. Moore: Corotech Pre-Catalyzed WB Epoxy Semi-Gloss
 - b. Pittsburgh: Pitt-Glaze WB1 Pre-Catalyzed S/G
 - c. Sherwin-Williams: Pro Industrial PreCatalyzed WB Epoxy, Semi-Gloss
- C. System I-3, interior PreCatalyzed Epoxy Semi-Gloss Finish: Apply to ferrous hollow metal door frames
 - 1. Prime Coat: Acrylic Metal Primer (FS TT-P-86). (Prime coat is not required on items delivered shop primed or pre-painted, but prime coats shall be touched up as required.)
 - Sherwin Williams: Pro Industrial ProCryl Primer
 - Or Approved Equal by Moore or Pittsburg
 - 2. First Coat: Interior PreCatalyzed Epoxy
 - Sherwin Williams: Pro Industrial PreCatalyzed WB Epoxy, SemiGloss
 - Or Approved Equal by Moore or Pittsburg

3. Second Coat: Interior PreCatalyzedSemi-Gloss Enamel (FS TT-E-509).
Sherwin Williams: Pro Industrial PreCatalyzed WB Epoxy, Semi-Gloss
Or Approved Equal by Moore or Pittsburg

END OF SECTION 09 91 23

PART 1 – GENERAL

1.1 WORK INCLUDES

- A. Base Bid: General contractor shall furnish all labor, materials, equipment and services necessary or incidental to the completion of all work of this section as shown on the drawings and herein specified, including;
 - 1. Stainless steel casework
 - 2. Stainless steel shelving
 - 3. Stainless steel cabinets
 - 4. Stainless steel mobile cart
 - 5. Stainless steel teaching station for A/V
 - 6. Stainless steel work surface, as Appendix 1
 - 7. Stainless steel casework schedule as Appendix 2

1.2 RELATED SECTIONS

- A. Section 09 65 13, "Resilient Base and Accessories"
- B. Section 22 45 00, "Emergency Plumbing Fixtures"
- C. Related Work To Be Performed By Others:
 - 1. Final installation of all plumbing fixtures attached to casework or countertop.
 - 2. Final connection to service lines of all plumbing fixtures attached to laboratory casework or furniture.

1.3 REFERENCES

- A. SEFA 8: Laboratory Furniture – Casework, Shelving and Tables Guidelines
Science Equipment and Furniture Association (SEFA)
- B. ISO 9001:2008 – Quality Management
International Standards Organization (ISO)
- C. ADA (ATBCB ADAAG) Americans with Disabilities Act Accessibility Guidelines
Americans with Disabilities Act (ADA)

1.4 SUBMITTALS

- A. Product Data:
 - 1. Drawings shall include data and details for construction of the laboratory casework as well as information regarding the name, quantity, type and construction of materials (such as hardware, gauges, etc), that will be used to complete the project.
- B. Shop Drawings:
 - 1. The laboratory casework manufacturer shall furnish shop drawings illustrating the layout and placement of all laboratory casework and fume hoods as well as any products included in this section.
 - 2. Indicate the type and location of all plumbing fixtures provided by others.
 - 3. Preparation instructions and recommendations.
 - 4. Storage and handling requirements and recommendations.
 - 5. Installation methods.

6. Indicate electrical devices and A/V equipment for coordination of sizes, cut-outs and utilities. Refer to electrical and A/V drawings.

C. Selection Samples:

Submit the following:

1. One 8" x 8" x 8" base cabinet corner sample showing construction.
2. Sample 8" x 8" x thickness, showing thickness.

D. Quality Assurance/Control

1. Design Data/Test Reports: Manufacturer shall submit test data and design criteria which are in compliance with the project specifications.
2. Certificates: All certifications required in the specifications shall be submitted with the original submittal package under separate cover. Certificates must be provided with the signature of a qualified individual of the supplier.
3. Manufacturers' Instructions: Provide manufacturer's instructions for installation and maintenance of all products provided and installed within this section. Instructions will be in bound form, tabbed and organized by section number.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. The following list of information will be provide to the Architect:
2. List of manufacturing facilities;
3. A list of ten (10) installations of comparable stature completed within the past 5 years;
4. Construction details depicting the materials, sizes and methods of construction;
5. Independent laboratory test reports that include information on cabinet, fume hood and table top finish and performance that have been conducted within the last two years.

B. Reviews During Fabrication:

1. At the owner's option, the owner may visit the fabricators shop to review casework.
2. At the owner's option, the owner may require photographs of casework for review.

1.6 DELIVERY, STORAGE AND HANDLING

A. Packaging, Shipping, Handling and Unloading

1. Packaging: Products shall have packaging adequate enough to protect finished surfaces from soiling or damage during shipping, delivery and installation.
2. Delivery: Casework delivery shall only take place after painting, utility rough-ins and related activities are completed that could otherwise damage, soil or deteriorate casework in installation areas.
3. Handling: Care, such as the use of proper moving equipment, experienced movers, etc., shall be used at all times to avoid damaging the casework. Until installation takes place, any wrapping, insulation or other method of protection applied to products from the factory will be left in place to avoid accidental damage.

B. Acceptance at Site:

Casework will not be delivered or installed until the conditions specified under Part 3, Installation section of this document have been met.

C. Storage:

Casework shall be stored in the area of installation. If, prior to installation, it is necessary for casework to be temporarily stored in an area other than the installation area, the environmental conditions shall meet the environmental requirements specified under the Project Site Conditions article of this section.

D. Waste Management and Disposal:

The supplier of the laboratory casework is responsible for removing any waste or refuse resulting from the installation of, or work pertaining to laboratory casework; thereby leaving the project site clean and free of debris. Trash container(s) to be provided by others.

1.7 PROJECT SITE CONDITIONS

- A. Building must be enclosed (windows and doors sealed and weather-tight);
- B. An operational HVAC system that maintains temperature and humidity at occupancy levels must be in place;
- C. Adjacent and related work shall be complete;
- D. Ceiling, overhead ductwork and lighting must be installed;
- E. Site must be free of any further construction such as "wet work";
- F. Required backing and reinforcements must be installed accurately and the project must be ready for casework installation.

1.8 WARRANTY

- A. Furnish a written warranty that Work performed under this Section shall remain free from defects as to materials and workmanship for a period of two (2) years from date of shipment. Defects in materials and workmanship that may develop within this time are to be replaced without cost or expense to the Owner.

Defects include, but are not limited to:

- 1. Ruptured, cracked, or stained coating
- 2. Discoloration or lack of finish integrity
- 3. Cracking or peeling of finish
- 4. Slippage, shift, or failure of attachment to wall, floor, or ceiling
- 5. Weld or structural failure
- 6. Warping or unloaded deflection of components
- 7. Failure of hardware

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. Acceptable Manufacturers:

- 1. Thermo Fischer Scientific, 4481 Campus Drive, Kalamazoo, MI 49008, Michael JKubacik, Tel: (847) 636-6059, email: Michael.kubacik@thermofischer.com
- 2. Mott Manufacturing Ltd.; 452 Hardy Rd. Brantford, ON, Canada N3T 5L8. Tel: (519) 752-7825. Fax: (519) 752-2895. email: inquire@mott.ca, www.mott.ca.
- 3. Kewaunee Scientific Corp., P.O. Box 1842, Statesville, NC 28687, Tel: (704) 873-7202, email: KSCMarketing@Kewaunee.com

4. Mortech Manufacturing Inc., 411 North Aerojet Avenue, Azusa, CA 91702, Tel: (626) 334-1471
email: info@mortechmfg.com

B. Substitutions:

1. Must meet all specification requirements and have prior approval.

2.2 CASEWORK MATERIALS

A. Stainless Steel:

1. Sheet: ASTM A240, Type 304 or 316 alloy.
2. Finish: Unless otherwise indicated, AISI No. 4 Brushed Finish

B. Glass:

1. Clear tempered, 6mm and 3mm thick, conforming to CAN/CGSB-12.1-M90, Glazing Quality.

C. Sealant:

1. One component, RTV silicone sealant. Color to suit application.

2.3 CASEWORK CONSTRUCTION

A. Materials and Thickness:

Use the following minimum steel thicknesses for furniture manufacturing:

1. 3mm (11 Ga) leveling bolt gusset plates.
2. 1.9mm (14 Ga) drawer slides and side suspension channels.
3. 1.5mm (16 Ga) for tubular rails, legs for tables, gusset plates, cabinet top and intermediate horizontal rails.
4. 1.2mm (18 Ga) for door and drawer fronts, cabinet floor, cabinet sides, vertical front members, cabinet toe kick, service cover panels, table and knee-hole frames, front rails, gable legs and dust caps, false panels, furring and filler panels.
5. 0.9mm (20 Ga) for drawer backs, door backs, vertical closure channel, removable back panels, shelves, drawer bodies, drawer dividers, bin bodies, and pull-out shelves.

B. Cabinet Frame:

1. Provide one-piece die-formed cabinet bottom construction with return side flanges turned down. Spot weld flanges to cabinet sides.
2. Cabinet bottoms shall be turned down at front to form 32mm (1-1/4") "U" channel to accept toe kick and turn down 133mm (5-1/4") at back with 16mm (5/8") return to form the back lower member of cabinet base. Provide punched 19mm (3/4") dia. corner holes for access to levelers and to accept PVC press plugs. It shall be possible to access levelers from above cabinet without removing drawers or drawer supports.
3. Provide additional vertical 75mm (3") "HAT" shaped channels, spot-welded to or formed with the rear vertical corner. Channel shall be provided with pre-punched holes to receive shelf clips, and slotted holes to receive drawer suspension tracks. Cabinets 762mm (30") wide and larger shall be provided with intermediate 117mm (4-5/8") "HAT" channels to brace cabinet and accept shelf clips and drawer tracks
4. Where applicable, the front corner posts shall be pre-punched and slotted to accept drawer suspension systems and suspension pull-out shelves. Front vertical posts shall form inboard flush front construction for doors and drawers acting as the cabinet main member side gable tying the cabinet bottom and horizontal member together to form a rigid case. Front post rear closure channels shall be "J" shaped

- 9mm (11/32") x 33mm (1-5/16") x 49mm (1-15/16"). Provide channel with pre-punched holes to receive shelf clips.
5. Doors and drawers shall overlay top intermediates and floor horizontal members.
 6. Top horizontal front framing member shall form a "J" shaped section 75mm (3") wide, 10mm (3/8") return by 25mm (1") deep with 16mm (5/8") return.
 7. Intermediate horizontal framing members shall form a "U" 32mm (1-1/4") high with a 25mm (1") return on top and 16mm (5/8") return on bottom.
 8. Top rear horizontal framing member shall be 50mm (2") x 32mm (1-1/4") angle section welded to back corner lapped post and side gables with welded corner gusset plates acting as cabinet bracing and counter top material fixing member.
 9. Enclose cabinetry toe space shall be 75mm (3") deep x 100mm (4") high and shall act as a total enclosure to bottom of cabinet. Toe space section shall key up into "U" shaped front floor member and act as reinforcement. Toe space, front floor of cabinet and corner post sections shall be spot welded together forming one structural member.
 10. The toe space members, side gable returns, and back lower member shall form all welded structural corner to accept leveller gussets and 10mm (3/8") levelling bolts.
 11. Cabinet construction shall be electro spot-welded to form a strong well-fitted, one-piece unit.
 12. Exposed horizontal structural cabinet members between doors and drawers shall be unacceptable.
- C. Cabinet Hardware:
1. Pulls: Provide handles for drawers and hinged doors in 100mm (4") stainless steel.
 2. Door Hinges: Provide five knuckle-type barrel door hinges of 1.9mm (14 Ga) steel screwed into door and fastened to cabinet side stile with two counter sunk #8-32 zinc plated machine screws & captive serrated tooth washer nuts. Hinge finish shall be stainless steel.
 3. Locks: Locks per Owners standard for keying.
- D. Base Cabinet Components:
1. Provide removable back panels for cupboard base cabinets. Provide partial back panels 229mm (9") in height to accommodate plumbing at sink units. Provide back panels and security panels on cabinets requiring locks.
 2. Shelving edges; turned down on all four sides 25mm (1"), and returned under on front and back 25mm (1"). Shelves 914mm (36") and longer shall be provided with "HAT" channel reinforcement at front edge.
 3. Doors:
 - a) Fabricate doors of metal panels, 19mm (3/4") thick, with a sound-deadening material extending continuously full-width, and top to bottom. Reinforce hinged side of door adequately with hinge machine screws to prevent sagging. Secure recessed hinges to cabinet posts with machine screws and concealed self-locking nuts. Provide nylon roller friction catches, mounted on horizontal top or intermediate members pull side of doors. Provide each hinged door with 2 rubber bumpers.
 - b) Doors, drawers, tracks and back panels shall be replaceable in the field without requiring special tools.
 - c) All standard double door cabinets shall be designed without center stiles to maximize access to the cabinet.
 - d) Doors shall be flush-overlay style.
 - e) 3mm (1/8") glazing shall be provided for frame glass doors, U.N.O.
 4. Drawers:
 - a) Fabricate drawer fronts of 2 telescoping metal panels and totally filled with sound-deadening material to eliminate possible drumming effect. Form removable outside panel with lip to fit over

- inside panel on top edge, and to lock into position at bottom with rivets to form a rigid, one-piece 19mm (3/4") thick drawer front.
- b) Provide drawer operation on Full Extension Drawer Slides, 508mm (20") extension, load capacity 45kg (100 pounds):. Equal to: Knap & Vogt #8400B.
 - c) Drawer body shall consist of one piece stainless steel construction including the bottom, two sides, back and inner front flanged end which shall be welded to the interior drawer front head. The exterior drawer front shall have a channel formation on the top edge with ground smooth and fully finished return edges telescoping together to form fully sounded-deadened drawer front. Drawer bodies shall have a reinforcing bend on top edges.
 - d) Provide built-in stops to prevent inadvertent removal of drawers, with allowance for drawer to be removed by lifting front of drawers and pulling out.
 - e) Provide drawer pulls in central location of drawer face. Two handles shall be provided on units 762mm (30") and larger.
 - f) Drawers shall be flush-overlay style.
5. Apron Drawer Assembly:
- a) Apron drawer assembly shall be fabricated from metal channel shaped skirting panels of modular widths the same as standard base cabinets. Rails 95mm (3-3/4") high channel ends shall be turned to fit into end mounting brackets. Drawer suspension framing shall be mechanically fixed to channels, welded integrally with front and back channel sections formed into a rigid one-piece frame.
 - b) Where called for, drawers located in table aprons shall be supplied in a maximum width of 381mm (15") with two drawers supplied in tables 1219mm (48") and wider. Drawer suspension shall be with 25mm (1") nylon ball bearing rollers and self-closing action, custom manufactured 1.5mm (16 Ga) suspension system.
6. Front Rails:
- a) Front rail units shall be fabricated from a single metal channel-shaped skirting panel in modular widths the same as standard base cabinets. Channel ends shall be turned to fit into end mounting brackets. Rails are 95mm (3-3/4") high.
7. Gable Legs:
- a) Gable legs shall consist of two telescoping side panels totally enclosed on all four sides and welded to form a strong rigid unit.
 - b) Gables shall be 38mm (1-1/2") thick with 75mm x 100mm (3" x 4") toe space and designed to be secured in a concealed fashion to the adjacent knee-hole assembly or to the bench top material.
 - c) Gable legs shall be provided with two levelling devices.
8. Filler Panels:
- a) Fabricate front filler panels complete with flanges on both sides and a 75mm x 100mm (3" x 4") toe space along the working face.
 - b) Scribe filler panels shall be flanged on one side and flat on the other, to be cut on jobsite to suit wall conditions, and shall fit into double angles secured to the wall. No visible mounting screws permitted.
 - c) Corner filler panels shall be a two-piece construction, one fixed panel and the other a variable panel to facilitate room dimensions. Each shall have flanges and an integral 75mm x 100mm (3" x 4") toe space filler to interlock with its counterpart.
 - d) End closing filler panels shall be flanged on one side 25mm (1") and secured to back of cabinet. The edge extending to wall shall be flat and fit into a double angle secured to wall. No visible mounting screws permitted.
9. Cabinets with Air Grille:
- a) Ventilated cabinets shall be the same construction as fixed base cabinets with the following modifications:

- b) Vents: removable, perforated metal face matching casework construction. Perforation pattern as indicated in the drawings, not less than 50%.
 - 10. Ventilated Cabinets:
 - a) Ventilated Mobile cabinets shall be the same construction as fixed base cabinets with the following modifications:
 - b) Vents: Vents to allow for 10 CFM of air flow.
 - 1) Vented front doors with concealed vents at cabinet doors and/or face.
 - 2) Side vent exhausts into the cabinet with air grille, above and as indicated in the drawings. 4" diameter collar and butterfly-type balancing damper to allow for variable adjustment of the air flow, or alternate device acceptable to the Architect.
 - 11. Mobile Cart Furniture:
 - a) Mobile cart shall be stainless steel, similar construction as fixed base cabinets.
 - b) Shelves: Two horizontal shelves, type as determined by the Architect.
 - c) Casters: Four casters with locking mechanism shall be provided with a load rating of 15 lbs each. Casters shall be as manufactured by Colson Casters, or equal. Casters shall be non-marking type urethane tires in grey color.
 - 12. Teaching Stations for A/V
 - a) Teaching Stations for A/V shall be the same construction as fixed base cabinets with the following modifications:
 - b) Vents: perforated metal face matching casework construction. Perforation pattern as indicated in the drawings, not less than 50%. Provide internal, unobstructed vertical space the full width of the cabinet to vent heat out the top of the cabinet as indicated in the drawings.
 - c) Provide cut-outs for A/V and electrical equipment as indicated. Provide internal, unobstructed clear dimensions for A/V equipment as indicated.
- E. Floor/Wall Cabinet Components:
- 1. Wall Storage Cabinets: Hinged Metal Doors
 - a) Fabricate cabinets as specified in Para. 2.3.D. with two front side frames modified to minimize dust penetration. Provide intermediate exposed vertical members in a double "U" shaped channel. The front edges of the top panel shall have a channel formation reinforced with a flanged "U" channel. The exterior bottom panel shall have a channel formation at front and fitted with a flanged interior floor.
 - b) Hinged metal doors shall be as specified in Para. 2.3.D. base cabinet components.
 - c) 3MM (1/8") glass shall be provided for glass frame doors.
 - 2. Floor Storage Cabinets: Hinged Metal Doors
 - a) Fabricate cabinet bottom as specified in Section 2.3.D., with vertical height divided into two equal sections, each with a set of hinged metal doors. Provide a finished floor full width and depth of interior with return flanges turned down on all four edges in both upper and lower sections and welded in place. Fabricate cabinet floor flush with front flange.
 - b) Provide a shelf separating upper and lower sections, with 40mm (1-9/16") flanges on all four sides, fixed and spot welded in place.
 - c) Provide built-in toe space 100mm (4") high extending full width of cabinet recessed back 75mm (3") from front face with a 10mm (3/8") diameter steel threaded bolt type leveling device in each corner.
 - d) Hinged metal doors as per Para. 2.3.D., base cabinet components.
 - e) 6mm (1/4") glass shall be provided for frame glass doors.
 - 3. Teaching Stations for A/V:
 - a) Teaching Stations for A/V shall be the same construction as Floor Storage Cabinets including the following modifications:
 - b) Vents: perforated metal face matching casework construction. Perforation pattern as indicated in the drawings, not less than 50%. Provide internal, unobstructed vertical space the full width of the cabinet to vent heat out the top of the cabinet as indicated in the drawings.

- c) Provide cut-outs for A/V and electrical equipment as indicated. Provide internal, unobstructed clear dimensions for A/V equipment as indicated in the drawings.

PART 3 – EXECUTION

4.1 INSTALLERS

A. Installer Qualifications:

1. Installer shall have a minimum of 5 years continued experience in installation or application of systems similar to those required for this project.
2. Installer shall be authorized by either the distributor or manufacturer. Warranty will be void if unauthorized installer executes the installation.

4.2 EXAMINATION

A. Site Verification of Conditions:

1. Installer shall examine the existing conditions and assure they are acceptable for installation of the casework including:
 - a) Building must be enclosed (windows and doors sealed and weather-tight);
An operational HVAC system that maintains temperature and humidity at occupancy levels must be in place.
 - b) Ceiling, overhead ductwork and lighting must be installed
 - c) Site must be free of any further construction such as "wet work."
 - d) Required backing and reinforcements must be installed accurately and the project must be ready for casework installation.

4.3 INSTALLATION

A. Casework Installation:

1. Casework shall be set with components plumb, straight and square, securely anchored to building structure with no distortion. Concealed shims shall be used as required.
2. Cabinets in continuous runs shall be fastened together with joints flush, uniform and tight with misalignment of adjacent units not to exceed 1/16 of an inch.
3. Wall casework shall be secured to solid material, not lath, plastic or gypsum board.
4. Top edge surfaces shall be abutted in one true plane. Joints are to be flush and gap shall not exceed 1/8 of an inch between tops units.
5. Casework and hardware shall be adjusted and aligned to allow for accurate connection of contact points and efficient operation of doors and drawers without any warping or binding.

B. Countertop Installation:

1. Countertops are to have been fabricated in the maximum lengths possible and according to drawings, with ends abutting tightly and sealed with corrosion resistant sealant.
2. Tops will be anchored to base casework in a single true plane with ends abutting at hairline joints with no raised edges at joints.
3. Joints shall be factory prepared having no need for in-field processing of top and edge surfaces.
4. Joints shall be dressed smoothly, surface scratches removed and entire surface cleaned thoroughly.

4.4 CLEANING

- A. Ensure all products are unsoiled and match factory finish. Remove or repair damaged or defective units.

- B. Clean all finished surfaces, including drawers and cabinet shelves, and touch up as necessary.
- C. Countertops shall be cleaned and free of grease or streaks.

4.5 PROTECTION:

- A. Counter tops and ledges shall be protected with 1/4 inch ribbed cardboard for the remainder of the construction process.
- B. Examine casework for damaged or soiled areas; replace, repair, and touch-up as required.
- C. Repair or replace damaged products before Substantial Completion.

END OF SECTION 12 35 53.13

APPENDIX 1

STAINLESS STEEL WORKSURFACE

1 – STAINLESS STEEL WORKSURFACE

- A. Responsibility:** Work to be fabricated and installed by the same manufacturer and installer as Section 12 35 53.13 – Stainless Steel Laboratory Casework.
- B. Material:**
1. 304 or 316 stainless steel with a #4 brushed finish
 - a) 14 Ga.
- C. Methods:** All factory welds shall be made using the TIG process. Filler rod shall be of the same composition as the base material.
- D. Tops:** Form tops with 1.25" high (32mm) edges with 0.5" (12mm) return flange. Reinforce with stainless steel hat channels as required. Form edges, flanges and backsplashes integrally from one sheet of steel. Intersections between backsplashes and work surface shall be radiused a minimum of 0.375" (9mm).
- E. Sink Tops:** Form tops with 1.25" high (32mm) edges with 0.5" (12mm) return flange.. Work surface shall be reinforced with stainless steel hat channels as required. Form edges, flanges and backsplashes integrally from one sheet of steel. Intersections between backsplashes and work surface shall be radiused a minimum of 0.375" (9mm).
- F. Sink Bowls:** Sink Bowls shall be made of the same material as the work surface and shall be of equal or greater thickness. Sink bowls shall be formed from one piece of steel with all inside corners radiused. Welds shall be hammered, ground and polished to produce a smooth, invisible joint. Sinks shall be welded into the work surface and welds shall be ground and polished to produce a smooth, invisible joint.
- G. Plumbing:** Coordinate sink bowls and faucets as indicate in the plumbing drawings and specifications. Provide openings as required.
- H. Joints:** Factory welds shall be ground and polished to provide an invisible joint. Field connections shall be mechanical "tongue and groove" interlocking design with concealed bolts to provide a hairline seam.
- I. Sound Deadener:** Countertops and sinks shall have sound deadening material applied as required to the underside. Nominal thickness shall be 0.062" (1.5mm). Sound deadener shall be waterborne, non flammable and shall contain no volatile organic compounds.
- J. Counter Lengths:** Fabricate counter lengths with the maximum lengths possible to minimize joint locations between units.

END OF APPENDIX 1

APPENDIX 2

Product Code C8007457

Product Name Casework, Lot,
Reference North Wall

Product Description Casework features:
Type 304 stainless steel construction
All welds polished and ground smooth

Casework lot includes:

Two (2) wall cabinets, 30"H x 30"W x 15"D w/one (1) tempered glass left-hand hinged door and two (2) adjustable shelves

Two (2) wall cabinets, 30"H x 30"W x 15"D w/one (1) tempered glass right-hand hinged door and two (2) adjustable shelves

One (1) wall cabinet, 30"H x 27"W x 15"D w/one (1) tempered glass left-hand hinged door keyed alike and two (2) adjustable shelves

One (1) wall cabinet, 30"H x 27"W x 15"D w/one (1) tempered glass right-hand hinged door keyed alike and two (2) adjustable shelves

One (1) countertop, 174"W x 30"D w/4"H backsplash, w/one (1) hairline seam

Two (2) return vent cabinets, 34.75"H x 36"W, w/perforated front panels

One (1) base cabinet, 34.75"H x 32"W x 28"D, w/one (1) standard drawer, one (1) left-hand hinged solid door and one (1) adjustable shelf

One (1) base cabinet, 34.75"H x 32"W x 28"D, w/one (1) standard drawer, one (1) right-hand hinged solid door and one (1) adjustable shelf

One (1) base cabinet, 34.75"H x 38"W x 28"D w/ one (1) left-hand hinged solid door

One (1) mobile cart

Product Code C8007458

Product Name Casework, Lot,
Reference East Wall

Product Description Casework features:
Type 304 stainless steel construction
All welds polished and ground smooth

Casework lot includes:

One (1) countertop, 204"W x 30"D w/4"H backsplash, w/two (2) notches and one (1) hairline seam

Leg framework support

Product Code C8007459

Product Name Casework, Lot,
Reference South
Wall

Product Description Casework features:
Type 304 stainless steel construction
All welds polished and ground smooth

Casework lot includes:
Six (6) wall cabinets, 30"H x 30"W x 15"D w/one (1) tempered glass
right-hand hinged door, one (1) tempered glass left-hand hinged door
and two (2) adjustable shelves

One (1) countertop, 30"W x 30"D w/4"H backsplash, w/marine edge, one
(1) 24" x 24" x 8"D integral sink, one (1) hot/cold water faucet w/wrist
blade handles and leg framework support

One (1) countertop, 213"W x 30"D w/4"H backsplash, w/marine edge,
one (1) 24" x 24" x 8"D integral sink, one (1) hot/cold water faucet
w/wrist blade handles and two (2) hairline seams

One (1) return vent cabinet, 34.75"H x 33"W, w/perforated front panel,
removeable

Four (4) base cabinets, 34.75"H x 30"W x 28"D, w/five (5) standard
drawers

One (1) sink base cabinet, 34.75"H x 30"W x 28"D, w/one (1) standard
false drawer front, one (1) left-hand hinged solid door and one (1) right-
hand hinged solid door

Product Code C8007460

Product Name Casework, Lot,
Reference West Wall

Product Description Casework features:
Type 304 stainless steel construction
All welds polished and ground smooth

Casework lot includes:
One (1) wall cabinet, 30"H x 24"W x 15"D w/one (1) tempered glass
right-hand hinged door and two (2) adjustable shelves
One (1) wall cabinet, 30"H x 16"W x 15"D w/one (1) tempered glass
left-hand hinged door and two (2) adjustable shelves
One (1) wall cabinet, 30"H x 16"W x 15"D w/one (1) tempered glass
right-hand hinged door and two (2) adjustable shelves
One (1) wall cabinet, 30"H x 24"W x 15"D w/one (1) tempered glass
left-hand hinged door and two (2) adjustable shelves
One (1) wall cabinet, 42"H x 36"W x 15"D w/two (2) hinged tempered
glass doors and four (4) adjustable shelves

Two (2) countertops, 192"W x 30"D w/4"H backsplash and side
splash and one notch

Two (2) base cabinets, 34.75"H x 18"W x 28"D, w/one (1) standard drawer, one (1) left-hand hinged solid door and one (1) adjustable shelf

One (1) base cabinet, 34.75"H x 18"W x 28"D, w/one (1) standard drawer, one (1) right-hand hinged solid door and one (1) adjustable shelf

Two (2) base cabinets, 34.75"H x 24"W x 28"D, w/one (1) standard drawer and two (2) file drawers

One (1) base cabinet, 42"H x 36"W x 30"D w/two (2) hinged tempered glass doors, one (1) pull-out shelf

One (1) base cabinet, 34.75"H x 18"W x 28"D, w/five (5) standard drawers

Product Code Custom, Teaching Station for A/V

Product Casework features:

Description Type 304 stainless steel construction
All welds polished and ground smooth

Casework lot includes:

One (1) countertop, 44"W x 26"D w/4"H backsplash, w/one (1) hairline seam

One (1) base cabinet, 42"H x 44"W x 30"D, w/ two (2) left-hand hinged doors w/perforated front panels and tall vented section w/perforated panels

END OF APPENDIX 2

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Escutcheons.
 - 2. Floor plates.

1.2 ACTION SUBMITTALS

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

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

- A. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
- B. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
 - 1. Escutcheons for New Piping:
 - a. Insulated Piping: One-piece, stamped-steel type.

3.2 FIELD QUALITY CONTROL

- A. Replace broken and damaged escutcheons and floor plates using new materials.

END OF SECTION 22 05 18

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. Bronze ball valves.

1.3 DEFINITIONS

- A. CWP: Cold working pressure.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of valve.
 - 1. Certification that products comply with NSF 61 Annex G and NSF 372.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, and soldered ends.
 - 3. Set ball valves open to minimize exposure of functional surfaces.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
 - 1. ASME B1.20.1 for threads for threaded end valves.
 - 2. ASME B16.1 for flanges on iron valves.
 - 3. ASME B16.5 for flanges on steel valves.
 - 4. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - 5. ASME B16.18 for solder-joint connections.
 - 6. ASME B31.9 for building services piping valves.
- C. NSF Compliance: NSF 61 Annex G[and NSF 372] for valve materials for potable-water service.
- D. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- E. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- F. Valve Sizes: Same as upstream piping unless otherwise indicated.
- G. Valve Actuator Types:
 - 1. Handlever: For quarter-turn valves.
- H. Valves in Insulated Piping:
 - 1. Include 2-inch stem extensions.
 - 2. Extended operating handles of nonthermal-conductive material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.
 - 3. Memory stops that are fully adjustable after insulation is applied.

2.2 BRONZE BALL VALVES

- A. Two-Piece, Bronze Ball Valves with Full Port, and Bronze or Brass Trim:
 - 1. Description:
 - a. Standard: MSS SP-110.
 - b. CWP Rating: 600 psig.
 - c. Body Design: Two piece.
 - d. Body Material: Bronze.
 - e. Ends: Threaded and soldered.
 - f. Seats: PTFE.
 - g. Stem: Bronze or brass.

- h. Ball: Chrome-plated brass.
 - i. Port: Full.
- B. Two-Piece, Bronze Ball Valves with Full Port and Stainless-Steel Trim:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Apollo Valves; Conbraco Industries, Inc.
 - b. Milwaukee Valve Company.
 - c. NIBCO INC.
 - 2. Description:
 - a. Standard: MSS SP-110.
 - b. CWP Rating: 600 psig.
 - c. Body Design: Two piece.
 - d. Body Material: Bronze.
 - e. Ends: Threaded or soldered.
 - f. Seats: PTFE.
 - g. Stem: Stainless steel.
 - h. Ball: Stainless steel, vented.
 - i. Port: Full.
- C. Two-Piece, Bronze Ball Valves with Regular Port and Bronze or Brass Trim:

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.

- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Install valve tags. Comply with requirements in Section 220553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valves with specified CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.
- B. Select valves with the following end connections:
 - 1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.

3.4 LOW-PRESSURE, COMPRESSED-AIR VALVE SCHEDULE (150 PSIG OR LESS)

- A. Pipe NPS 2 and Smaller:
 - 1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
 - 2. Class 150, iron ball valves.

3.5 DOMESTIC HOT- AND COLD-WATER VALVE SCHEDULE

- A. Pipe NPS 2 and Smaller:
 - 1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
 - 2. Two-piece, bronze ball valves with full port and stainless-steel trim.

END OF SECTION 22 05 23.12

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Metal pipe hangers and supports.
 - 2. Trapeze pipe hangers.
 - 3. Thermal-hanger shield inserts.
 - 4. Fastener systems.
 - 5. Equipment supports.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
 - 1. Design supports for multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.
 - 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following; include Product Data for components:
 - 1. Trapeze pipe hangers.
 - 2. Equipment supports.
- C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
 - 3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
 - 4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
 - 5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
- B. Copper Pipe Hangers:
 - 1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
 - 2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

2.2 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3 THERMAL-HANGER SHIELD INSERTS

- A. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig minimum compressive strength and vapor barrier.
- B. Insulation-Insert Material for Hot Piping: ASTM C 552, Type II cellular glass with 100-psig minimum compressive strength.
- C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- E. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.4 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
- B. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.5 PIPE POSITIONING SYSTEMS

- A. Description: IAPMO PS 42, positioning system of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

2.6 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.7 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
 - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
 - 2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- D. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- E. Pipe Positioning-System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture.
- F. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- G. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- I. Install lateral bracing with pipe hangers and supports to prevent swaying.
- J. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- K. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- L. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- M. Insulated Piping:
1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
 3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

- a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
 - b. NPS 4: 12 inches long and 0.06 inch thick.
 - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
 - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
 - e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
5. Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and 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. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.4 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.5 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports and metal trapeze pipe hangers and attachments for general service applications.
- F. Use copper-plated pipe hangers and stainless-steel attachments for copper piping and tubing.
- G. Use padded hangers for piping that is subject to scratching.
- H. Use thermal-hanger shield inserts for insulated piping and tubing.
- I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
 - 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F, pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
 - 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
 - 4. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 - 5. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
 - 6. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
 - 7. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
 - 8. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.
 - 9. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
- J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
 - 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.

- K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
- L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction, to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 - c. Heavy (MSS Type 33): 3000 lb.
 8. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 9. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
- M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- N. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- O. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.
- P. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION 22 05 29

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. Equipment labels.
 - 2. Pipe labels.
 - 3. Valve tags.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

PART 2 - PRODUCTS

- A. Plastic Labels for Equipment:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Champion America.
 - c. Seton Identification Products.
 - 2. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
 - 3. Letter Color: White.
 - 4. Background Color: Black.
 - 5. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

6. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 7. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
 8. Fasteners: Stainless-steel rivets.
 9. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.
- C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number, and identify Drawing numbers where equipment is indicated (plans, details, and schedules) and the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 PIPE LABELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Brady Corporation.
 2. Champion America.
 3. Seton Identification Products.
- B. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings; also include pipe size and an arrow indicating flow direction.
1. Flow-Direction Arrows: Integral with piping-system service lettering to accommodate both directions or as separate unit on each pipe label to indicate flow direction.
 2. Lettering Size: Size letters according to ASME A13.1 for piping.

2.3 VALVE TAGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Brady Corporation.
 2. Champion America.
 3. Seton Identification Products.
- B. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 2. Fasteners: Brass wire-link chain or beaded chain.
- C. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
1. Valve-tag schedule shall be included in operation and maintenance data.

2.4 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

2.5 GENERAL INSTALLATION REQUIREMENTS

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

2.6 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

2.7 PIPE LABEL INSTALLATION

- A. Pipe Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
1. Near each valve and control device.
 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
 4. Near major equipment items and other points of origination and termination.
 5. Spaced at maximum intervals of 2 feet along each run.
 6. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- B. Directional Flow Arrows: Arrows shall be used to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.

- C. Pipe Label Color Schedule:
 - 1. Lab Cold Water Piping
 - a. Background: Safety green.
 - b. Letter Colors: White.
 - 2. Lab Hot Water Piping.
 - a. Background: Safety green.
 - b. Letter Colors: White.
 - 3. Sanitary Waste and acid waste Piping:
 - a. Background Color: Yellow.
 - b. Letter Color: Black.

2.8 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, shutoff valves, faucets, convenience and lawn-watering hose connections, and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
 - 1. Valve-Tag Size and Shape:
 - a. Cold Water: 1-1/2 inches round.
 - b. Hot Water: 1-1/2 inches round.
 - 2. Valve-Tag Colors:
 - a. Cold Water: Match existing tag color.
 - b. Hot Water: Match existing tag color.
 - 3. Letter Colors:
 - a. Cold Water: White.
 - b. Hot Water: White.

END OF SECTION 22 05 53

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes insulating the following plumbing piping services:

1. Lab hot and cold water piping.

1.2 ACTION SUBMITTALS

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

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

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
3. Detail removable insulation at piping specialties, equipment connections, and access panels.
4. Detail application of field-applied jackets.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

B. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Supply and Drain Protective Shielding Guards: ICC A117.1.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Aromstron.
 - b. World Industries Inc.
- D. Mineral-Fiber, Preformed Pipe Insulation:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. Knauf Insulation.
 - c. Certain Teed Corporation.
 - d. Owens Corning.
 - 2. Type I, 850 Deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.2 INSULATING CEMENTS

- A. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Johns Manville.

2.3 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.
- B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Aeroflex USA, Inc.

- b. Armacell LLC.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. K-Flex USA.
- C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Mon-Eco Industries, Inc.
- D. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Mon-Eco Industries, Inc.
- E. PVC Jacket Adhesive: Compatible with PVC jacket.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Dow Corning Corporation.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. P.I.C. Plastics, Inc.
 - d. Speedline Corporation.

2.4 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
- B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below-ambient services.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Knauf Insulation.
 - d. Vimasco Corporation.
 - 2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
 - 3. Service Temperature Range: Minus 20 to plus 180 deg F.
 - 4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.

5. Color: White.

C. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.

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

- a. Childers Brand; H. B. Fuller Construction Products.
- b. Eagle Bridges - Marathon Industries.
- c. Foster Brand; H. B. Fuller Construction Products.
- d. Knauf Insulation.
- e. Mon-Eco Industries, Inc.
- f. Vimasco Corporation.

2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.

3. Service Temperature Range: Minus 20 to plus 180 deg F.

4. Solids Content: 60 percent by volume and 66 percent by weight.

5. Color: White.

2.5 SEALANTS

A. Joint Sealants for Cellular-Glass Products:

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

- a. Childers Brand; H. B. Fuller Construction Products.
- b. Eagle Bridges - Marathon Industries.
- c. Foster Brand; H. B. Fuller Construction Products.
- d. Mon-Eco Industries, Inc.
- e. Pittsburgh Corning Corporation.

2. Materials shall be compatible with insulation materials, jackets, and substrates.

3. Permanently flexible, elastomeric sealant.

4. Service Temperature Range: Minus 100 to plus 300 deg F.

5. Color: White or gray.

B. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

- a. Childers Brand; H. B. Fuller Construction Products.

2. Materials shall be compatible with insulation materials, jackets, and substrates.

3. Fire- and water-resistant, flexible, elastomeric sealant.

4. Service Temperature Range: Minus 40 to plus 250 deg F.

5. Color: White.

2.6 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. P.I.C. Plastics, Inc.
 - c. Proto Corporation.
 - d. Speedline Corporation.
 - 2. Adhesive: As recommended by jacket material manufacturer.
 - 3. Color: White.
 - 4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Compac Corporation.
 - b. Ideal Tape Co., Inc., an American Biltrite Company.
 - c. Venture Tape.
 - 2. Width: 2 inches.
 - 3. Thickness: 6 mils.
 - 4. Adhesion: 64 ounces force/inch in width.
 - 5. Elongation: 500 percent.
 - 6. Tensile Strength: 18 lbf/inch in width.

2.7 PROTECTIVE SHIELDING GUARDS

- A. Protective Shielding Pipe Covers:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Engineered Brass Company.
 - b. McGuire Manufacturing.
 - c. Truebro.
 - 2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
 - L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
 - a. For below-ambient services, apply vapor-barrier mastic over staples.
 - 4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
 - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
 - M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
 - N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
 - O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
 - P. For above-ambient services, do not install insulation to the following:
 - 1. Vibration-control devices.
 - 2. Testing agency labels and stamps.
 - 3. Nameplates and data plates.
 - 4. Cleanouts.
 - Q. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
 - R. Insulation Installation at Floor Penetrations:
 - 1. Pipe: Install insulation continuously through floor penetrations.
- 3.3 GENERAL PIPE INSULATION INSTALLATION
- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
 - B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
 - 1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.

2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
 3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
 6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
 8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
 9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
 3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
 4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill

space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.

5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.4 INSTALLATION OF CELLULAR-GLASS INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient services, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient services, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of cellular-glass block insulation of same thickness as pipe insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed sections of insulation are not available, install mitered sections of cellular-glass insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of cellular-glass insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.5 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as pipe insulation when available.
2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.6 INSTALLATION OF MINERAL-FIBER PREFORMED PIPE INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

- C. Insulation Installation on Pipe Fittings and Elbows:
 - 1. Install preformed sections of same material as straight segments of pipe insulation when available.
 - 2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

- D. Insulation Installation on Valves and Pipe Specialties:
 - 1. Install preformed sections of same material as straight segments of pipe insulation when available.
 - 2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
 - 3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.

3.7 FIELD-APPLIED JACKET INSTALLATION

- A. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive.
 - 1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

- B. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

- C. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

- D. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

3.8 FIELD QUALITY CONTROL

- A. Perform tests and inspections.

- B. Tests and Inspections:
 - 1. Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.

- C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.9 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

3.10 INDOOR PIPING INSULATION SCHEDULE

- A. Lab Cold Water and Hot Water: Insulation shall be one of the following:
 - 1. Flexible Elastomeric: 1 inch thick.
 - 2. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

3.11 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Concealed:
 - 1. None.
 - 2. PVC 20 mils thick.

END OF SECTION 22 07 19

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Copper tube and fittings.
 - 2. Transition fittings.
 - 3. Dielectric fittings.

1.2 ACTION SUBMITTALS

- A. Product Data: For transition fittings and dielectric fittings.

1.3 INFORMATIONAL SUBMITTALS

- A. System purging and disinfecting activities report.
- B. Field quality-control reports.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
- B. Potable-water piping and components shall comply with NSF 14 and NSF 61 Annex G. Plastic piping components shall be marked with "NSF-pw."
- C. Comply with NSF Standard 372 for low lead.

2.2 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.
- B. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.
- C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
- D. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
- E. Copper Unions:

1. MSS SP-123.
2. Cast-copper-alloy, hexagonal-stock body.
3. Ball-and-socket, metal-to-metal seating surfaces.
4. Solder-joint or threaded ends.

2.3 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials:

1. AWWA C110/A21.10, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
2. Full-face or ring type unless otherwise indicated.

B. Solder Filler Metals: ASTM B 32, lead-free alloys.

2.4 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. A.Y. McDonald Mfg. Co.
 - b. Capitol Manufacturing Company.
 - c. Central Plastics Company.
 - d. HART Industrial Unions, LLC.
 - e. Jomar Valve.
 - f. Matco-Norca.
 - g. Watts; a Watts Water Technologies company.
 - h. Wilkins.
 - i. Zurn Industries, LLC.
2. Standard: ASSE 1079.
3. Pressure Rating: 250 psig.
4. End Connections: Solder-joint copper alloy and threaded ferrous.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."

- C. Install ductile-iron piping under building slab with restrained joints according to AWWA C600 and AWWA M41.
- D. Install shutoff valve immediately upstream of each dielectric fitting.
- E. Install domestic water piping level with 1/32 inch per foot toward drain and plumb.
- F. Rough-in domestic water piping for water-meter installation according to utility company's requirements.
- G. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- H. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- I. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- J. Install piping to permit valve servicing.
- K. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.
- L. Install piping free of sags and bends.
- M. Install fittings for changes in direction and branch connections.
- N. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- O. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.2 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Braze Joints" chapter.
- E. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

- F. Pressure-Sealed Joints for Copper Tubing: Join copper tube and pressure-seal fittings with tools recommended by fitting manufacturer.
- G. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.

3.3 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric nipples unions.

3.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for pipe hanger, support products, and installation in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Support vertical piping and tubing at base and at each floor.
- C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.
- D. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
 - 2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
- E. Install supports for vertical copper tubing every 10 feet.
- F. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/4 and Smaller: 84 inches with 3/8-inch rod.
 - 2. NPS 1-1/2: 108 inches with 3/8-inch rod.

3.5 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
 - 1. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.

2. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.

3.6 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."

3.7 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:

1. Piping Inspections:

- a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
- b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - 1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
 - 2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.
- c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
- d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

2. Piping Tests:

- a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
- b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
- c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
- d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
- e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
- f. Prepare reports for tests and for corrective action required.

- B. Domestic water piping will be considered defective if it does not pass tests and inspections.

- C. Prepare test and inspection reports.

3.8 ADJUSTING

- A. Perform the following adjustments before operation:
1. Close drain valves, hydrants, and hose bibbs.
 2. Open shutoff valves to fully open position.
 3. Open throttling valves to proper setting.
 4. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
 5. Remove and clean strainer screens. Close drain valves and replace drain plugs.
 6. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
 7. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.9 CLEANING

- A. Clean and disinfect potable domestic water piping as follows:
1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
 2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Repeat procedures if biological examination shows contamination.
 - e. Submit water samples in sterile bottles to authorities having jurisdiction.
- B. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.
- C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.10 PIPING SCHEDULE

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.

- D. Aboveground domestic water piping, NPS 2 and smaller, shall be one of the following:
1. Hard copper tube, ASTM B 88, Type L cast or wrought- copper, solder-joint fittings; and soldered joints.

END OF SECTION 22 11 16

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Temperature-actuated, water mixing valves.

1.2 ACTION SUBMITTALS

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

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

- A. Potable-water piping and components shall comply with NSF 61 Annex G and NSF 14.

2.2 PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

2.3 TEMPERATURE-ACTUATED, WATER MIXING VALVES

- A. Water-Temperature Limiting Devices:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Leonard Valve Company.
 - b. Powers.
 - c. Watts; a Watts Water Technologies company.
 - 2. Standard: ASSE 1017.

3. Pressure Rating: 125 psig.
4. Type: Thermostatically controlled, water mixing valve.
5. Material: Bronze body with corrosion-resistant interior components.
6. Connections: Adjustable.
7. Accessories: Check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
8. Tempered-Water Setting: 100 deg F.
9. Tempered-Water Design Flow Rate: 1.5 gpm.
10. Valve Finish: Chrome plated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install temperature-actuated, water mixing valves with check stops or shutoff valves on inlets and with shutoff valve on outlet.
 1. Install cabinet-type units recessed in or surface mounted on wall as specified.

3.2 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 1. Test each thermostatic mixing valve according to authorities having jurisdiction and the device's reference standard.
- B. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

3.3 ADJUSTING

- A. Set field-adjustable pressure set points of water pressure-reducing valves.
- B. Set field-adjustable flow set points of balancing valves.
- C. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.

END OF SECTION 22 11 19

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pipe, tube, and fittings.

1.2 ACTION SUBMITTALS

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

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:
 - 1. Soil, Waste, and Vent Piping: 10-foot head of water.

2.2 PIPING MATERIALS

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.3 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 74, Service class.
- B. Gaskets: ASTM C 564, rubber.
- C. Calking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

2.4 COPPER TUBE AND FITTINGS

- A. Copper Type DWV Tube: ASTM B 306, drainage tube, drawn temper.
- B. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.
- C. Solder: ASTM B 32, lead free with ASTM B 813, water-flushable flux.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.
 - 1. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations.
 - 2. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.
- J. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends.
 - 1. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical.
 - 2. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe.
 - a. Straight tees, elbows, and crosses may be used on vent lines.
 - 3. Do not change direction of flow more than 90 degrees.
 - 4. Use proper size of standard increasers and reducers if pipes of different sizes are connected.

- a. Reducing size of waste piping in direction of flow is prohibited.
 - K. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
 - L. Install aboveground copper tubing according to CDA's "Copper Tube Handbook."
 - M. Plumbing Specialties:
 - 1. Install drains in sanitary waste gravity-flow piping.
 - a. Comply with requirements for drains specified in Section 221319 "Sanitary Waste Piping Specialties."
 - N. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
 - O. Install escutcheons for piping penetrations of walls, ceilings, and floors.
 - 1. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."
- 3.2 JOINT CONSTRUCTION
- A. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
 - B. Join copper tube and fittings with soldered joints according to ASTM B 828. Use ASTM B 813, water-flushable, lead-free flux and ASTM B 32, lead-free-alloy solder.
 - C. Grooved Joints: Cut groove ends of pipe according to AWWA C606. Lubricate and install gasket over ends of pipes or pipe and fitting. Install coupling housing sections, over gasket, with keys seated in piping grooves. Install and tighten housing bolts.
- 3.3 HANGER AND SUPPORT INSTALLATION
- A. Support horizontal piping and tubing within 12 inches of each fitting, valve, and coupling.
 - B. Support vertical piping and tubing at base and at each floor.
 - C. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.
 - D. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
 - 2. NPS 3: 60 inches with 1/2-inch rod.
 - E. Install supports for vertical cast-iron soil piping every 15 feet.

- F. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:
- G. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/4: 72 inches with 3/8-inch rod.
 - 2. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
 - 3. NPS 2-1/2: 108 inches with 1/2-inch rod.
 - 4. NPS 3 and NPS 5: 10 feet with 1/2-inch rod.
- H. Install supports for vertical copper tubing every 10 feet.
- I. Support piping and tubing not listed above according to MSS SP-58 and manufacturer's written instructions.

3.4 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect waste and vent piping to the following:
 - 1. Plumbing Fixtures: Connect waste piping in sizes indicated, but not smaller than required by plumbing code.
 - 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
 - 3. Plumbing Specialties: Connect waste and vent piping in sizes indicated, but not smaller than required by plumbing code.
 - 4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
 - 5. Section 221319 "Sanitary Waste Piping Specialties."
 - 6. Equipment: Connect waste piping as indicated.
- D. Make connections according to the following unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.5 IDENTIFICATION

- A. Identify exposed sanitary waste and vent piping.
- B. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.6 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary waste and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
 - 1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.
 - a. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 - 2. Leave uncovered and unconcealed new, altered, extended, or replaced waste and vent piping until it has been tested and approved.
 - a. Expose work that was covered or concealed before it was tested.
 - 3. Roughing-in Plumbing Test Procedure: Test waste and vent piping except outside leaders on completion of roughing-in.
 - a. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water.
 - b. From 15 minutes before inspection starts to completion of inspection, water level must not drop.
 - c. Inspect joints for leaks.
 - 4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight.
 - a. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg.
 - b. Use U-tube or manometer inserted in trap of water closet to measure this pressure.
 - c. Air pressure must remain constant without introducing additional air throughout period of inspection.
 - d. Inspect plumbing fixture connections for gas and water leaks.
 - 5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 - 6. Prepare reports for tests and required corrective action.

3.7 CLEANING AND PROTECTION

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect sanitary waste and vent piping during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.
- D. Repair damage to adjacent materials caused by waste and vent piping installation.

3.8 PIPING SCHEDULE

- A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.
- B. Aboveground, soil and waste piping NPS 4 and smaller shall be the following:
 - 1. Match existing waste piping and fittings; gaskets..

END OF SECTION 22 13 16

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. Floor drains.

1.3 DEFINITIONS

- A. FRP: Fiberglass-reinforced plastic.
- B. HDPE: High-density polyethylene plastic.
- C. PE: Polyethylene plastic.
- D. PP: Polypropylene plastic.
- E. PVC: Polyvinyl chloride plastic.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Floor drains.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For drainage piping specialties to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic sanitary piping specialty components.

PART 2 - PRODUCTS

2.1 FLOOR DRAINS

A. Cast-Iron Floor Drains:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Jay R. Smith Mfg. Co.
 - b. Josam Company.
 - c. Watts; a Watts Water Technologies company.
 - d. Wade
2. Standard: ASME A112.6.3.
3. Pattern: Floor drain.
4. Body Material: Gray iron.
5. Double Drainage Flange: Required.
6. Clamping Device: Reversible clamping collar.
7. Outlet: Bottom.
8. Coating on Interior and Exposed Exterior Surfaces: Acid-resistant enamel.
9. Sediment Bucket: Not required.
10. Top or Strainer Material: Nickel bronze or Stainless steel.
11. Top of Body and Strainer Finish: Nickel bronze.
12. Top Shape: Round.
13. Top Loading Classification: Heavy Duty.
14. Funnel: Not required.
15. Inlet Fitting: Not required.
16. Trap Material: Cast iron.

PART 3 - EXECUTION

3.1 INSTALLATION

- #### A. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
1. Position floor drains for easy access and maintenance.
 2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
 - a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.
 3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
 4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.

- B. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.
 - 1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
 - 2. Size: Same as floor drain inlet.

3.2 CONNECTIONS

- A. Install piping adjacent to equipment to allow service and maintenance.

3.3 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.4 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 22 13 19

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. Sink faucets.
 - 2. Supply fittings.
 - 3. Waste fittings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sinks.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Counter cutout templates for mounting of counter-mounted lavatories.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sinks to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Faucet Washers and O-Rings: Equal to 10 percent of amount of each type and size installed.
 - 2. Faucet Cartridges and O-Rings: Equal to 5 percent of amount of each type and size installed.

PART 2 - PRODUCTS

2.1 SINK FAUCETS

- A. NSF Standard: Comply with NSF/ANSI 61 Annex G, "Drinking Water System Components - Health Effects," for faucet-spout materials that will be in contact with potable water.
- B. Sink Faucets: Infrared sensor faucet.
 - 1. General-Duty, Solid-Brass Faucets.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Chicago Faucets; Geberit Company.
 - 2) Moen Incorporated.
 - 3) Sloan.
 - 2. Standard: ASME A112.18.1/CSA B125.1.
 - 3. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and sink receptor.
 - 4. Body Type: Centerset.
 - 5. Body Material: General-duty, solid brass.
 - 6. Finish: Chrome plated.
 - 7. Maximum Flow Rate: 2.2 gpm.
 - 8. Handle(s): Not applicable.
 - 9. Mounting Type: Deck, exposed.
 - 10. Spout Type: Rigid gooseneck.
 - 11. Vacuum Breaker: Not required for hose outlet.
 - 12. Spout Outlet: Aerator.

2.2 SUPPLY FITTINGS

- A. NSF Standard: Comply with NSF/ANSI 61 Annex G, "Drinking Water System Components - Health Effects," for supply-fitting materials that will be in contact with potable water.
- B. Standard: ASME A112.18.1/CSA B125.1.
- C. Supply Piping: Chrome-plated brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated brass or stainless-steel wall flange.
- D. Supply Stops: Chrome-plated brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.
- E. Operation: Loose key.
- F. Risers:
 - 1. Chrome-plated, rigid-copper pipe.

2.3 WASTE FITTINGS

- A. Standard: ASME A112.18.2/CSA B125.2.
- B. Drain: Grid type with NPS 1-1/2 offset and straight tailpiece.
- C. Trap:
 - 1. Size: NPS 1-1/2.
 - 2. Material: Chrome-plated, two-piece, cast-brass trap and swivel elbow with 0.032-inch-thick brass tube to wall; and chrome-plated brass or steel wall flange.
 - 3. Material: Stainless-steel, two-piece trap and swivel elbow with 0.012-inch-thick stainless-steel tube to wall; and stainless-steel wall flange.

2.4 GROUT

- A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before sink installation.
- B. Examine walls, floors, and counters for suitable conditions where sinks will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install sinks level and plumb according to roughing-in drawings.
- B. Install water-supply piping with stop on each supply to each sink faucet.
 - 1. Install stops in locations where they can be easily reached for operation.
- C. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

- D. Seal joints between sinks and counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."
- E. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible sinks. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

3.3 CONNECTIONS

- A. Connect sinks with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."
- C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

- A. Operate and adjust sinks and controls. Replace damaged and malfunctioning sinks, fittings, and controls.
- B. Adjust water pressure at faucets to produce proper flow.

3.5 CLEANING AND PROTECTION

- A. After completing installation of sinks, inspect and repair damaged finishes.
- B. Clean sinks, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.
- C. Provide protective covering for installed sinks and fittings.
- D. Do not allow use of sinks for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 42 16.16

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Combination units.
 - 2. Water-tempering equipment.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Diagram power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control test reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 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. ANSI Standard: Comply with ANSI Z358.1, "Emergency Eyewash and Shower Equipment."
- C. NSF Standard: Comply with NSF 61 Annex G, "Drinking Water System Components - Health Effects," for fixture materials that will be in contact with potable water.
- D. Regulatory Requirements: Comply with requirements in ICC/ANSI A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act"; for plumbing fixtures for people with disabilities.

PART 2 - PRODUCTS

2.1 COMBINATION UNITS

- A. Standard, Plumbed Emergency Shower with Eyewash Combination Units:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bradley Corporation.
 - b. Haws Corporation.
2. Piping:
 - a. Material: Chrome-plated brass or stainless steel.
 - b. Unit Supply: NPS 1-1/4 minimum.
 - c. Unit Drain: Outlet at back or side near bottom.
3. Shower:
 - a. Capacity: Not less than 20 gpm for at least 15 minutes.
 - b. Supply Piping: NPS 1 with flow regulator and stay-open control valve.
 - c. Control-Valve Actuator: Pull rod.
 - d. Shower Head: 8-inch-minimum diameter, stainless steel.
 - e. Mounting: Pedestal.
4. Eyewash Unit:
 - a. Capacity: Not less than 0.4 gpm for at least 15 minutes.
 - b. Supply Piping: NPS 1/2 with flow regulator and stay-open control valve.
 - c. Control-Valve Actuator: Paddle.
 - d. Spray-Head Assembly: Two receptor-mounted spray heads.
 - e. Receptor: stainless-steel bowl.
 - f. Mounting: Surface mounted stainless steel cabinet enclosure.
 - g. Drench-Hose Option: May be provided instead of eyewash unit.
 - 1) Capacity: Not less than 0.4 gpm for at least 15 minutes.
 - 2) Drench Hose: Hand-held spray head with squeeze-handle actuator and hose.
 - 3) Mounting: Bracket on shower pedestal.

2.2 WATER-TEMPERING EQUIPMENT

A. Hot- and Cold-Water, Water-Tempering Equipment, <Insert drawing designation>:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bradley Corporation.
 - b. Haws Corporation.
 - c. Leonard Valve Company.
 - d. Powers.
 - e. Watts; a Watts Water Technologies company.
2. Description: Factory-fabricated equipment with thermostatic mixing valve.
 - a. Thermostatic Mixing Valve: Designed to provide 85 deg F tepid, potable water at emergency plumbing fixtures, to maintain temperature at plus or minus 5 deg F throughout

required 15-minute test period, and in case of unit failure to continue cold-water flow, with union connections, controls, metal piping, and corrosion-resistant enclosure.

- b. Supply Connections: For hot and cold water.

2.3 SOURCE QUALITY CONTROL

- A. Certify performance of emergency plumbing fixtures by independent testing organization acceptable to authorities having jurisdiction.

PART 3 - EXECUTION

3.1 EMERGENCY PLUMBING FIXTURE INSTALLATION

- A. Assemble emergency plumbing fixture piping, fittings, control valves, and other components.
- B. Install fixtures level and plumb.
- C. Fasten fixtures to substrate.
- D. Install shutoff valves in water-supply piping to fixtures. Use ball or gate valve if specific type valve is not indicated. Install valves chained or locked in open position if permitted. Install valves in locations where they can easily be reached for operation. Comply with requirements for valves specified in Section 220523.12 "Ball Valves for Plumbing Piping".
- E. Install dielectric fitting in supply piping to emergency equipment if piping and equipment connections are made of different metals. Comply with requirements for dielectric fittings specified in Section 221116 "Domestic Water Piping."
- F. Install trap and waste piping on drain outlet of emergency equipment receptors that are indicated to be directly connected to drainage system. Retain first paragraph below if emergency equipment has an indirect waste connection.
- G. Install indirect waste piping on drain outlet of emergency equipment receptors that are indicated to be indirectly connected to drainage system.
- H. Install escutcheons on piping wall and ceiling penetrations in exposed, finished locations.

3.2 CONNECTIONS

- A. Connect cold-water-supply piping to plumbed emergency plumbing fixtures not having water-tempering equipment.
- B. Connect hot- and cold-water-supply piping to hot- and cold-water, water-tempering equipment. Connect output from water-tempering equipment to emergency plumbing fixtures.
- C. Directly connect emergency plumbing fixture receptors with trapped drain outlet to sanitary waste and vent piping.

- D. Indirectly connect emergency plumbing fixture receptors without trapped drain outlet to sanitary waste or storm drainage piping.
- E. Where installing piping adjacent to emergency plumbing fixtures, allow space for service and maintenance of fixtures.

3.3 IDENTIFICATION

- A. Install equipment nameplates or equipment markers on emergency plumbing fixtures and equipment and equipment signs on water-tempering equipment.

3.4 FIELD QUALITY CONTROL

- A. Mechanical-Component Testing: After plumbing connections have been made, test for compliance with requirements. Verify ability to achieve indicated capacities.
- B. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection.
 - 2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Emergency plumbing fixtures and water-tempering equipment will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.5 ADJUSTING

- A. Adjust or replace fixture flow regulators for proper flow.
- B. Adjust equipment temperature settings.

END OF SECTION 22 45 00

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Single-wall piping.

1.2 ACTION SUBMITTALS

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

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, and coordinated with each other, using input from installers of the items involved:
- B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Single-Wall Piping Pressure Rating: 5-psig air test pressure.
- B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design seismic restraints for aboveground piping.

2.2 SINGLE-WALL PIPE AND FITTINGS

- A. PP Drainage Pipe and Fittings: ASTM F 1412 pipe extruded and drainage-pattern fittings molded, with Schedule 40 dimensions and with fire-retardant additive complying with ASTM D 4101; with fusion joint ends.
 - 1. Exception: Pipe and fittings made from PP resin without fire-retardant additive may be used for underground installation.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Georg Fischer Inc.
 - b. Orion Fittings; a Watts Water Technologies company.
- B. PVC Drainage Pipe and Fittings: ASTM D 2665 pipe and drainage-pattern fittings.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Chemical-Waste Piping Inside the Building:

1. Install piping next to equipment, accessories, and specialties to allow service and maintenance.
2. Transition and special fittings with pressure ratings at least equal to piping pressure rating may be used unless otherwise indicated.
3. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
4. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
5. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
6. Install piping at indicated slopes.
7. Install piping free of sags and bends.
8. Install fittings for changes in direction and branch connections.
9. Verify final equipment locations for roughing-in.
10. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.2 JOINT CONSTRUCTION

A. Chemical-Waste Piping Inside the Building:

1. Plastic-Piping Fusion Joints: Make PP drainage-piping joints according to ASTM F 1290.
2. Dissimilar-Material Piping Joints: Make joints using adapters compatible with both system materials.

3.3 HANGER AND SUPPORT INSTALLATION

A. Pipe sizes in this article refer to aboveground single-wall piping.

B. Comply with requirements in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment" for pipe hanger and support devices. Install the following:

1. Vertical Piping: MSS Type 8 or MSS Type 42 riser clamps.
2. Individual, Straight, Horizontal Piping Runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet, if Indicated: MSS Type 49, spring cushion rolls.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 4. Base of Vertical Piping: MSS Type 52 spring hangers.
- C. Comply with requirements in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment" for installation of supports.
- D. Support horizontal piping and tubing within 12 inches of each fitting and coupling.
- E. Support vertical piping and tubing at base and at each floor.
- F. Rod diameter may be reduced one size for double-rod hangers, to minimum of 3/8 inch.
- G. Install vinyl-coated hangers for PP piping with the following maximum horizontal spacing and minimum rod diameters:
1. NPS 2: 33 inches with 3/8-inch rod.
 2. NPS 2-1/2 and NPS 3: 42 inches with 1/2-inch rod.
 3. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
 4. NPS 6: 48 inches with 3/4-inch rod.
 5. NPS 8: 48 inches with 7/8-inch rod.
- H. Install supports for vertical PP piping every 72 inches.

3.4 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Make connections to existing piping, so finished Work complies as nearly as practical with requirements specified for new Work.
- C. Protect existing piping to prevent concrete or debris from entering while making connections. Remove debris or other extraneous material that may accumulate.
- D. Install piping adjacent to equipment to allow service and maintenance.

3.5 LABELING AND IDENTIFICATION

- A. Comply with requirements in Section 220553 "Identification for Plumbing Piping and Equipment" for labeling of equipment and piping.

3.6 FIELD QUALITY CONTROL

- A. Chemical-waste piping will be considered defective if it does not pass tests and inspections.
- B. Prepare test and inspection reports.

3.7 CLEANING

- A. Use procedures prescribed by authorities having jurisdiction or, if not prescribed, use procedures described below:
 - 1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
 - 2. Clean piping by flushing with potable water.

3.8 PIPING SCHEDULE

- A. Transition and special fittings with pressure ratings at least equal to piping pressure rating may be used in applications below unless otherwise indicated.
- B. Single-Wall, Chemical-Waste Sewerage Piping: Use the following piping materials for each size range:
 - 1. NPS 1-1/2 to NPS 4: PP drainage pipe and fittings and fusion joints.

END OF SECTION 22 66 00

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Balancing Air Systems:

1.2 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. NEBB: National Environmental Balancing Bureau.
- C. TAB: Testing, adjusting, and balancing.
- D. TABB: Testing, Adjusting, and Balancing Bureau.
- E. TAB Specialist: An independent entity meeting qualifications to perform TAB work.
- F. TDH: Total dynamic head.

1.3 ACTION SUBMITTALS

- A. TAB Report: Documentation indicating that Work complies with ASHRAE/IES 90.1, Section 6.7.2.3 - "System Balancing."

1.4 INFORMATIONAL SUBMITTALS

- A. Certified TAB reports.

1.5 QUALITY ASSURANCE

- A. TAB Specialists Qualifications: Certified by AABC.
 - 1. TAB Field Supervisor: Employee of the TAB specialist and certified by AABC.
 - 2. TAB Technician: Employee of the TAB specialist and certified by AABC as a TAB technician.
- B. TAB Specialists Qualifications: Certified by NEBB.
 - 1. TAB Field Supervisor: Employee of the TAB specialist and certified by NEBB.
 - 2. TAB Technician: Employee of the TAB specialist and certified by NEBB as a TAB technician.
- C. Instrumentation Type, Quantity, Accuracy, and Calibration: Comply with requirements in ASHRAE 111, Section 4, "Instrumentation."

- D. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6.7.2.3 - "System Balancing."

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.
- B. Examine installed systems for balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine equipment performance data including fan and pump curves.
 - 1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
 - 2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- G. Examine test reports specified in individual system and equipment Sections.
- H. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.
- I. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.
- J. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- K. Examine operating safety interlocks and controls on HVAC equipment.
- L. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

- A. Prepare a TAB plan that includes strategies and step-by-step procedures for balancing the systems.
- B. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:
 - 1. Airside:
 - a. Duct systems are complete with terminals installed.
 - b. Dampers are open and functional.
 - c. Clean filters are installed.
 - d. Fans are operating, free of vibration, and rotating in correct direction.
 - e. Variable-frequency controllers' startup is complete and safeties are verified.
 - f. Automatic temperature-control systems are operational.
 - g. Ceilings are installed.
 - h. Windows and doors are installed.
 - i. Suitable access to balancing devices and equipment is provided.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" ASHRAE 111 NEBB's, "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" , and SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section.
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
 - 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
 - 2. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 233300 "Air Duct Accessories."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Cross-check the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. For variable-air-volume systems, develop a plan to simulate diversity.
- D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

- E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- G. Verify that motor starters are equipped with properly sized thermal protection.
- H. Check dampers for proper position to achieve desired airflow path.
- I. Check for airflow blockages.
- J. Check condensate drains for proper connections and functioning.
- K. Check for proper sealing of air-handling-unit components.
- L. Verify that air duct system is sealed as specified in Section 233113 "Metal Ducts."

3.5 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

- A. Adjust the variable-air-volume systems as follows:
 - 1. Verify that the system static pressure sensor is located two-thirds of the distance down the duct from the fan discharge.
 - 2. Verify that the system is under static pressure control.
 - 3. Select the terminal unit that is most critical to the supply-fan airflow. Measure inlet static pressure, and adjust system static pressure control set point so the entering static pressure for the critical terminal unit is not less than the sum of the terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
 - 4. Calibrate and balance each terminal unit for maximum and minimum design airflow as follows:
 - a. Adjust controls so that terminal is calling for maximum airflow. Some controllers require starting with minimum airflow. Verify calibration procedure for specific project.
 - b. Measure airflow and adjust calibration factor as required for design maximum airflow. Record calibration factor.
 - c. When maximum airflow is correct, balance the air outlets downstream from terminal units.
 - d. Adjust controls so that terminal is calling for minimum airflow.
 - e. Measure airflow and adjust calibration factor as required for design minimum airflow. Record calibration factor. If no minimum calibration is available, note any deviation from design airflow.
 - f. When in full cooling or full heating, ensure that there is no mixing of hot-deck and cold-deck airstreams unless so designed.
 - g. On constant volume terminals, in critical areas where room pressure is to be maintained, verify that the airflow remains constant over the full range of full cooling to full heating. Note any deviation from design airflow or room pressure.
 - 5. After terminals have been calibrated and balanced, test and adjust system for total airflow. Adjust fans to deliver total design airflows within the maximum allowable fan speed listed by fan manufacturer.

- a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
 - b. Set terminals for maximum airflow. If system design includes diversity, adjust terminals for maximum and minimum airflow so that connected total matches fan selection and simulates actual load in the building.
 - c. Where duct conditions allow, measure airflow by Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses to obtain total airflow.
 - d. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
 - e. If a reliable Pitot-tube traverse or coil traverse is not possible, measure airflow at terminals and calculate the total airflow.
6. Measure fan static pressures as follows:
- a. Measure static pressure directly at the fan outlet or through the flexible connection.
 - b. Measure static pressure directly at the fan inlet or through the flexible connection.
 - c. Measure static pressure across each component that makes up the air-handling system.
 - d. Report any artificial loading of filters at the time static pressures are measured.
7. Set final return and outside airflow to the fan while operating at maximum return airflow and minimum outdoor airflow.
- a. Balance the return-air ducts and inlets the same as described for constant-volume air systems.
 - b. Verify that terminal units are meeting design airflow under system maximum flow.
8. Re-measure the inlet static pressure at the most critical terminal unit and adjust the system static pressure set point to the most energy-efficient set point to maintain the optimum system static pressure. Record set point and give to controls contractor.
9. Verify final system conditions as follows:
- a. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to match design if necessary.
 - b. Re-measure and confirm that total airflow is within design.
 - c. Re-measure final fan operating data, rpms, volts, amps, and static profile.
 - d. Mark final settings.
 - e. Test system in economizer mode. Verify proper operation and adjust if necessary. Measure and record all operating data.
 - f. Verify tracking between supply and return fans.

3.6 TOLERANCES

- A. Set HVAC system's airflow rates and water flow rates within the following tolerances:
 1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 5 percent.
- B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.7 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
 2. Include a list of instruments used for procedures, along with proof of calibration.
 3. Certify validity and accuracy of field data.
- B. Final Report Contents: In addition to certified field-report data, include the following:
1. Field test reports prepared by system and equipment installers.
 2. Other information relative to equipment performance; do not include Shop Drawings and Product Data.
- C. General Report Data: In addition to form titles and entries, include the following data:
1. Title page.
 2. Name and address of the TAB specialist.
 3. Project name.
 4. Project location.
 5. Architect's name and address.
 6. Engineer's name and address.
 7. Contractor's name and address.
 8. Report date.
 9. Signature of TAB supervisor who certifies the report.
 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 11. Summary of contents including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
 12. Nomenclature sheets for each item of equipment.
 13. Data for terminal units, including manufacturer's name, type, size, and fittings.
 14. Notes to explain why certain final data in the body of reports vary from indicated values.
- D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outdoor, supply, return, and exhaust airflows..
 2. Duct, outlet, and inlet sizes.
 3. Terminal units.
 4. Balancing stations.
 5. Position of balancing devices.
- E. Air-Terminal-Device Reports:
1. Unit Data:

- a. System and air-handling unit identification.
 - b. Location and zone.
 - c. Apparatus used for test.
 - d. Area served.
 - e. Make.
 - f. Number from system diagram.
 - g. Type and model number.
 - h. Size.
 - i. Effective area in sq. ft..
2. Test Data (Indicated and Actual Values):
- a. Airflow rate in cfm.
 - b. Air velocity in fpm.
 - c. Preliminary airflow rate as needed in cfm.
 - d. Preliminary velocity as needed in fpm.
 - e. Final airflow rate in cfm.
 - f. Final velocity in fpm.
 - g. Space temperature in deg F.

3.8 VERIFICATION OF TAB REPORT

- A. The TAB specialist's test and balance engineer shall conduct the inspection in the presence of Owner.
- B. Owner shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
- C. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
- D. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.
- E. If TAB work fails, proceed as follows:
 1. TAB specialists shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
 2. If the second final inspection also fails, Owner may contract the services of another TAB specialist to complete TAB work according to the Contract Documents and deduct the cost of the services from the original TAB specialist's final payment.
 3. If the second verification also fails, Owner or Architect may contact AABC Headquarters regarding the AABC National Performance Guaranty.
- F. Prepare test and inspection reports.

3.9 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.
- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 23 05 93

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Round ducts and fittings.
2. Sheet metal materials.
3. Sealants and gaskets.
4. Hangers and supports.

B. Related Sections:

1. Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
2. Section 233300 "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.
- B. Structural Performance: Duct hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and ASCE/SEI 7.
- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ANSI/ASHRAE 62.1.

1.3 ACTION SUBMITTALS

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

B. Shop Drawings:

1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
2. Factory- and shop-fabricated ducts and fittings.
3. Duct layout indicating sizes, configuration, and static-pressure classes.
4. Elevation of top of ducts.
5. Dimensions of main duct runs from building grid lines.
6. Fittings.
7. Reinforcement and spacing.
8. Seam and joint construction.

9. Penetrations through fire-rated and other partitions.
10. Equipment installation based on equipment being used on Project.
11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
12. Hangers and supports, including methods for duct and building attachment and vibration isolation.

C. Delegated-Design Submittal:

1. Sheet metal thicknesses.
2. Joint and seam construction and sealing.
3. Reinforcement details and spacing.
4. Materials, fabrication, assembly, and spacing of hangers and supports.
5. Design Calculations: Calculations for selecting hangers and supports.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.
3. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

- B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-up."

- C. ASHRAE/IES Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

PART 2 - PRODUCTS

2.1 ROUND DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ductmate Industries, Inc.
 - b. Elgen Manufacturing.
 - c. Linx Industries (formerly Lindab).
 - d. McGill AirFlow LLC.
 - e. MKT Metal Manufacturing.
 - f. SEMCO LLC.
 - g. Sheet Metal Connectors, Inc.

- h. Spiral Manufacturing Co., Inc.
 - i. Stamped Fittings Inc.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 1. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 1. Fabricate round ducts larger Than 90 inches in diameter with butt-welded longitudinal seams.
- D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: G60.
 - 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- C. Carbon-Steel Sheets: Comply with ASTM A 1008/A 1008M, with oiled, matte finish for exposed ducts.
- D. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
 - 1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.
- E. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

C. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. 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."

D. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

E. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.4 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.

- E. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
- F. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- G. Trapeze and Riser Supports:

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- I. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
- J. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

3.2 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.

- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- B. Seal ducts at a minimum to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":
 - 1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 2. Conditioned Space, Exhaust Ducts: Seal Class B.

3.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 - 1. Where practical, install concrete inserts before placing concrete.
 - 2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 - 3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
 - 4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
 - 5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.
- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Section 233300 "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 DUCT CLEANING

- A. Clean new duct system(s) before testing, adjusting, and balancing.
- B. Use service openings for entry and inspection.
 - 1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Section 233300 "Air Duct Accessories" for access panels and doors.
 - 2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
 - 3. Remove and reinstall ceiling to gain access during the cleaning process.
- C. Particulate Collection and Odor Control:
 - 1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
 - 2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.
- D. Mechanical Cleaning Methodology:
 - 1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
 - 2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
 - 3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
 - 4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
 - 5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
 - 6. Provide drainage and cleanup for wash-down procedures.
 - 7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

3.7 START UP

- A. Air Balance: Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

3.8 DUCT SCHEDULE

A. Exhaust Ducts:

1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:

- a. Pressure Class: Negative 3-inch wg.
- b. Minimum SMACNA Seal Class: C.
- c. SMACNA Leakage Class for Round and Flat Oval: 6.

B. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."

a. Velocity 1000 fpm or Lower:

- 1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
- 2) Mitered Type RE 4 without vanes.

b. Velocity 1000 to 1500 fpm:

- 1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
- 2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
- 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

c. Velocity 1500 fpm or Higher:

- 1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
- 2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
- 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

2. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."

a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.

- 1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
- 2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.

- 3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
 - 4) Radius-to Diameter Ratio: 1.5.
- b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.

END OF SECTION 23 31 13

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Manual volume dampers.
 - 2. Flexible connectors.
 - 3. Duct accessory hardware.

1.2 ACTION SUBMITTALS

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

1.3 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

2.2 MATERIALS

- A. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: G60.
- B. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- C. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 MANUAL VOLUME DAMPERS

A. Standard, Steel, Manual Volume Dampers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Louvers and Dampers, Inc..
 - b. Nailor Industries Inc.
 - c. Ruskin Company.
2. Standard leakage rating.
3. Suitable for horizontal or vertical applications.
4. Frames:
 - a. Frame: Hat-shaped, 0.094-inch-thick, galvanized sheet steel.
 - b. Mitered and welded corners.
 - c. Flanges for attaching to walls and flangeless frames for installing in ducts.
5. Blades:
 - a. Multiple or single blade.
 - b. Parallel- or opposed-blade design.
 - c. Stiffen damper blades for stability.
 - d. Galvanized steel, 0.064 inch thick.
6. Blade Axles: Galvanized steel.
7. Bearings:
 - a. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
8. Tie Bars and Brackets: Galvanized steel.

2.4 FLEXIBLE CONNECTORS

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

1. CL WARD & Family Inc.
2. Ductmate Industries, Inc.
3. Duro Dyne Inc.
4. Elgen Manufacturing.
5. Hardcast, Inc.
6. JP Lamborn Co.
7. Ventfabrics, Inc.
8. Ward Industries; a brand of Hart & Cooley, Inc.

B. Materials: Flame-retardant or noncombustible fabrics.

- C. Coatings and Adhesives: Comply with UL 181, Class 1.
- D. Metal-Edged Connectors: Factory fabricated with a fabric strip[3-1/2 inches wide attached to two strips of 2-3/4-inch-wide, 0.028-inch-thick, galvanized sheet steel or 0.032-inch-thick aluminum sheets. Provide metal compatible with connected ducts.
- E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
 - 1. Minimum Weight: 26 oz./sq. yd..
 - 2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
 - 3. Service Temperature: Minus 40 to plus 200 deg F.

2.5 DUCT ACCESSORY HARDWARE

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.
- B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- C. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
 - 1. Install steel volume dampers in steel ducts.
- D. Set dampers to fully open position before testing, adjusting, and balancing.
- E. Install test holes at fan inlets and outlets and elsewhere as indicated.
- F. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
- G. Install flexible connectors to connect ducts to equipment.
- H. Connect flexible ducts to metal ducts with draw bands.

- I. Install duct test holes where required for testing and balancing purposes.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Operate dampers to verify full range of movement.

END OF SECTION 23 33 00

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Electrical contractor to provide:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.

1.2 RELATED DOCUMENTS

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

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA or an NRTL.
 - 1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Alpha Wire Company.
 - 2. Belden Inc.
 - 3. Cerro Wire LLC.
 - 4. Cooper Industries, Inc.
 - 5. Encore Wire Corporation.
 - 6. General Cable Technologies Corporation.
 - 7. General Cable; General Cable Corporation.
 - 8. Senator Wire & Cable Company.

9. Service Wire Co.
10. Southwire Company.
11. Thomas & Betts Corporation, A Member of the ABB Group.

- 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/THWN-2.

2.2 CONNECTORS AND SPLICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. 3M.
 2. AFC Cable Systems; a part of Atkore International.
 3. Gardner Bender.
 4. Hubbell Power Systems, Inc.
 5. Ideal Industries, Inc.
 6. ILSCO.
 7. NSi Industries LLC.
 8. O-Z/Gedney; a brand of Emerson Industrial Automation.
 9. Tyco Electronics Corp.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 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: Copper Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger, which shall be extra flexible stranded.

3.2 CONDUCTOR INSULATION AND WIRING METHODS

- A. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN/THWN-2, single conductors in raceway.

- B. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.
- C. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors 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 exposed cables 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."

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. 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.
 - 1. Use oxide inhibitor in each splice, termination, and tap for aluminum conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

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."
- B. Cables will be considered defective if they do not pass tests and inspections.

END OF SECTION 26 05 19

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Electrical contractor to provide:
 - 1. Equipment grounding conductor.

1.2 RELATED DOCUMENTS

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

1.3 ACTION SUBMITTALS

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

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 & Grounding.
 - 7. ILSCO.
 - 8. O-Z/Gedney; a brand of Emerson Industrial Automation.
 - 9. Robbins Lightning, Inc.
 - 10. Siemens Power Transmission & Distribution, Inc.
 - 11. Thomas & Betts Corporation, A Member of the ABB Group.

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

2.3 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

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 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 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.
 - 6. Flexible raceway runs.
 - 7. Armored and metal-clad cable runs.
- C. 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.

2.6 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

END OF SECTION 26 05 26

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Electrical contractor to provide:
 - 1. Hangers and supports for electrical equipment and systems.

1.2 RELATED DOCUMENTS

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

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - a. Hangers.
 - b. Steel slotted support systems.
 - c. Trapeze hangers.
 - d. Clamps.
 - e. Sockets.
 - f. Eye nuts.
 - g. Saddles.
 - h. Brackets.
 - 2. Include rated capacities and furnished specialties and accessories.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Suspended ceiling components.
 - 2. Structural members to which hangers and supports will be attached.
 - 3. Size and location of initial access modules for acoustical tile.
 - 4. Items penetrating finished ceiling, including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - f. Projectors.

- B. Seismic Qualification Certificates: For hangers and supports for electrical equipment and systems, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

C. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M.
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M.
 - 2. AWS D1.2/D1.2M.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Hangers and supports shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the supported equipment and systems will remain in place without separation of any parts when subjected to the seismic forces specified and the system will be fully operational after the seismic event."
 - 2. Component Importance Factor: 1.5.
- B. 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 Rating: Class 1.
 - 2. Self-extinguishing according to ASTM D 635.

2.2 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; a part of Atkore International.
 - b. B-line, an Eaton business.
 - c. ERICO International Corporation.
 - d. Flex-Strut Inc.
 - e. GS Metals Corp.
 - f. G-Strut.
 - g. Haydon Corporation.

- h. Metal Ties Innovation.
 - i. Thomas & Betts Corporation, A Member of the ABB Group.
 - j. Unistrut; Part of Atkore International.
 - k. Wesanco, Inc.
 2. Material: Galvanized steel.
 3. Channel Width: 1-5/8 inches.
 4. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 5. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 6. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 7. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
 8. Channel Dimensions: Selected for applicable load criteria.
- B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.
- 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.
 - 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 where used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) B-line, an Eaton business.
 - 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 are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are 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.

2.3 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 unless requirements in this Section are stricter.
- B. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- C. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMTs, IMCs, and RMCs as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- D. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 1. Secure raceways and cables to these supports with two-bolt conduit clamps.
- E. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

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

- B. Raceway Support Methods: In addition to methods described in NECA 1, EMTs, IMCs, and RMCs may be supported by openings through structure members, according to NFPA 70.
- 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 SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
 - 7. To Light Steel: Sheet metal screws.
 - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate[by means that comply with seismic-restraint strength and anchorage requirements].
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

3.4 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touchup: Comply with requirements in Section 099123 "Interior Painting" for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

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

END OF SECTION 26 05 29

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Metal conduits and fittings.
 - 2. Boxes, enclosures, and cabinets.

1.2 RELATED DOCUMENTS

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

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:
 - 1. Structural members in paths of conduit groups with common supports.
 - 2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.
- B. Seismic Qualification Data: Certificates, for enclosures, cabinets, and conduit racks and their mounting provisions, including those for internal components, from manufacturer.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

- A. Metal Conduit:
 - 1. 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.
 - 2. GRC: Comply with ANSI C80.1 and UL 6.
 - 3. ARC: Comply with ANSI C80.5 and UL 6A.
 - 4. IMC: Comply with ANSI C80.6 and UL 1242.
 - a. Comply with NEMA RN 1.

- b. Coating Thickness: 0.040 inch, minimum.
 5. EMT: Comply with ANSI C80.3 and UL 797.
 6. FMC: Comply with UL 1; zinc-coated steel.
 7. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- B. Conduit Color
1. Manufacturers: Setmark Semi-rigid plastic identification markers or equal.
 2. Spacing: 20 feet on center.
 3. Identify all conduit using coded identifying bands.
 - a. Spacing:
 - 1) Minimum every 20'.
 - 2) Within 1' of each junction box.
 4. For 208/120V:
 - a. A-Phase – Black.
 - b. B-Phase – Red.
 - c. C-Phase – Blue.
 - d. Neutral – White.
 5. For 277/408V:
 - a. A-Phase – Brown.
 - b. B-Phase – Orange.
 - c. C-Phase – Yellow.
 - d. Neutral – Gray.
 6. Conductor colors shall apply to all conductor sizes and apply to entire insulation. No exceptions for larger cables. Identifying colored tape shall not be allowed. Other colors allowed for branch circuits and switch leg conductors.
 7. Fire Alarm System: Red
- C. Metal Fittings: Comply with NEMA FB 1 and UL 514B.
1. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 2. Fittings, General: Listed and labeled for type of conduit, location, and use.
 3. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
 4. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: Compression.
- D. 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 BOXES, ENCLOSURES, AND CABINETS

- A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- D. Metal Floor Boxes:
 - 1. Material: Cast metal.
 - 2. Type: Fully adjustable.
 - 3. Shape: Rectangular.
 - 4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- E. 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.
- F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- G. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.
- H. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- I. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.
- J. Gangable boxes are prohibited.
- K. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Nonmetallic Enclosures: Plastic.
 - 3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.
- L. Cabinets:
 - 1. NEMA 250, Type 1 galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 - 2. Hinged door in front cover with flush latch and concealed hinge.
 - 3. Key latch to match panelboards.
 - 4. Metal barriers to separate wiring of different systems and voltage.
 - 5. Accessory feet where required for freestanding equipment.
 - 6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Indoors: Apply raceway products as specified below unless otherwise indicated.
 - 1. Exposed, Not Subject to Physical Damage: EMT. (Do not use as surface raceway).
 - 2. Exposed, Not Subject to Severe Physical Damage: EMT. (Do not use as surface raceway).
 - 3. Exposed and Subject to Severe Physical Damage: IMC.
 - 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.
- B. Minimum Raceway Size: 3/4-inch trade size.
- C. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. 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 compression or 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.
- D. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
- E. Install surface raceways only where indicated on Drawings.

3.2 INSTALLATION

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- B. 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.
- C. Do not install raceways or electrical items on any "explosion-relief" walls or rotating equipment.
- D. Do not fasten conduits onto the bottom side of a metal deck roof.
- E. 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.
- F. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- G. Arrange stub-ups so curved portions of bends are not visible above finished slab.

- H. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- I. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- J. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- K. Support conduit within 12 inches of enclosures to which attached.
- L. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Arrange raceways to keep a minimum of 1 inch.
 - 4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
- M. 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.
- N. Threaded Conduit Joints: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- O. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- P. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- Q. 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.
- R. 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.
- S. 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.

- T. 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. Conduit extending from interior to exterior of building.
 - 4. Conduit extending into pressurized duct and equipment.
 - 5. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
 - 6. Where otherwise required by NFPA 70.
 - U. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches] of flexible conduit for recessed equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations subject to severe physical damage.
 - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
 - V. 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.
 - W. 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 the box and cover plate or the supported equipment and box.
 - X. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
 - Y. Locate boxes so that cover or plate will not span different building finishes.
 - Z. 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.
 - AA. Fasten junction and pull boxes to or support from building structure. Do not support boxes by
- 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."

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 26 05 33

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Electrical contractor to provide:
 - 1. Sleeves for raceway and cable penetration of non-fire-rated construction walls and floors.

1.2 RELATED DOCUMENTS

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

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Wall Sleeves:
 - 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.
- B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.
- C. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.
- D. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.
- E. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.
- F. Sleeves for Rectangular Openings:

1. Material: Galvanized sheet steel.
2. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches and with no side larger than 16 inches, thickness shall be 0.052 inch.
 - b. For sleeve cross-section rectangle perimeter 50 inches or more and one or more sides larger than 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
1. 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:
 - a. Advance Products & Systems, Inc.
 - b. CALPICO, Inc.
 - c. Metraflex Company (The).
 - d. Pipeline Seal and Insulator, Inc.
 - e. Proco Products, Inc.
 2. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 3. Pressure Plates: Carbon steel.
 4. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating of length required to secure pressure plates to sealing elements.

2.3 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.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. HOLDRITE.

2.4 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.

2.5 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 content of 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.
- 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. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 3. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed or unless seismic criteria require different clearance.
 - 4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
 - 5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches above finished floor level. Install sleeves during erection of floors.
- D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:
 - 1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.

2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.
- B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.3 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 26 05 44

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Electrical contractor to provide:
 - 1. Receptacles, receptacles with integral GFCI, and associated device plates.
 - 2. Weather-resistant receptacles.
 - 3. Snap switches and wall-box dimmers.
 - 4. Wall-switch and occupancy sensors.
 - 5. Communications outlets.

1.2 RELATED DOCUMENTS

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

1.3 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. GFCI: Ground-fault circuit interrupter.
- C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- D. RFI: Radio-frequency interference.
- E. UTP: Unshielded twisted pair.

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.

1.6 MAINTENANCE MATERIAL SUBMITTALS

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton (Arrow Hart).
 - 2. Hubbell Incorporated; Wiring Device-Kellems.
 - 3. Leviton Manufacturing Co., Inc.
 - 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.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart).
 - b. Hubbell Incorporated; Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).

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.

B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart).
 - b. Hubbell Incorporated; Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).

2.5 TOGGLE SWITCHES

A. Comply with NEMA WD 1, UL 20, and FS W-S-896.

B. Switches, 120/277 V, 20 A:

1. Single Pole:

- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Eaton (Arrow Hart).
 - 2) Hubbell Incorporated; Wiring Device-Kellems.
 - 3) Leviton Manufacturing Co., Inc.
 - 4) Pass & Seymour/Legrand (Pass & Seymour).

2. Two Pole:

- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Eaton (Arrow Hart).
 - 2) Hubbell Incorporated; Wiring Device-Kellems.
 - 3) Leviton Manufacturing Co., Inc.
 - 4) Pass & Seymour/Legrand (Pass & Seymour).

3. Three Way:

- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Eaton (Arrow Hart).
 - 2) Hubbell Incorporated; Wiring Device-Kellems.
 - 3) Leviton Manufacturing Co., Inc.
 - 4) Pass & Seymour/Legrand (Pass & Seymour).

C. Pilot-Light Switches, 20 A:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart).
 - b. Hubbell Incorporated; Wiring Device-Kellems.

- c. Leviton Manufacturing Co., Inc.
- d. Pass & Seymour/Legrand (Pass & Seymour).

2. Description: Single pole, with neon-lighted handle, illuminated when switch is "on."

2.6 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.

2.7 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: Smooth, high-impact thermoplastic
 - 3. Material for Unfinished Spaces: Galvanized steel.
 - 4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-
- C. Voice and Data Communication Outlet: Blank cover with bushed cable opening.

2.8 FINISHES

- A. Device Color:
 - 1. Wiring Devices Connected to Normal Power System: As selected by Architect unless otherwise indicated or required by NFPA 70 or device listing.
- B. Wall Plate Color: For plastic covers, match device color.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
- 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. 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. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the left.
2. Install hospital-grade receptacles in patient-care areas with the ground pin or neutral blade 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 and with grounding terminal of receptacles on top. 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. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

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. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
 - 3. Ground Impedance: Values of up to 2 ohms are acceptable.
 - 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
 - 5. Using the test plug, verify that the device and its outlet box are securely mounted.
 - 6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
- C. Wiring device will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

END OF SECTION 26 27 26

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Electrical contractor to provide:
 - 1. Interior solid-state luminaires that use LED technology.
 - 2. Lighting fixture supports.

1.2 RELATED DOCUMENTS

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

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. LED: Light-emitting diode.
- F. Lumen: Measured output of lamp and luminaire, or both.
- G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Arrange in order of luminaire designation.
 - 2. Include data on features, accessories, and finishes.
 - 3. Include physical description and dimensions of luminaires.
 - 4. Include emergency lighting units, including batteries and chargers.
 - 5. Include life, output (lumens, CCT, and CRI), and energy efficiency data.
 - 6. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing and Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps and accessories identical to those indicated for the lighting fixture as applied in this Project, IES LM-79 and IES LM-80.
 - a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

- b. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.
 - B. Shop Drawings: For nonstandard or custom luminaires.
 - 1. Include plans, elevations, sections, and mounting and attachment details.
 - 2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include diagrams for power, signal, and control wiring.
- 1.5 INFORMATIONAL SUBMITTALS
- A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Lighting luminaires.
 - 2. Suspended ceiling components.
 - 3. Partitions and millwork that penetrate the ceiling or extend to within 12 inches of the plane of the luminaires.
 - 4. Structural members to which equipment or luminaires will be attached.
 - 5. Initial access modules for acoustical tile, including size and locations.
 - 6. Items penetrating finished ceiling, including the following:
 - a. Other luminaires.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - f. Ceiling-mounted projectors.
 - 7. Moldings.
 - B. Qualification Data: For testing laboratory providing photometric data for luminaires.
 - C. Seismic Qualification Certificates: For luminaires, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - D. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
 - E. Product Certificates: For each type of luminaire.
 - F. Product Test Reports: For each luminaire, for tests performed by a qualified testing agency.
 - G. Sample warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.
 - 1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Lamps: Ten for every 100 of each type and rating installed. Furnish at least one of each type.
 - 2. Diffusers and Lenses: One for every 100 of each type and rating installed. Furnish at least one of each type.
 - 3. Globes and Guards: One for every 20 of each type and rating installed. Furnish at least one of each type.

1.8 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under the NVLAP 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, accredited under the NVLAP for Energy Efficient Lighting Products, and complying with the applicable IES testing standards.
- C. Provide luminaires from a single manufacturer for each luminaire type.
- D. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.10 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Five year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- B. Seismic Performance: Luminaires and lamps shall be labeled vibration and shock resistant.
 - 1. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified and the luminaire will be fully operational during and after the seismic event."

2.2 LUMINAIRE REQUIREMENTS

- 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. NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.
- C. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.
- D. Recessed Fixtures: Comply with NEMA LE 4.
- E. Bulb shape complying with ANSI C79.1.
- F. Lamp base complying with ANSI C81.61 or IEC 60061-1.
- G. CRI of minimum 80. CCT of 3500K.
- H. Rated lamp life of 50,000 hours.
- I. Lamps dimmable from 100 percent to 0 percent of maximum light output.
- J. Internal driver.
- K. Nominal Operating Voltage: 277 V ac.
 - 1. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
- L. Housings:
 - 1. Extruded-aluminum housing and heat sink.
 - 2. Clear painted finish.

2.3 RECESSED LINEAR

- A. Minimum 3,000 lumens. Minimum allowable efficacy of 85 lumens per watt.
- B. Integral junction box with conduit fittings.

2.4 SUSPENDED, LINEAR

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Focal Point LLC.
 - 2. Light Control Lighting.
 - 3. Nulite Lighting.
 - 4. Pinnacle Lighting.
- B. Minimum 3,000 lumens. Minimum allowable efficacy of 85 lumens per watt.

2.5 MATERIALS

- A. Metal Parts:
 - 1. Free of burrs and sharp corners and edges.
 - 2. Sheet metal components shall be steel unless otherwise indicated.
 - 3. Form and support to prevent warping and sagging.
- B. 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.
- C. Diffusers and Globes:
 - 1. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
 - 2. Glass: Annealed crystal glass unless otherwise indicated.
 - 3. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
- D. Housings:
 - 1. Extruded-aluminum housing and heat sink.
 - 2. Clear painted finish.
- E. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
 - 1. Label shall include the following lamp characteristics:
 - a. "USE ONLY" and include specific lamp type.
 - b. Lamp diameter, shape, size, wattage, and coating.
 - c. CCT and CRI for all luminaires.

2.6 METAL FINISHES

- A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.7 LUMINAIRE FIXTURE SUPPORT COMPONENTS

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
- C. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage.
- D. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
- E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before fixture installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TEMPORARY LIGHTING

- A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.

3.3 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.
- D. Supports:
 - 1. Sized and rated for luminaire weight.

2. Able to maintain luminaire position after cleaning and relamping.
3. Provide support for luminaire without causing deflection of ceiling or wall.
4. Luminaire mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and vertical force of 400 percent of luminaire weight.

E. Flush-Mounted Luminaire Support:

1. Secured to outlet box.
2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
3. Trim ring flush with finished surface.

F. Ceiling-Mounted Luminaire Support:

1. Ceiling mount with two 5/32-inch- diameter aircraft cable supports adjustable to required length.
2. Ceiling mount with pendant mount with 5/32 inch diameter aircraft cable supports adjustable to required length.
3. Ceiling mount with hook mount.

G. Suspended Luminaire Support:

1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
2. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
3. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and wire support for suspension for each unit length of luminaire chassis, including one at each end.
4. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

H. Ceiling-Grid-Mounted Luminaires:

1. Secure to any required outlet box.
2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

- I. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.4 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
 2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

3.6 ADJUSTING

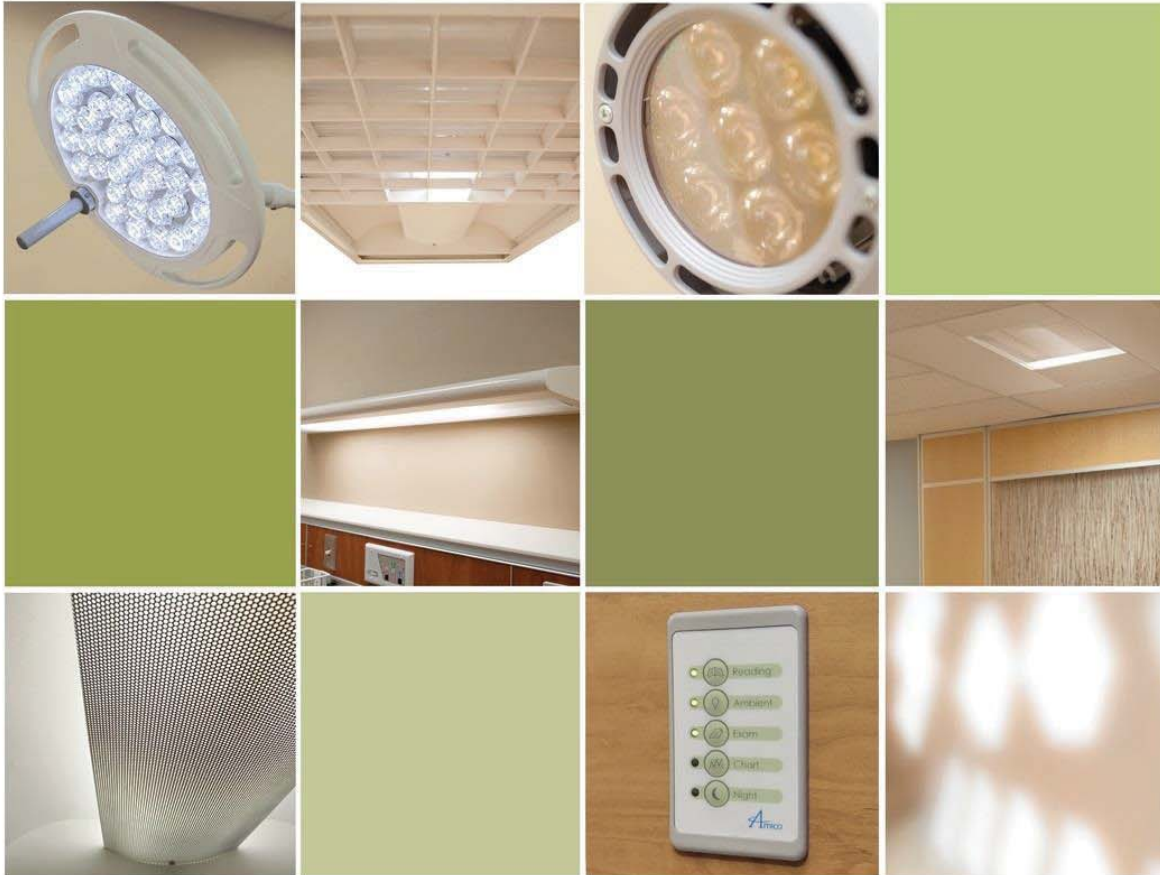
- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.
1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
 2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 3. Adjust the aim of luminaires in the presence of the Architect.

END OF SECTION 26 51 19

Lighting Solutions

26 51 19 - LED Interior Lighting

Appendix 1 - Basis of Design 'F-3' Fixture



Mira LED Pre-Installation Package

Amico Lights Corporation

AMICO CORPORATION

MIRA LED SINGLE CEILING MOUNT

DES. **J. ROBERSON**

JOB NO. **11-1403**

DATE **1/13/14**

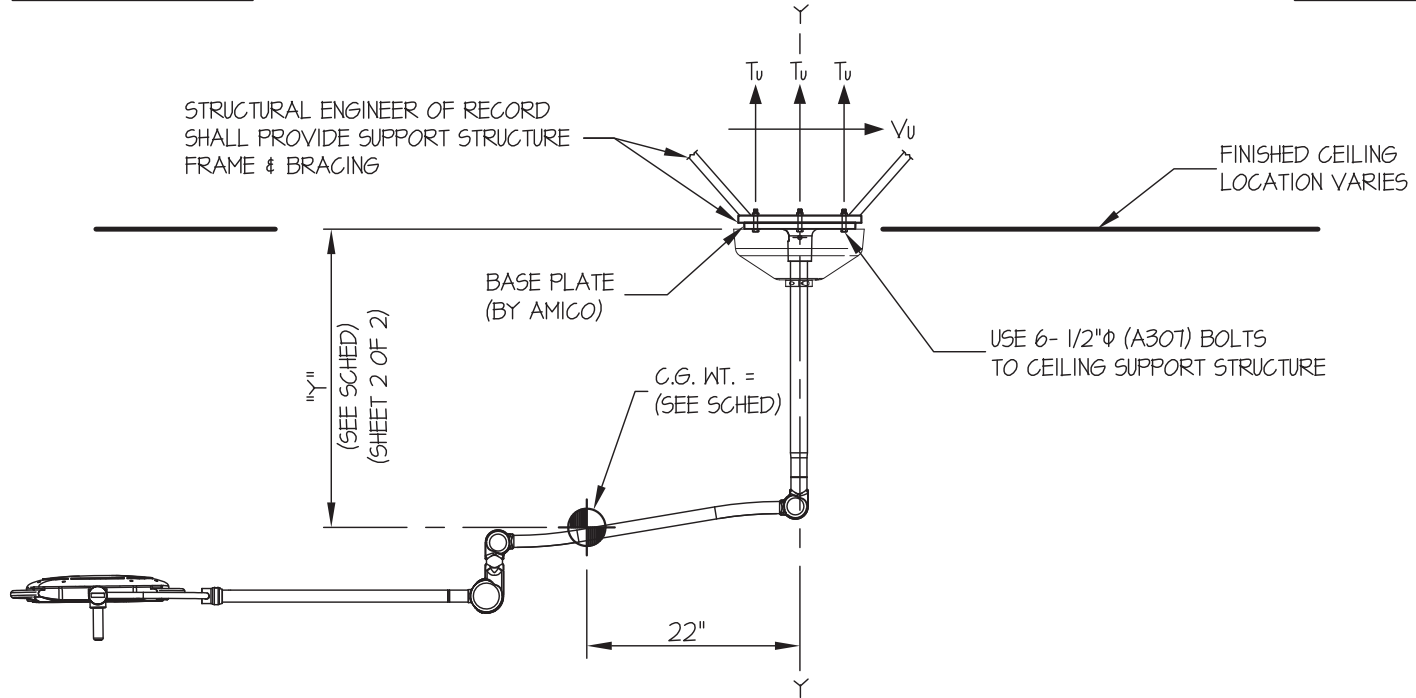
SHEET

1

OF **2** SHEETS

SEISMIC ANCHORAGE

CEILING MOUNTED



$T_u = 772 \text{ LB/BOLT (MAX)}$

$V_u = 40 \text{ LB/BOLT (MAX)}$

ELEVATION

NOTES:

- FORCES ARE DETERMINED PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10 STRENGTH DESIGN IS USED.

$$\text{HORIZONTAL FORCE (E}_h\text{)} = 4.50 W_p \text{ (S}_D\text{s} = 2.5, a_p = 2.5, I_p = 1.5, R_p = 2.5, z/h \leq 1)$$

$$\text{VERTICAL FORCE (E}_v\text{)} = 0.50 W_p$$

- CENTER OF GRAVITY (C.G.) AND WEIGHT ARE THE GOVERNING PARAMETERS FOR DESIGN. THESE CALCULATIONS ENCOMPASS ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.
- STRUCTURAL ENGINEER OF RECORD SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN, IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.



AMICO CORPORATION

MIRA LED SINGLE CEILING MOUNT

DES. **J. ROBERSON**

JOB NO. **11-1403**

DATE **1/13/14**

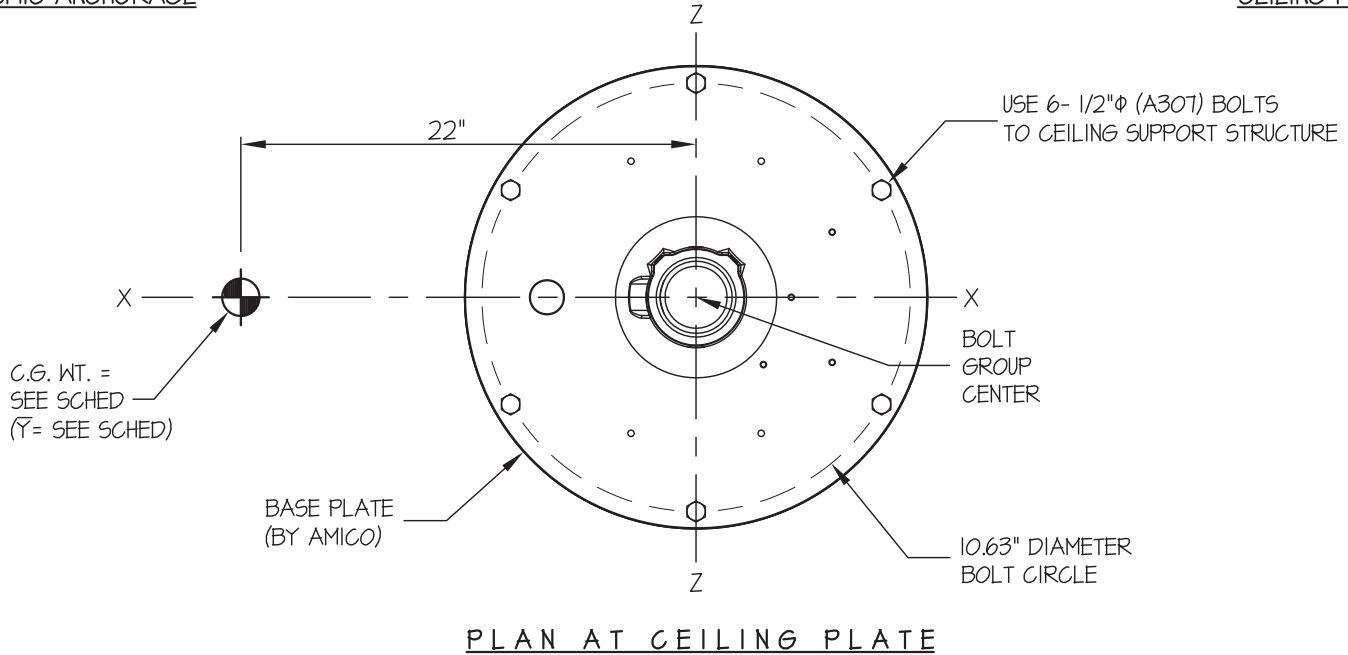
SHEET

2

OF **2** SHEETS

SEISMIC ANCHORAGE

CEILING MOUNTED



DROP TUBE LENGTH	WEIGHT (LB)	Y (IN)	T _U	V _U	MOMENT (M _{xx}) (IN-LB)	MOMENT (M _{yy}) (IN-LB)
500 mm	48	26.5	485	36	7519	0
* 900 mm	53	42.2	712	40	12,079	0

* THIS MODEL IS REPRESENTED IN THE CALCULATION SHOWN.

LOADS: PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.

(STRENGTH DESIGN IS USED) (S_{ds} = 2.5, α_p = 2.5, I_p = 1.5, R_p = 2.5, z/h ≤ 1)

WEIGHT = 53 LB

HORIZONTAL FORCE (E_h) = 4.50 W_p = 239 LB

VERTICAL FORCE (E_v) = 0.50 W_p = 27 LB

BOLT GROUP PROPERTIES:

$$I_{X-X} = 85 \text{ in.}^4$$

$$I_{Z-Z} = 85 \text{ in.}^4$$

$$I_{Y-Y} = 170 \text{ in.}^4$$

MOMENTS:

$$M_{XX} = 239\#(42.2") + (53\#(1.2) + 27\#)22" = 12,079\#\#$$

$$M_{ZZ} = 239\#(42.2") + (53\#(1.2) + 27\#)22" = 12,079\#\#$$

$$M_{YY} = 0\#\# \text{ (Unit is free to rotate around Y-Y axis)}$$

BOLT SPECS: 1/2"φ (A307) BOLTS

$$\phi T = 6615 \text{ LB/BOLT (TENSION)}$$

$$\phi V = 3528 \text{ LB/BOLT (SHEAR)}$$

BOLT FORCES:

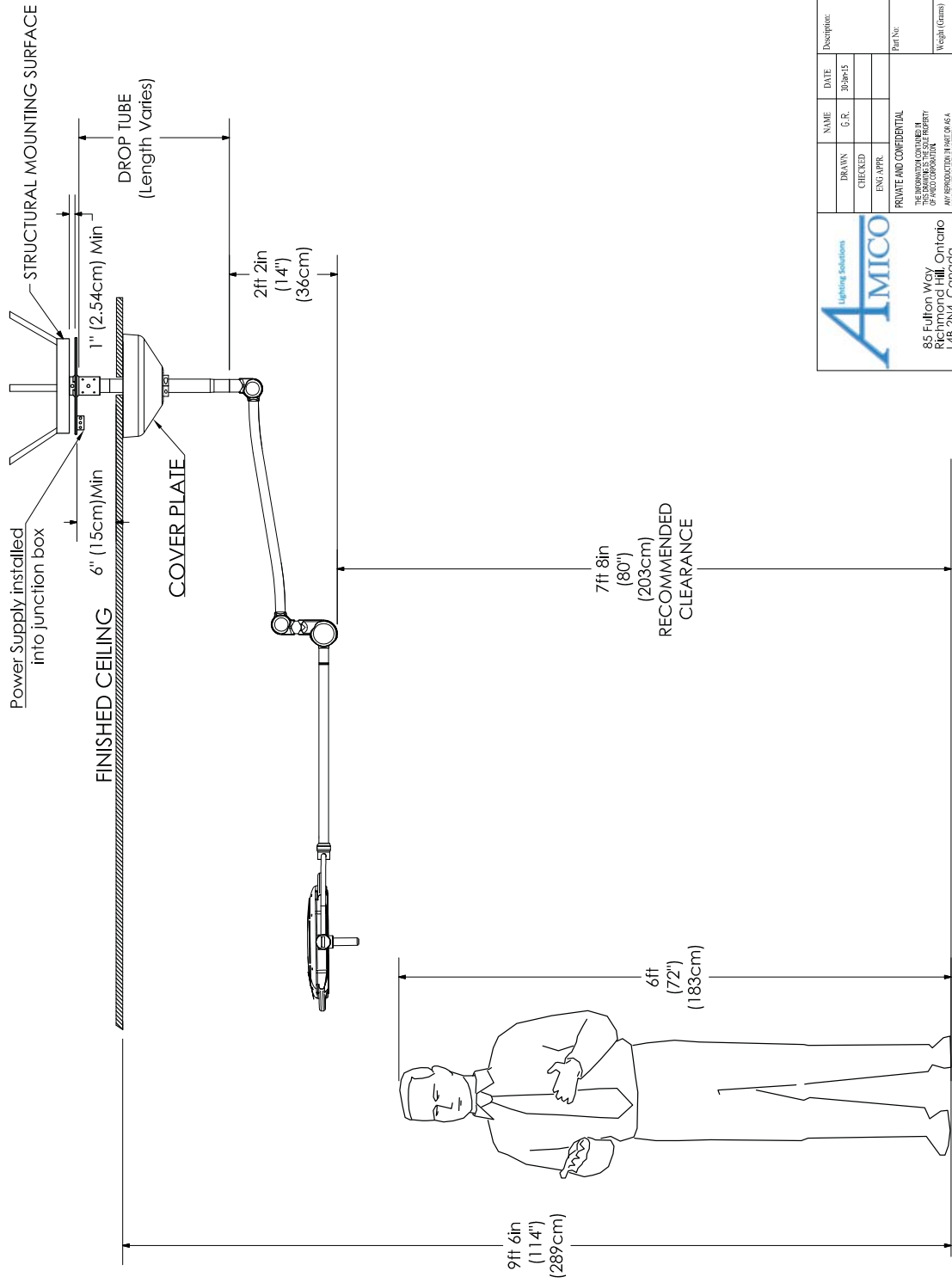
TENSION (T)

$$T_U = \frac{12079\#\#(5.31")}{85} + \frac{53\#(1.2) + 27\#}{6 \text{ BOLTS}} = 772 \text{ LB/BOLT (MAX)}$$

SHEAR (V)

$$V_U = \frac{239\#}{6 \text{ BOLTS}} = 40 \text{ LB/BOLT (MAX) (PER AISC J3.7, LESS THAN 20% STRESS)}$$

ABOVE CEILING INSTALLATION



85 Fulton Way
 Richmond Hill, Ontario
 L4B 2N4, Canada
 Tel: (905) 764-0800
 Fax: (905) 764-0862

DRAWN		DATE		Description	
	G. R.		30/04/15		
CHECKED		ENG. APPR.		Part No:	
<p>PRIVATE AND CONFIDENTIAL</p> <p>THIS DRAWING IS THE PROPERTY OF AMICO CORPORATION. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE PERMISSION OF AMICO CORPORATION IS PROHIBITED.</p>					
Weight (grams)				DRAWING No:	
REV				SHEET OF 1	

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85 Fulton Way, Richmond Hill
Ontario, L4B 2N4, Canada

Toll Free Tel: 1.877.264.2697

Toll Free Fax: 1.866.440.4986

Tel: 905.763.7778

Fax: 905.763.8587

Email: info@amico.com

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section. The Contractor shall read, review and understand all documents listed below prior to bidding and before proceeding with work. The Contractor shall also refer to and understand all other related documents indicated herein.

1.2 SUMMARY

- A. Base Bid: Contractor shall furnish all labor, materials, equipment and services necessary or incidental to the completion of all work of this section as shown on the drawings and herein specified, including:
 - 1. The purpose of this section is to provide the contract specification for the audio and video systems to be installed in the College Of Dupage Cadaver Lab. The following summary will provide the general requirements related to the Audio and Video Systems.
 - 2. Audio
 - a. Wireless speech reinforcement of narration and presentations.
 - b. Distributed ceiling speakers
 - c. Audio digital signal processing for audio routing and room equalization
 - d. Recording, playback and connectivity system for use in support of program material.
 - e. Paging feed from main PA system
 - 3. Video
 - a. Integrated control system that allows users as well as technical staff to conveniently set up, operate and control the system for the majority of the usage scenarios.
 - b. Touch Screen control of all HD Camera positions
 - c. iPad wireless control of system with Crestron App
 - d. Digital Media Video Matrix Switcher enabling any camera feed to any video end point
 - e. Scaled HDMI inputs to multiple flat panel positions
 - f. Quad split screen viewing at any designated video end point
 - g. Hard Drive dual streaming recording capability
 - h. Document Camera and Laptop video source (by owner)
 - 3. Bunker/Cabinet
 - a. Stainless free standing teaching station to be provided by GC
 - b. Cabinets in Bunker to be provided by AC Contractor

1.2 SUBMITTALS

- A. All material shall be reviewed before orders are placed as described herein. The Owner reserves the right to reject any material or installation practice which is not in accordance with this specification either before or after installation. Rejected work and materials shall be removed at once and replaced with work and materials acceptable to the Owner.
- B. Submit all materials for review as described below, referenced to the Specification paragraph number, where applicable.
- C. Submit (2) two sets of submittals in hard copy form and (1) one CD containing combined .pdf files for AV review. Photo copies are acceptable.
- D. Where materials are presented on sheets 11" X 17" or smaller, organize into three-ring binders which include:

1. Dividers or tabs between logical sections
 2. Project name and binder title labels on face and edge of binders.
- E. Submit all minor drawings on sheets of one size.
- F. On submittal drawings maintain 3/32" minimum lettering height wherever possible. Submittals with text less than 1/16" in height may be rejected.
- G. Partial submittals may be rejected.
1. The following conditions apply:
 - a. A submittal with Table of Contents
 - b. Acknowledge any and all addenda
 - c. A detailed section by section equipment list
 2. Catalog sheets as required by this Specification and for products where Contractor has a choice allowed by the Specifications
- H. Revise and resubmit submittals as required. Identify all changes made since previous submittal.
- I. Shop and field drawings
1. Provide the following shop and field drawings for review and approval prior to the purchase, fabrication or assembly of equipment.
 2. Point to point field wiring diagrams and interconnection of all systems.
 3. Floor plan drawings, including all walls, doors and room numbers, showing exact locations of devices and equipment.
 4. Rack drawing showing exact configuration, dimensions and installation details.
 5. Mounting details for all equipment, devices and hardware.
 6. Legends indicating device type and manufacturer's model number.
 7. All panels, plates and designation strips detailing all terminology, engraving, finish and color.
 8. Fabrication drawings for all input panels.
 9. A mechanical drawing of every equipment cabinet, rack and console.
 10. Reflected ceiling plans showing speaker locations and other ceiling mounted devices.
 11. Schematic drawings of all custom circuitry and interface work.
 12. A detailed, itemized equipment listing of each piece of equipment, the manufacturer's name, model number and quantities of each. A manufacturer's cut sheet of each piece of equipment shall also be provided, with the appropriate model or part number highlighted in cases where multiple model numbers or part numbers are shown.
 13. Wall elevations of all equipment closets showing exact configurations and installation of racks, equipment cabinets and conduit.
- J. Personnel – Provide the following in writing after the award of contract
1. Elected Project Manager
 - a. Name, cell number or office phone number
 - b. Years of experience
 2. Technical Project Manager
 - a. Name, cell number or office phone
 3. Technical Office Foreman
 - a. Name, cell number or office phone
- K. Verification of Conduit – within two (2) weeks after the award of contract submit the following:
1. Statement confirming that the Contractor has reviewed the conduit system as shown in the electrical section of the building construction documents.

2. Notification to Consultant, Architect, and Electrical Contractor of any deficiencies or inadequacies, if any, in the conduit system diagrams.
- L. Prior to initiating work, the Contractor shall submit to the Owner's Representative, at the Owner's Representative's office for review, the following information:
1. Point-to-point field wiring diagrams and interconnection of all systems.
 2. Functional block diagrams of each system to be installed.
 3. Floor plan drawings, including all walls, doors and room numbers, showing exact locations of devices and equipment.
 4. Rack drawing showing exact configuration, dimensions and installation details.
 5. Mounting details for all equipment, devices and hardware.
 6. Legends indicating device type and manufacturer's model number.
 7. All panels, plates and designation strips detailing all terminology, engraving, finish and color.
 8. Fabrication drawings for all input panels.
 9. A mechanical drawing of every equipment cabinet, rack and console.
 10. Reflected ceiling plans showing speaker locations and other ceiling mounted devices.
 11. Schematic drawings of all custom circuitry and interface work.
 12. A detailed, itemized equipment listing of each piece of equipment, the manufacturer's name, model number and quantities of each. A manufacturer's cut sheet of each piece of equipment shall also be provided, with the appropriate model or part number highlighted in cases where multiple model numbers or part numbers are shown.
 13. Wall elevations of all equipment closets showing exact configurations and installation of racks, equipment cabinets and conduit.
- M. An approved and stamped copy of the most up to date drawings is to be kept on the project site at all times.
- N. All drawings are to be revised to "As-Built" at the project completion, and the contractor shall submit to the consultant up to (3) complete sets of prints and one set of electronic files on CD. As-Built drawings shall include: quantity and types of cables, equipment locations, actual rack layout, terminal cabinet locations, actual measured impedance of speaker lines, copies of DSP software and configuration files.
- 1.3 QUALITY ASSURANCE
- A. Equipment equal in performance & scope from other manufacturers is encouraged to be submitted and will be actively entertained, but only those items judged by the Consultant to be equal to or superior to the specified items (in any/all aspects relating to this project) will be approved. Features, functions, and performance shall remain essentially the same regardless of equipment manufacturer.
- B. All materials supplied by the Contractor shall be new and shall meet or exceed the latest published specifications of the manufacturer in all respects. The Contractor shall supply the latest model available of each piece of equipment at the time of bidding. Unless otherwise indicated there shall be no substitutions in this specification, all electronic equipment shall be submitted as specified.
- C. In the event that specified equipment has been discontinued, either during bidding or construction, the contractor is to replace the device with the latest available model that meets or exceeds the manufacturer's specifications of the specified device.
- D. All materials shall fully comply with Underwriters Laboratories where applicable and any other authorities having jurisdiction.

- E. Acceptable Manufacturers: Subject to compliance with requirements, major components that may be incorporated in the work include: The equipment components specified or those meeting the specified performance requirements.
 - F. Pre-Qualified Bidders: The following bidders are pre-qualified to provide the following specified systems. Additional bidders must be pre-approved by the Architect and Owner.
 - a. Advanced Communications, Inc. – 219.874.3333
 - b. AVI/SPL – 866.559.8197
 - c. Interstate Electronics – 630.789.8700
 - d. Low Voltage Solutions – 630.434.9600
 - G. Any firm wishing to be qualified for this project must have been in the business of Professional Audio and Video installation for a minimum of 5 years, have completed not less than 5 projects of similar size and scope operational for a minimum of 1 year, provide a list of references, provide a listing of staff experience including qualifications and accreditations, provide a current work load, and be a manufacturer's approved dealer for all major equipment manufacturers at time of bid (including but not limited to: mixing consoles, amplifiers, DSP, loudspeakers, projectors, projection screens, cameras, video switching, video distribution, and control systems)
 - H. All bidding contractors shall own, at the time of bid, all required testing equipment called for in the specifications. Technicians responsible for operating testing equipment will have successfully completed all manufacturers approved training courses for the successful operation of the testing equipment.
 - I. All bidding contractors shall be an authorized dealer for at least 75% of the equipment specified for at least one year prior to bid time.
 - J. The principal members and key personnel to be assigned to the project shall each have a minimum of (10) years experience in completing Audio/Visual projects of equal scope, quality, type, and complexity to that required herein.
 - K. All bidding contractors must be factory authorized representatives and factory authorized to provide field or in shop service of all major systems of this project at the time of bid. Including: Loudspeaker Systems, Amplification Systems, Digital Signal Processing Systems, Control Systems, Video Distribution Systems, Video Displays.
 - L. All bidding contractors are to have DMC-E certified personnel at the time of bid. Provide documentation with bid.
 - M. Bidding contractors must have documented prior experience with projects of similar size and scope. Documented proof must be provided to Consultant prior to bid date.
 - N. The Architect, Owner, and Engineer reserve the right to reject any bids from contractors deemed unqualified for any reason.
 - O. In the event that the specified systems are not complete during the end of project walk through, the contractor will be held financially responsible for any of the Engineer's expenses (time, travel, materials, etc...) associated with any required return visits.
 - P. It is the bidding contractor's responsibility to be aware of any site conditions that may impact the specified installation.
- 1.4 SYSTEM WARRANTY
- A. The individual systems in their entirety shall be warranted by the Contractor for a period of two (2) year from the dates of individual system acceptance to meet all performance requirements outlines in these specifications.

- B. No charges shall be made by the Contractor for any labor, equipment or transportation during this period to maintain functions. However, the Contractor shall not be held responsible for damage resulting from vandalism or misuse. Not included in warranty shall be bulbs, lamps, batteries or other consumable items.
- C. The warranty shall include full preventive maintenance and service on all equipment, components and systems. Preventive maintenance shall include, at a minimum, semi-annual inspections and servicing of all equipment to insure continued operation in accordance with manufacturers' specifications as well as the specifications stated herein.
- D. Upon completion of the work, the Contractor shall submit a Certificate of Warranty stating commence and expiration dates and conditions of the warranty. Incremental warranties for completed portions of the work may be negotiated at the discretion of the Owner if delays occur beyond the control of the Contractor.

1.5 WARRANTY SERVICE RESPONSE

- A. Warranty servicing shall include the following provisions:
 - 1. Replacing defective parts and components as required.
 - 2. Readjustment, reprogramming, alignment or tuning of systems or components by properly trained service personnel to comply with manufacturers' specifications and the specifications stated herein.
 - 3. The service organization of the Contractor shall respond to a warranty service request and deploy personnel on the site to initiate corrective action, no later than twenty-four hours upon a request for service by the Owner.

1.6 PROJECT CONDITIONS

- A. The drawings included in this specification package are intended to convey the general concept of the systems. The plans are not intended to show complete and accurate details of every aspect of the building. The drawings show those approximate device locations and relationships which are subject to approval by the Architect. The Contractor is responsible for making all field measurements necessary for establishing the exact locations and relationships necessary for the installation of his equipment.
- B. The successful Contractor will be responsible for providing all components necessary for complete and operational systems based on a turnkey system price. The Bidder should, therefore, verify the quantities of each item he plans to supply based upon the specifications of that equipment.
- C. The Owner reserves the right to make any reasonable change in location of devices and equipment prior to rough installation without involving additional expense. All changes from the drawings as are necessary to make the work of the Contractor conform to the building as constructed shall be included in the Bidder's price and installed without extra cost.
- D. The Contractor shall generate all drawings and information for the complete installation and wiring of the systems. He shall provide the on-site installation and wiring, as well as continuous supervision and coordination of the on-site installation and wiring until the systems are accepted by the Owner as operational and complete.
- E. The work covered by this section of the specification consists of furnishing all materials, equipment, components, engineering, fabrication, labor, tools, delivery, storage of materials, permits and supervision required for or incidental to furnishing and/or installation of complete and operational turnkey audio-visual systems as indicated on the drawings and as specified herein.
- F. It is the contractor's responsibility to assure safe installation practices for all installed equipment. The contractor is to include in their bid, and related costs to provide structural engineering review and acceptance of their work prior to commencing of such work.

- G. Contractor to attend a minimum of three (3) coordination meetings
- H. Contractor to coordinate work with Owner, General Contractor, Electrical Contractor, Security Contractor, and other trades as necessary.

PART 2 - EQUIPMENT

2.1 AUDIO SYSTEM

- A. Digital Signal Processor:
 - 1. BSS London BLU-5 or approved equivalent system by Biamp (1 unit)
 - 2. Provide signal conversion transformers as required for page system input
- B. DSP Programming Requirements
 - 1. Provide level control for all inputs and a master output
 - 2. Provide ducker features for Precedence Paging
- C. Computer & Network Devices
 - 1. Control Network Switch
 - a. 8 -port (min.) POE Gigabit network switch from Cisco, 3-M, Pakedge, or HP (1 unit)
 - b. Provide patch cables and connectors as required.
- D. Power Amplifiers
 - 1. JBL CSA series as shown on drawings, or approved equal by Lab Gruppen
- E. Loudspeakers
 - 1. Distributed Speakers (4 units)
 - a. Tannoy CMS-803DC
 - i. Provide with pre-installation mounting bracket as needed
 - ii. Integrated back can and transformer
 - iii. Provide with tile support brackets as needed
 - b. Install ceiling speakers in recessed enclosures unless otherwise noted.
 - c. Provide with tile support brackets as needed
 - 2. Standard color as per architect
 - 3. Provide with all necessary and appropriately rated hanging hardware
- F. Input/Output Panels
 - 1. Provide floorbox connector plates with connectivity as shown on drawings
 - 2. Custom plates by ProCo, Whirlwind, or Panel Crafters.
 - 3. All plates to be laser etched aluminum
 - 4. Plate color as per architect
 - 5. Install (2) extra 1pr/sh cables to each location.
 - 6. Provide detail of all custom plates with submittals
- G. Equipment Racks (1 unit)
 - 1. MAP SRSR-X-12 sliding rotating rack or approved equal.
 - a. LACE cable lacer strips
 - i. Cables are not to be laced to rack rails or equipment
 - b. Provide thermostatic fan controllers for all equipment racks
 - c. Provide (1) MAP PDS-1615R sequenced power strip for each rack
 - d. All equipment racks to adhere to appropriate methods of thermal management

3. Contractor to provide appropriately rated mount types as shown on drawing for all display locations provided by contractor and provided by owner.
 4. Articulating Arm Wall Mount
 - a. Peerless SA700 series (or equivalent by Chief)
 - b. Appropriately sized for each display
 5. Provide FSR PWB-250 wall box and FSR PWB-2X0-AVBB AV back box at each current and future display location
 6. Surgex SA-82 surge elimination installed behind each display (4 units)
 7. Comprotec SonicShock 5 installed at each display (4 units)
 8. Coordinate with GC to get proper backing at all TV current and future locations
- B. Digital Video Transport
1. General System Requirements:
 - a. The HD Digital Transport and Distribution System shall operate as a standalone point-to-point system delivering local content to a far-end sink (display). It shall also operate as part of a larger matrix switching system.
 - b. The video transport system shall transcode the AV signals to a single digital signal type for distribution.
 - c. The video transport system shall use multi-mode fiber or shielded twisted pair for AV signal distribution as shown on drawings.
 - d. The AV distribution system shall route AV signals from any input to any output with less than 1ms of latency.
 - e. The twisted pair structured cabling used to carry the AV signals shall be shielded and certified to 1.2GHz of bandwidth or greater.
 - f. The AV distribution system shall not require extra cabling to transmit control signals for AV sources and sinks: RS-232, infrared, Ethernet, USB HID, contact closures.
 - g. Video transport system shall support: HDCP 1.1 or greater, Deep color, 3-D
 - h. The Video Switching system shall detect the number of supported HDCP keys (KSV's) supported by each source and not send a source more KSV's than it can support
 - i. The Video Switching system shall authenticate all cached KSV's with each source up to the source's KSV limit, so that authentication does not need to be re-started each time content is routed to a new output.
 - j. The contractor shall provide AV source equipment with support for enough KSV's so that it can be rerouted to all sinks simultaneously. If a particular source cannot be found to support enough KSV's to route to all sinks simultaneously, the contractor shall notify the engineer and configure the AV switching equipment so that it shall not send an AV source more KSV's than it supports.
 - k. The system installation, setup, and commissioning shall be performed by a Crestron DigitalMedia Certified Engineer (DMC-E)
 - l. DMC-E certified technician to terminate and test all cable terminations. Results of tests to be provided with system As-Built documentation and available upon request during system check out.
 - m. Contractor is to have DMC-E certified personnel at time of bid. Provide documentation with bid.
 - n. The contractor shall provide a copy of the following information in electronic format in order to verify the AV switching equipment has been installed and configured correctly: number of KSV's supported by each source, video timing and HDCP use and audio format of each source, video timings and audio formats of each connected sink (display), video timings and supported audio formats presented in the EDID to each source, length of cable used for distribution (STP and fiber), and data rate supported by each cable used.
 2. Crestron DM-MD8x8 Digital Media Switcher (1 unit)
 - a. Provide with input and output cards as required
 - b. Provide with redundant power supply
 3. Crestron DM-TX-201-C 8G+ Transmitter (1 unit)
 4. Crestron DM-RMC-4K-SCALER-C 8G+ Receiver with Scaler (4 units)
 5. Provide with power supplies, mounting hardware, interface cables, and any other accessories required for a complete and functional installation.

6. Digital Media system to utilize only appropriately selected Crestron cable.

- C. Camera
 1. Vaddio RoboShot 20 UHD (4 units)
 2. Vaddio In-Ceiling Half-Recessed Enclosure (4 units)
 3. Vaddio OneLink HDMI camera receiver (4 units)

- D. Video Recorder/Streamer
 1. Extron SMP 351 (1 unit)

- E. Video Processing
 1. RGB Spectrum Quadview UHD MultiViewer (1 unit)
 - a. 4 input multi-window 4K video processor

- F. Source Devices
 1. Provide patch cables from owner provided laptop and document camera accessible above the teaching station top via grommets
 - a. HDMI (4K) (2 units)
 - b. VGA + audio (1 unit)
 2. Provide wireless keyboard/mouse, and desktop monitor arm mount for owner provided computer
 - a. Ergotron LX series monitor arm (1 unit)
 - b. Gyration GYM1100CKNA wireless compact keyboard & mouse system (1 unit)
 - c. Computer to be located inside the teaching station

- G. Miscellaneous Equipment
 1. Provide signal distribution as necessary
 2. Interconnect cables as required
 3. All video cables to be 4K capable

- H. Training
 1. Provide minimum of four (4) hours of formal instruction to Owner. Training blocks to be min. of 1 hour in length.

2.3 CONTROL SYSTEM

- A. Control System Processor
 1. Crestron PRO3 Control System (1 unit)
 - a. Series 3 processor
 - b. Dual network interface cards
 - c. RS-232, TCP-IP, relay, etc... communications
 - d. Provide with expansion Card Frame as necessary
 2. Provide processor with all accessories for required interconnection
 - a. I/O cards, frames, internet connectivity, external power supply

- B. User Interface
 1. Crestron TSW-760 7" touch screen (1 unit)
 - a. Provide with TSW-760-TTK table top kit (1 unit)
 - b. Provide with TSW-560/760/1060-SMK swivel mount kit (1 unit)
 - c. Provide with required Crestron POE injectors Panel color as per architect.
 2. Provide full Crestron iPad app for installation on owner provided iPad (1 unit)
 - a. iPad to mirror all control screens of the wired touch screen controller

- b. Coordinate iPad setup and control system setup with building IT personnel to allow iPad access to the control system via building wifi.
- C. Computer & Network Devices
 - 1. Network Switch
 - a. 16-port (min.) POE Gigabit network switch from Cisco, 3-M, Packedge, or HP (1 unit)
 - b. Provide patch cables and connectors as required.
- D. Programming
 - 1. Contractor to provide system programming by a Crestron certified CAIP
 - 2. Control menus are to be laid out as per architect and approved by consultant.
 - 3. Control system to interface with and control all components as laid out on the drawings.
- E. Devices to Control
 - 1. Audio DSP (via RS-232)
 - 2. All Playback Devices (via RS-232)
 - 3. Displays (via RS-232)
 - 4. Video Recording (via RS-232)
 - 5. Video Cameras (via RS-232)
 - 6. Split Screen Video Processor (via RS-232)
- F. Miscellaneous
 - 1. Contractor to work with client and engineer/architect to arrive at desired screen layouts
 - 2. Allow for up to 16 hours of programming changes after initial approval within the first year of use.
 - 3. Provide minimum of two (2) hours of formal instruction to Owner. Training blocks to be min. of 1 hour in length. Training to cover control systems hardware, operation, and system monitoring software.

2.4 CABLE

- A. General
 - 1. Use specified brand and type or approved equivalent
 - 2. Use manufacturer suggested cable as applicable
 - 3. For each cable type, use same make and model throughout the entire project.
 - 4. Cable model #'s shown below are for non-plenum rated cable. Provide rated for installation in a plenum and direct burial cable as required.
 - 5. Contractor may utilize multi-pair version of cabling for convenience for point to point connections only.
 - 6. All cables to be individually labeled at each end
 - 7. Provide with J-hooks, bridle rings, cable guides, connectors, and required miscellaneous devices as necessary.
 - 8. Cable by West Penn or pre-approved equivalent by Belden, Liberty, or Extron.
- B. Audio Cables
 - 1. Microphone and line level: shielded twisted pair 22 AWG stranded
 - a. West Penn 452
 - 2. Loudspeaker: 12 AWG twisted pair with overall jacket
 - a. West Penn 227
 - 3. Sub-Low loudspeaker: 10 AWG twisted pair with overall jacket
 - a. West Penn HA210
 - 4. Distributed Loudspeakers: 16 AWG twisted pair with overall jacket
 - a. West Penn 225
 - 5. Paging and Sound Masking Loudspeakers: 18 AWG twisted pair with overall jacket
 - a. West Penn 223

6. Antenna Cable (Wireless Microphones and Hearing Assist Systems): RG-8 coax 10 AWG 50 Ohm
 - a. West Penn 808F

- C. Video System
 1. Composite Video (CV): RG-59 coax 20AWG
 - a. West Penn 815
 2. S-Video (YC): (2) mini coax 25 AWG solid in Siamese Jacket
 - a. West Penn 2825
 3. RGBHV Video: (5) mini coax 25 AWG solid in overall shielded jacket
 - a. West Penn WP8255
 4. RF TV System Trunk Line: RG-11 coax 14 AWG solid
 - a. West Penn 811
 5. RF TV Branch Line: RG-6 coax 18 AWG solid
 - a. West Penn 806
 6. DM 8G: High performance shielded twisted pair CAT5e
 - a. Crestron DM-CBL-8G
 7. Verify cable type to be adequate for length of signal run based on actual site conditions

- D. Control System
 1. Provide specific cable type/rating as required by system design and site conditions. Based on manufacturer's requirements.
 2. Control Cable: (1) pair 18 AWG and (1) pair 22 AWG with overall jacket
 - a. Crestron CRESNET
 3. Digital Media: (1) 4 pair twisted STP, (1) CAT5e 4 pair UTP, and (1) DMNet cable
 - a. Crestron DM-CBL-xx
 4. QuickMedia: (1) low skew CAT5e UTP and (1) CRESNET control cable in a Siamese jacket
 - a. Crestron CRESCAT-QM-xx
 5. iMedia: (1) low skew CAT5e UTP and (1) 20 AWG drain wire in a Siamese jacket
 - a. Crestron CRESCAT-IM-P-DRN

- E. Data/LAN Cable
 1. CAT5e: (4) pair 24 AWG UTP
 - a. West Penn 4245
 2. CAT6: (4) pair 23 SWG UTP
 - a. West Penn 4246

PART 3 - EXECUTION

3.1 INSTALLATION GUIDELINES

- A. All installation practices shall be in accordance with, but not limited to, these specifications and drawings. Installation shall be performed in accordance with the applicable standards, requirements and recommendations of the current National Electrical Code, local codes, and any additional authorities having jurisdiction.
- B. Installation shall include the delivery, storage, setting in place, fastening to the building structure, interconnection of the system components, alignment, adjustment and all other work whether or not expressly described herein which is necessary to result in tested and operational systems.
- C. The installation of all equipment must be coordinated with the Owner and General Contractor.

- D. Special back boxes for equipment, all connections to the raceways and extensions of these raceways, shall be provided as part of this contract by the Contractor.
- E. At the completion of the installation, the Contractor shall provide two copies of all information necessary for the Owner to operate the systems and to perform comprehensive maintenance repair and modification to the systems.

3.2 PHYSICAL INSTALLATION

- A. In the installation of equipment and cables, consideration shall be given, not only to operational efficiency, but also to overall aesthetic factors.
- B. All boxes, equipment, etc., shall be plumb and square. The Contractor must take such precautions as are necessary to prevent and guard against electromagnetic and electrostatic hum, to supply adequate ventilation, and to install the equipment so as to provide reasonable safety for the operator.
- C. All equipment shall be firmly secured in place unless requirements of portability dictate otherwise.
- D. Fastenings and supports shall be adequate to support their loads with a safety factor of at least three.
- E. Coordinate all LCD panel heights with Architect and Owner representative.

3.3 CABLE INSTALLATION

- A. All cables run within ceilings and not run within conduits, shall be plenum applicable type and conform with all governing authorities and codes. All open run cables located within ceiling plenums shall be provided with and utilize bridging ring supports of not more than five foot on center or two feet from vertical height change.
- B. All circuits shall be protected to avoid interruption of service due to short-circuiting or other conditions which might adversely affect the connected devices.
- C. All cabling in racks, cabinets and junction boxes shall be neatly strapped, dressed and adequately supported. Cable installation shall conform to good engineering practices and to the standards of the current National Electrical Code.
- D. Screw terminal blocks, or connectors, shall be furnished for all cables which interface with racks, cabinets, consoles or equipment modules.
- E. Every cable or wire shall be labeled or coded at each end. Marking codes used on cables shall correspond to codes shown on the drawings and/or run sheets. Each terminal of each field terminal strip shall be permanently labeled or coded to show the zone, instrument or item serviced.
- F. Care shall be exercised in wiring, so as to avoid damage to the cables and to the equipment. All joints and connections shall be made with rosin core solder or with mechanical connectors.
- G. All cables shall be grouped according to the signals being carried to reduce signal contamination.

3.4 INSPECTION OF WORK

- A. During the course of system installation, the Owner's Representative will periodically inspect the work of the Contractor to observe the quality of workmanship and progress of the work.

- B. The Owner's Representative reserves the right to reject any material or installation practice which, in his opinion, is not in accordance with the specification, either before or after installation.
- C. Rejected work and material shall be removed at once and replaced with work and materials acceptable to the Owner's Representative.
- D. Approval of partial payment applications does not constitute approval of the work by the Owner's Representative. The Owner's Representative reserves the right to disapprove partial payment applications if a substantial portion of the inspected work is not in accord with specifications or if the work is significantly behind schedule due to delays caused by the Contractor.

3.5 GROUNDING PRACTICES

- A. Single "system ground" point shall be established for the system. This system ground shall consist of a single grounding point to which all grounds in the system are connected.
- B. The system ground shall be equivalent to that of a metallic "cold water pipe ground" and shall consist of a copper bus bar sufficient in size to accommodate the required number of individual equipment grounds.
- C. Under no circumstances shall AC neutral, either in a power panel or in receptacle outlet, be used for a reference ground.
- D. Because of the great number of variations possible in grounding systems, it shall be the responsibility of the Contractor to follow good engineering practices.
- E. If the Owner's Representative encounters work which is not acceptable, he will notify the Contractor in writing.

3.6 OPERATOR'S MANUALS, MAINTENANCE MANUALS AND AS-BUILT DRAWINGS

- A. The operator's manuals and maintenance manuals shall have accurate tables of contents and be assembled with tab sheets placed before instructions covering the subject. Each manual shall contain a comprehensive index of all manuals prepared for the system.
- B. The operator's manuals shall contain guidance and procedures for operation of the system, including required actions at each operator position. Step-by-step instructions for system startup, execution of all system functions and restoration shall be provided.
- C. The maintenance manuals shall contain the following information:
 - 1. Documentation of all user-performed maintenance on all system components including inspection, periodic preventive maintenance, fault diagnosis, and repair or replacement of all modules and controls, plus diagnosis and repair or replacement of all system hardware.
 - 2. Manufacturer's service manuals for each major piece of equipment.
 - 3. Manufacturer's installation manuals for each major piece of equipment.
 - 4. All related drawings and relevant systems data.
 - 5. A description of all the functional and operational requirements that have been established for the system and its functions. This description shall be written for the average layman and shall not require knowledge of electronics for complete comprehensive.
- D. The as-built drawings shall consist of three (3) sets of reproducibles. All drawings shall be of the same size. The drawing package shall include the following:
 - 1. Floor plan drawings showing device locations.

2. Updated point-to-point wiring diagrams for each system.
3. Cable identification codes on wiring diagrams.
4. Schematic drawings of all custom circuitry and interfaces to NIC work.
5. A functional block drawing of each major system and its subsystems.

E. Provide three (3) copies of CD with pdf files of all as-built drawings and appropriate DSP system files.

3.7 TRAINING OF OWNER PERSONNEL

- A. The Contractor shall provide maintenance and operational training for designated employees of the Owner. Maintenance training shall take place during the course of the installation. Operational training shall take place prior to substantial completion of the systems by the Contractor.
- B. All training shall be scheduled in coordination with the installation work in such a manner that installation work is not disrupted or subject to unscheduled interruptions. Maintenance and operation training shall be scheduled, and the Owner shall be informed of the schedule, at least fourteen days prior to the start of training. Training shall be conducted during normal Owner business hours.
- C. During the course of installation, several persons will be designated by the Owner to receive maintenance training. The Contractor shall train these persons in the installation, maintenance and troubleshooting of the system.
- D. Prior to completion of the system acceptance tests, several suitable persons will be designated by the Owner to receive detailed system operation training.
- E. A minimum of four (4) hours of scheduled, formal maintenance training shall be given to the Owner's maintenance personnel.

3.8 CLEAN UP

- A. On a continuing basis during the execution of the Contractor's work, the Contractor shall remove all his refuse from the premises. He shall leave the relevant areas and equipment clean and usable. The Contractor shall be responsible for repairing any damage caused to the premises due to his installation activities.

END OF SECTION 27 41 00

FINISH SCHEDULE

ROOM #	ROOM NAME	FLOORING	WALLS				WALL BASE	CEILING	
			N	E	S	W		MAT/FINISH	HEIGHT
2318	CADAVER LAB	EPX-1	EPT-1	EPT-1	EPT-1	EPT-1	EPX-1 / RB-1	ACT-1	9'-9" V.I.F
2304	ADVANCED A&P LAB	--	--	--	--	LP-1	--	--	--

OPENING SCHEDULE

ROOM NAME	OPNG #	OPNG					FRAME			UL LABEL
		WIDTH	HEIGHT	MATERIAL	FINISH	TYPE	MATERIAL	FINISH	TYPE	
CADAVER LAB	2318A	6' - 0"	3' - 4"	GL	DBL	CLEAR	HM	ANOD	LP-2	2

AREA SUMMARY

ROOM #	ROOM NAME	AREA
2318	CADAVER LAB	1128 SQFT

FINISH MATER

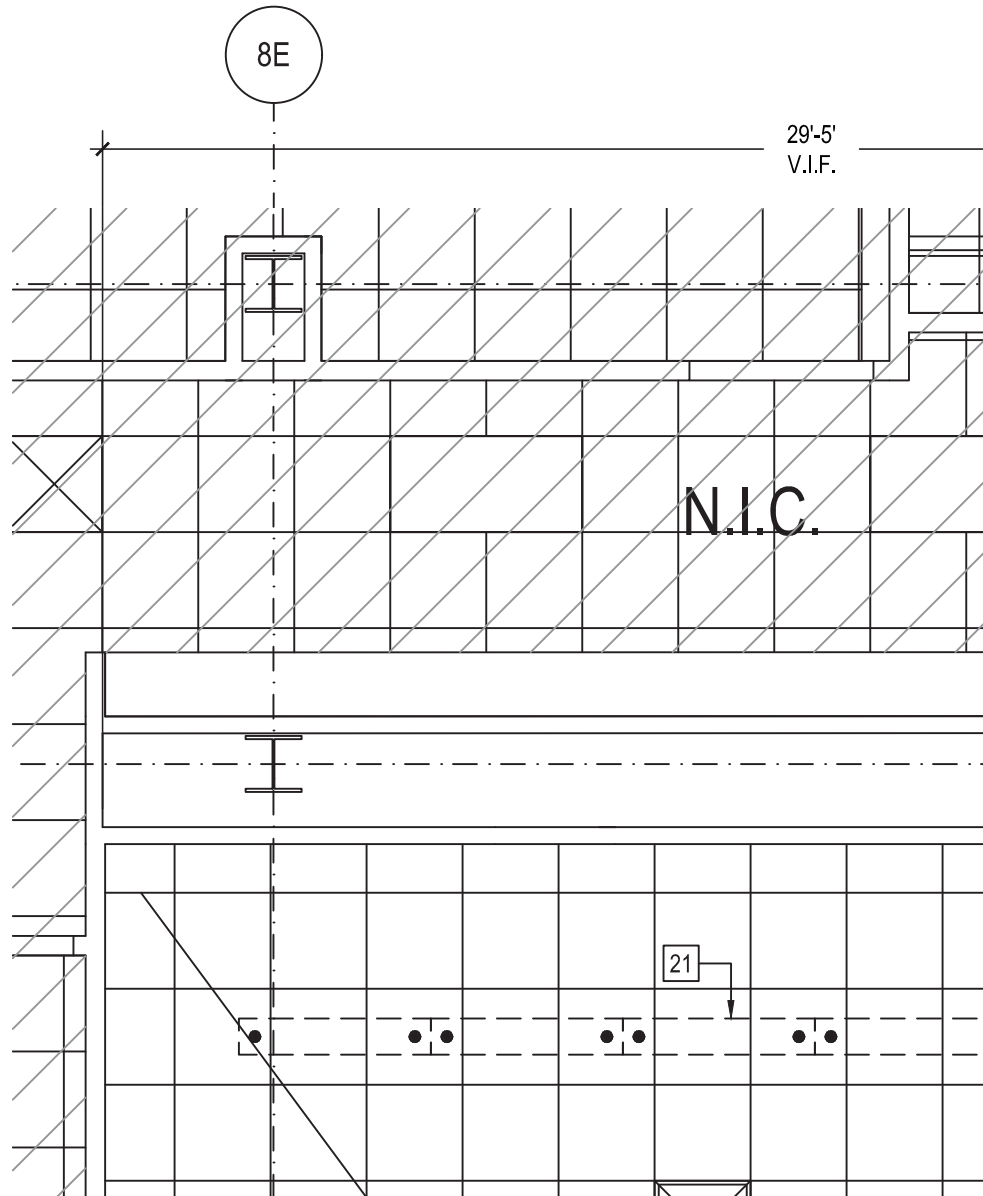
MATERIAL TYPE/ CODE	MATERIAL DESCRIPTION	MANUFACTURER M
EPX-1	EPOXY FLOORING	SHERWIN WILLIAMS COLOR BY ARCHI FUL
RB-1	RESILIENT BASE	JOHNSONITE, CO FROM MANU
EPT-1	EPOXY PAINT	SHERWIN WILLIAMS FROM MANU
LPT-1	LATEX PAINT	MATCH EXISTING
LPT-2	LATEX PAINT	MATCH EXISTING
ACT-1	ACOUSTICAL CEILING TILE	USG - CLEAN F PERFORMANCE

FINISH MATERIAL LEGEN

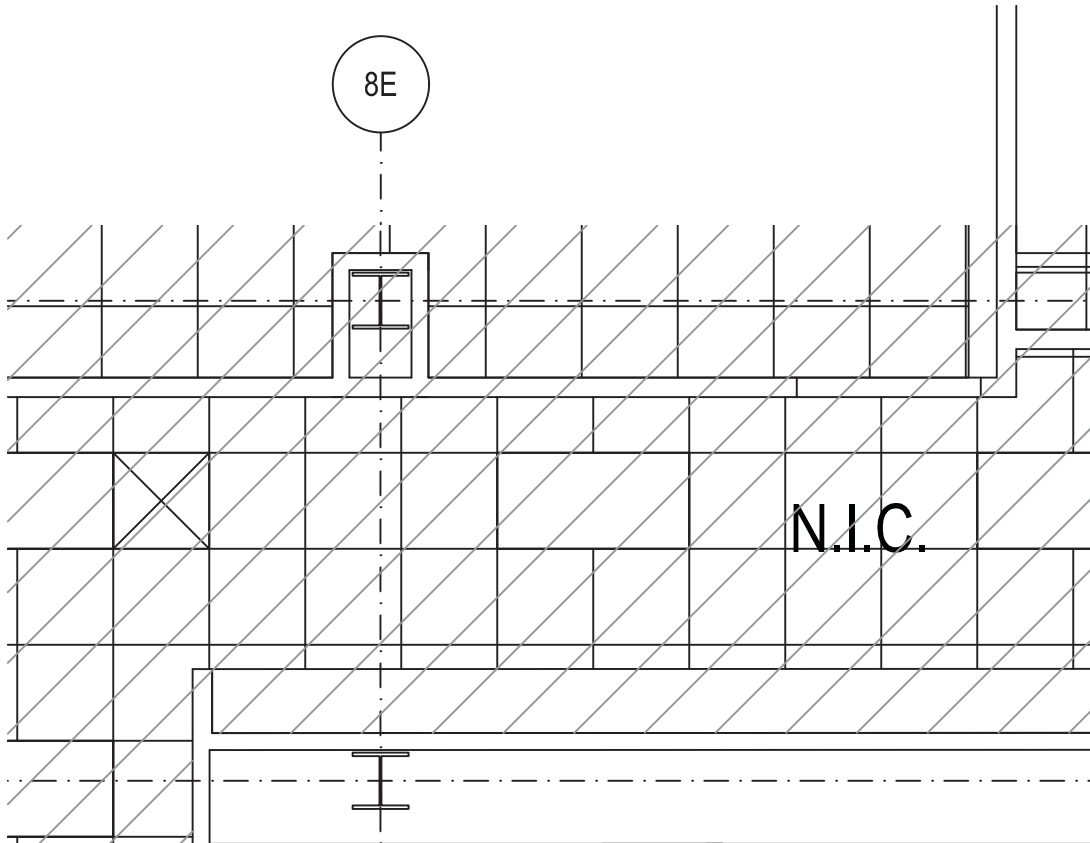
GENERAL	ALL WALL FINISHES SHALL BE CLASS 'A' FLAM LESS THAN OR EQUAL TO 450.
GENERAL	ALL FLOOR FINISHES SHALL BE RATED FOR F
1	PREP - BLAST EXISTING SLAB AS SPECIFIED. F DEBRIS

GENERAL DEMOLITION NOTES

1. CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH THE EXISTING CONDITIONS PRIOR TO COMMENCING THE WORK.
2. CONTRACTOR SHALL NOTIFY THE ARCHITECT OF ANY AND ALL DISCREPANCIES BETWEEN THE DEMOLITION DRAWINGS AND ACTUAL CONDITIONS PRIOR TO PROCEEDING WITH THE WORK.
3. THE OWNER HAS NOT IDENTIFIED HAZARDOUS MATERIALS IN THE EXISTING SPACES. CONTRACTOR TO NOTIFY THE ARCHITECT IMMEDIATELY IF HAZARDOUS MATERIALS ARE IDENTIFIED. DO NOT PROCEED WITH THE WORK UNTIL THE HAZARDOUS MATERIALS HAVE BEEN REMOVED.
4. REFER TO MEP AND FP DEMOLITION AND NEW WORK DRAWINGS FOR ADDITIONAL REQUIREMENTS.
5. PROVIDE PROTECTION AGAINST MOISTURE, IMPACT, AND OTHER TYPES OF DAMAGE AT ALL OPENINGS CREATED BY SELECTIVE DEMOLITION. PROTECT EXISTING CONSTRUCTION FROM DAMAGE DURING THE DEMOLITION AND NEW CONSTRUCTION WORK. REPAIR OR REPLACE AS REQUIRED EXISTING CONSTRUCTION DAMAGED AT NO COST TO THE OWNER.
6. ALL PENETRATIONS OF EXISTING PARTITIONS SHALL BE PATCHED AND REPAIRED AS REQUIRED TO MAINTAIN THE EXISTING INTEGRITY OF THE WALL. ALL SLEEVES, WIREWAYS, CABLE TRAYS, PIPES, DUCTWORK, ETC. SHALL BE SEALED TIGHT TO THE WALL PENETRATIONS.
7. EXISTING FLOOR PENETRATIONS, WHERE PIPING, DUCTWORK, CONDUIT OR OTHER ITEMS HAVE BEEN REMOVED DURING REMOVAL ARE TO BE FILLED WITH CONCRETE TO MATCH THE EXISTING SURROUNDING FLOOR AND REQUIRED FIRE RATINGS.



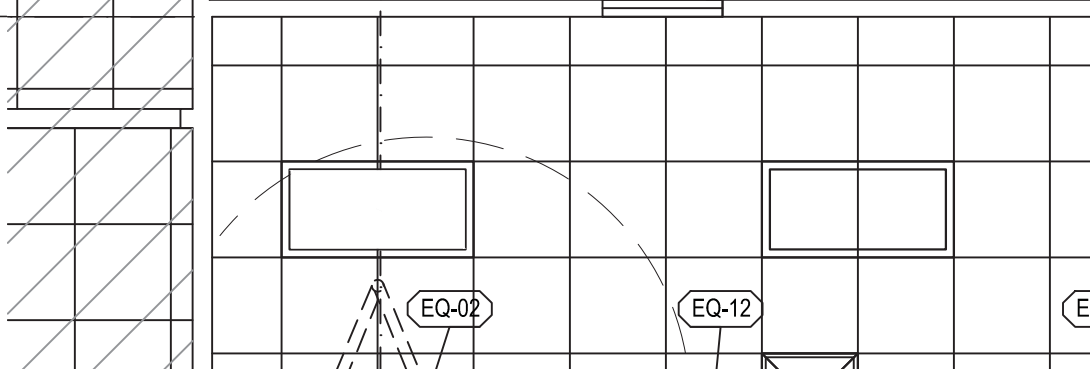
8E



N.I.C.

V.I.F.

ABLES AND SHAFTS ON
IE OF TILE ABOVE.



EQ-02

EQ-12

E

EQUIPMENT SCHEDULE

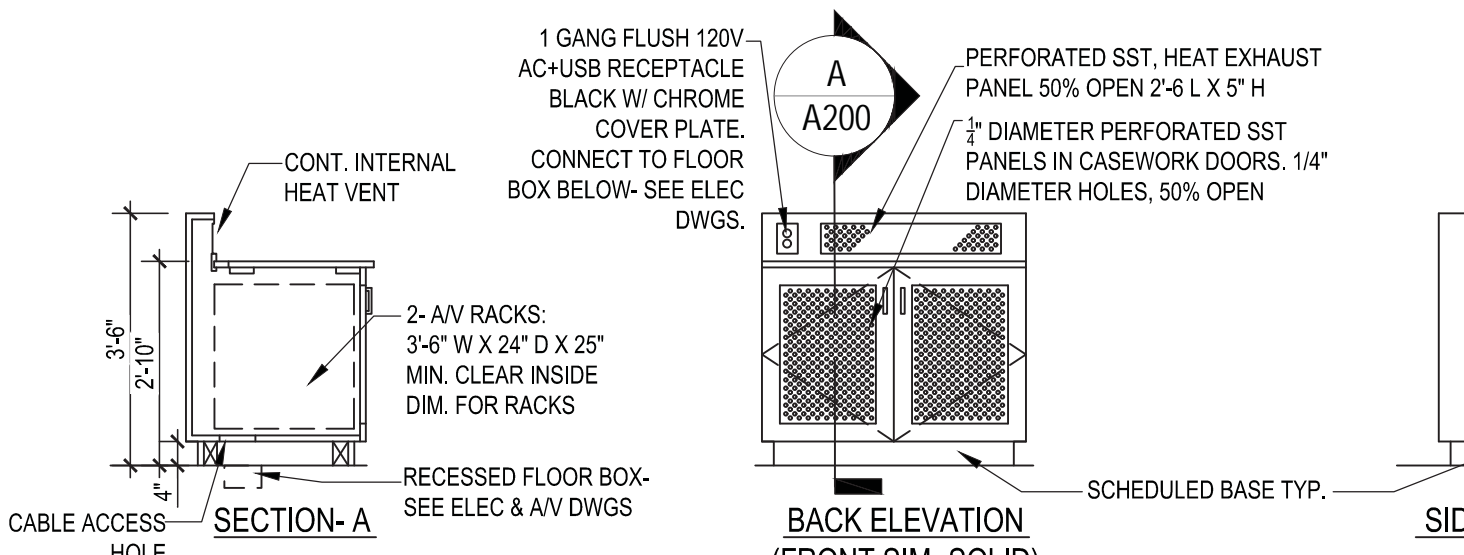
No.	DESCRIPTION	MANUFACTURER, MODEL	SIZE (INCHES, UNO)	PLUMB	MECH	ELEC	DATA	CFCI
EQ-01	CADAVER TABLE: SST, W/ HINGED COVERS, WHEELED, VENTILATED, DRAINED W/ COVERED, SEALED, FLUID COLLECTION	DOWNDRAFT ANATOMY DISSECTION TABLE RE: OWNER FOR MANUF & MODEL	86 L x 32 W x 46 1/4 H	--	8" DIA EXHAUST	--	--	
EQ-02	OH PROCEDURE LIGHT	AMICL MIRA 50 LED SINGLE ARM, RE. ELEC DRAWINGS, LIGHT SCHEDULE	72" RADIUS ARM, 35" DROP	--	--	120 V	--	
EQ-03	VENTED CASEWORK BASE CABINET	RE. CASEWORK SPECS	42 W	--	--			X
EQ-04	ROLLING EQUIPMENT AND MATERIALS CART	RE. CASEWORK SPECS	30 W x 24L x 30 H	--	--	--	--	X
EQ-05	DISHWASHER, BUILT-IN BELOW COUNTER	TBD	24 W X 24 D X 35 H* NOMINAL R.O.	X	--	120 V	--	
EQ-06	EMERGENCY SHOWER AND EYEWASH	GUARDIAN SURFACE MOUNTED, GBF 2173	19 W X 92+ H X 3 1/2 D	X	--	--	--	X
EQ-06a	THERMOSTATIC MIXING VALVE FOR EMERGENCY SHOWER	GUARDIAN SURFACE MOUNTED, G3802LF	16 W X 16 H X 8 D	X	--	--	--	X
EQ-07	NOT USED							
EQ-08	STERILIZATION EYE GLASS CABINET			--	--	120 V	--	
EQ-09	WHITEBOARD	RE: SPECS	72 W x 42 H	--	--	--	--	X
EQ-10	SOAP DISPENSER							X
EQ-11	TOWEL DISPENSER							X
EQ-12	OH ELECTRICAL HOSE REEL	RE: ELEC SPECS		--	--	120 V	--	X
EQ-20	MONITOR & ARM WALL MOUNT	SEE A/V DWGS & SPECS	SEE A/V			X	X	X
EQ-21	OH CAMERA	SEE A/V DWGS & SPECS	SEE A/V				X	X
EQ-22	TEACHING STATION FOR A/V	SEE CASEWORK DWGS & SPECS. SEE ALSO A/V DWGS & SPECS	SEE 7/A200			X	X	X

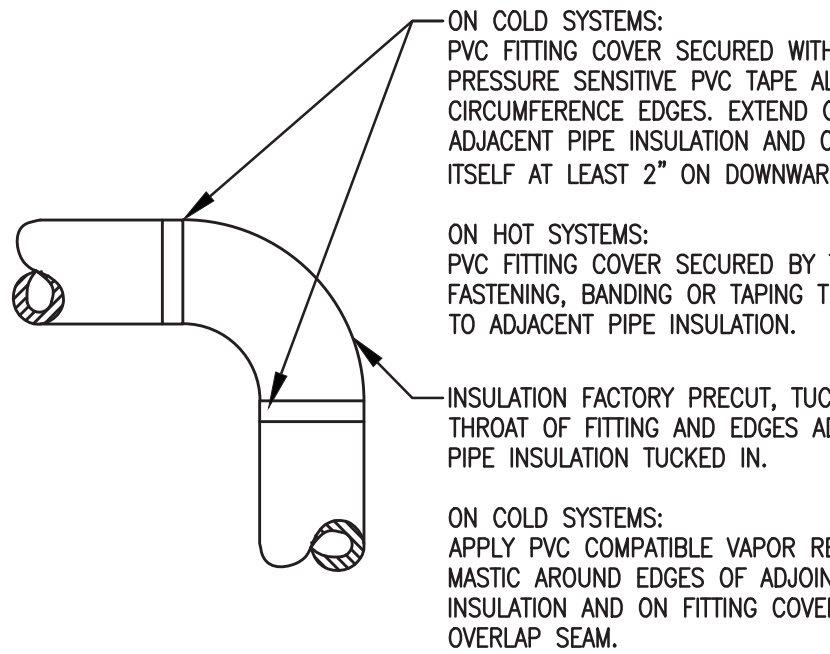
ABBREVIATIONS:

CFCI: CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
 OFCI: OWNER FURNISHED, CONTRACTOR INSTALLED
 OFOI: OWNER FURNISHED, OWNER INSTALLED
 CFOI: CONTRACTOR FURNISHED, OWNER INSTALLED (NOT USED)

NOTES:

SEE A/V DWGS & SPECS FOR ADDITIONAL EQUIPMENT AND REQUIREMENTS



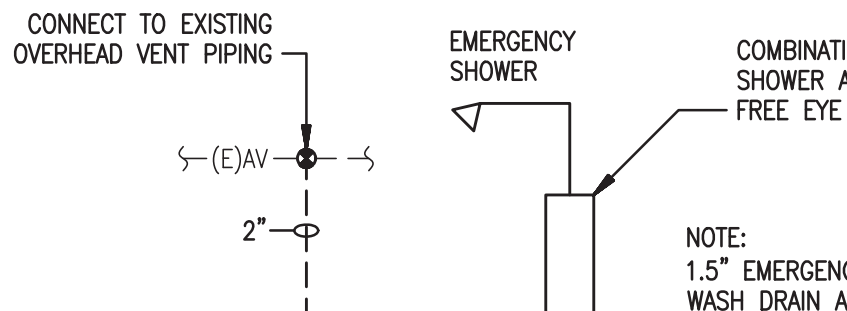


NOTES:

1. TEE AND VALVE INSULATION & COVERS SIMILAR, USING INSULATION PRECUT TO SHAPE. PROVIDE TURNS OF FIBERGLASS YARN AS REQUIRED FOR TEE OR VALVE INSULATION INSERTS TO PREVENT VOIDS OR HOT SPOTS.
2. FOR MECHANICAL GROOVE TYPE PIPE AND FITTINGS, INSULATE TO THICKNESS SPECIFIED AND APPLY PVC PREFORMED COVERS IN MANNER DESCRIBED FOR ELBOWS.
3. SIMILARLY, PROVIDE INSULATION AND PVC COVERS FOR REDUCER, P-TRAPS, Y-BRANCHES, LINE FLANGES, BUTTERFLY VALVES, GATE VALVES, BALL VALVES, CHECK VALVES, CONTROL VALVES, STRAINERS, BALANCING COCKS, AND BALANCING DEVICES.

PIPE ELBOW INSULATION DETAIL

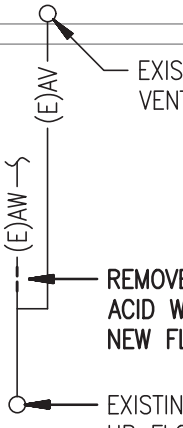
NO SCALE



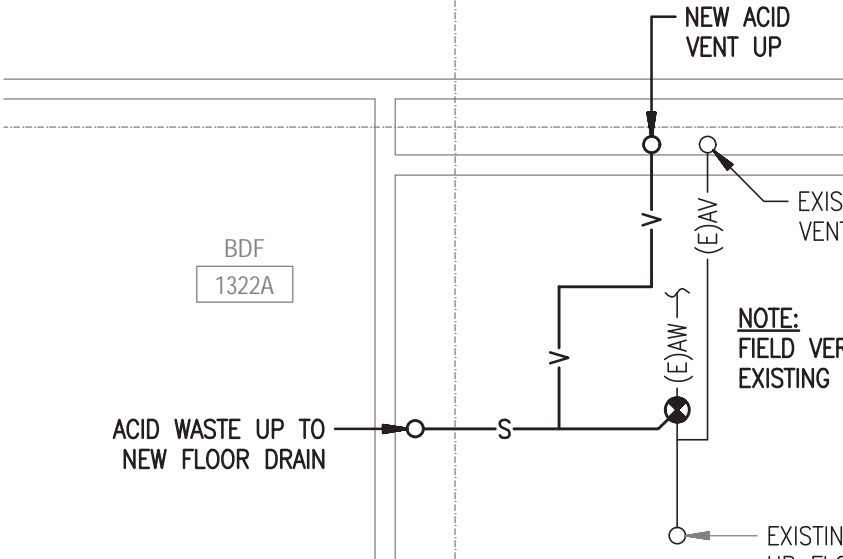
8E



BDF
1322A



8E



FIRE PROTECTION NOTES:

AREAS SHOWN: LIGHT HAZARD, 0.10 GPM OVER 1,500 SQ. FEET, ORDINARY
GROUP 1 0.15 GPM OVER 1,500 SQ. FEET.

LINE PIPING – SCHEDULE 40 STEEL PIPE, STANDARD CAST IRON FITTINGS

MAIN PIPING – SCHEDULE 10 STEEL PIPE, GROOVED FITTINGS, WELDED

HANGERS – 3/8" THREADED ROD, CLAMP TO STRUCTURE, ANGLE IRON

REQUIRED, PROVIDE SLEEVES AT WALL PENETRATIONS AND SEAL.

FIRE PROTECTION KEY NOTES:

NOTE: THIS IS AN EXISTING SPRINKLER SYSTEM TO REMAIN.

- ① EXISTING CONCEALED SPRINKLER HEAD IN DROP CEILING TO REMAIN. REMOVE
ESCUTCHEONS AND REINSTALL AFTER NEW CEILING TILE IS INSTALLED BY
G.C./OWNER. PLUMBING CONTRACTOR SHALL PROTECT SPRINKLER HEADS
FROM DAMAGE DURING CONSTRUCTION.

APPLICABLE BUILDING

GENERAL NOTES:

1. EXISTING CEILING GRID TO REMAIN DURING CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGES TO GRID OCCURRED DURING CONSTRUCTION.
2. CONTRACTOR SHALL CLOSE ALL VAV SUPPLY AND EXHAUST BOXES IN WORK SPACE WHILE CONSTRUCTION IS ONGOING.

DEMOLITION KEY NOTES:

- ① REMOVE EXISTING EXHAUST DUCTWORK AND CAP AT LOCATION.
- ② REMOVE EXHAUST GRILLE AND DUCT TO RISER. CAP EXISTING DUCT FLOOR BEHIND DRYWALL AND ABANDON DUCT IN THE WALL IN PLACE.
- ③ REMOVE THERMOSTAT.

EXHAUST GRILLE AND
DUCT TO RISER TO BE
REMOVED. DUCT RISER TO
BE CAPPED BEHIND WALL.
(TYP. FOR 2)



1

WALL MOUNTED EXHA

EXHAUST DUCT TO BE
PATCHED AND SEALED.



GENERAL NOTES:

1. EXISTING CEILING GRID MAIN (EAST & WEST) TO REMAIN DURING CONSTRUCTION. (NORTH & SOUTH) T's SHALL BE REMOVED AS REQUIRED TO REMOVE AND INSTALL DUCTS. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGES TO GRID OCCURRED DURING CONSTRUCTION. COORDINATE WITH G.C.
2. FIELD VERIFY PLUMBING PIPING AND EQUIPMENT LOCATIONS TO AVOID CONFLICTS WITH PROPOSED DUCTWORK ROUTING.
3. PROVIDE TEST AND BALANCING TO ENSURE MAXIMUM AIRFLOW QUANTITIES FOR EACH DIFFUSER, GRILLE AND VAV BOX AS SHOWN ON DRAWING. BALANCE MINIMUM AIRFLOW QUANTITIES TO HALF OF MAXIMUM VALUE. CONTRACTOR IS NOT REQUIRED TO BALANCE HYDRONIC SYSTEM. A COPY OF THE TEST AND BALANCE REPORT SHALL BE SUBMITTED TO DUPAGE COUNTY PRIOR TO FINAL INSPECTION.
4. MODIFY TEMPERATURE CONTROLS TO OPERATE AT-2318A AND AT-2318B OFF SINGLE REMAINING THERMOSTAT. ADJUST THERMOSTAT DEADBAND TO KEEP SPACE CONDITIONED BETWEEN 65°F AND 67°F. RESET EXISTING ALARM ON SYSTEM TO SEND ALERT TO BAS FRONT END WHEN ROOM TEMPERATURE EXCEEDS THE 67°F UPPER LIMIT. PROVIDE TEST OF ALARM WHILE OWNER IS PRESENT.

MECHANICAL KEY NOTES:

- ① CONNECT NEW DUCTWORK TO EXISTING EXHAUST DUCT.
- ② ROUTE EXHAUST DUCT DOWN WALL, THROUGH ACOUSTICAL CEILING CASEWORK COUNTERTOP. PROVIDE 90° FITTING AND FLEXIBLE DUCT ROUND EXHAUST DUCT TO NEW LAB TABLE. SEE DETAIL ON M200
- ③ CLEAN SURFACE OF GRILLE. GRILLE TO REMAIN IN PLACE.
- ④ EXISTING VERTICAL EXHAUST DUCT BEHIND FULL HEIGHT GYPSUM

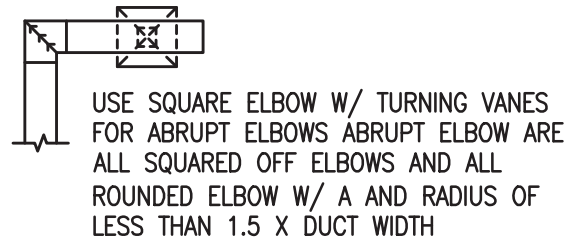
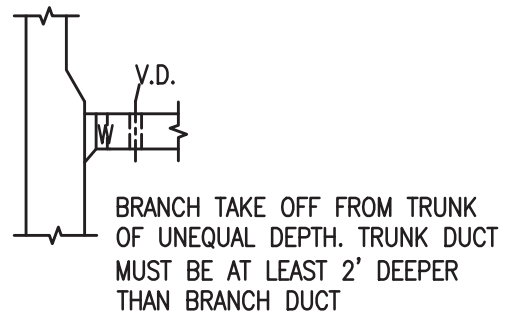
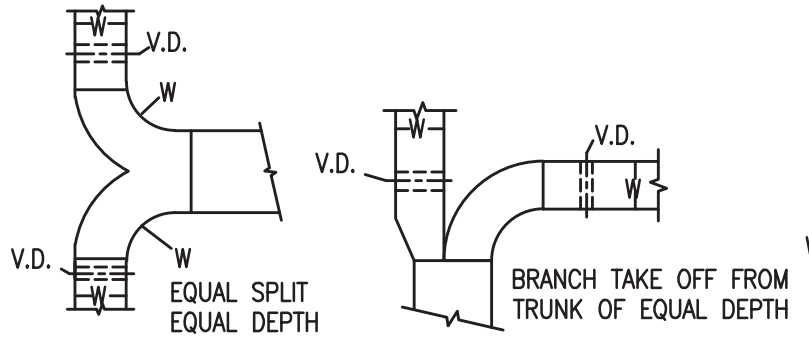
EXISTING SUPPLY DUCT.



1

EXHAUST DUCT - WEST

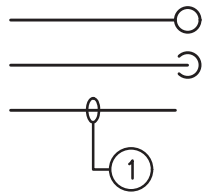




DUCT CONNEC

NOTE: PROVIDE DUCT FITTINGS AND TRANSITIONS AS REQUIRED TO
 STRUCTURAL BEAMS, 2'-9" DEEP, AT COLUMN LINES AND
 FIELD VERIFY EXACT DUCT ROUTING.
 COORDINATE ELEVATION OF DUCT WITH TABLE IN FIELD PR

CONDUIT



CONDUIT STUBBED UP

CONDUIT STUBBED DOWN

FEEDER CONDUIT – TAG INDICATES PANEL FEEDER NUMBER
REFER TO FEEDER SCHEDULE

RECEPTACLES



SINGLE 20A RECEPTACLE, MOUNTED AT 15" AFF U.N.O.



SINGLE 20A RECEPTACLE, MOUNTED 6" ABOVE COUNTER



DUPLEX 20A RECEPTACLE, MOUNTED AT 15" AFF U.N.O.



DUPLEX 20A RECEPTACLE, MOUNTED 6" ABOVE COUNTER



DUPLEX 20A GFI RECEPTACLE, MOUNTED 15" AFF U.N.O.



DUPLEX 20A GFI RECEPTACLE, MOUNTED 6" ABOVE COUNTER



QUADPLEX 20A RECEPTACLE, MOUNTED 15" AFF U.N.O.



QUADPLEX 20A GFI RECEPTACLE, MOUNTED 15" AFF U.N.O.



QUADPLEX 20A RECEPTACLE, MOUNTED 6" ABOVE COUNTER



QUADPLEX 20A GFI RECEPTACLE, MOUNTED 6" ABOVE COUNTER



SPECIAL USE RECEPTACLE, SIZED AS INDICATED OR AS REQUIRED



FLUSH MOUNTED FLOOR BOX, WITH DEVICES AS INDICATED



DUPLEX 20A RECEPTACLE, FLUSH MOUNTED IN CEILING



DUPLEX 20A SWITCHED RECEPTACLE, MOUNTED AT 15" AFF U.N.O.



DUPLEX 20A SWITCHED RECEPTACLE, W/ DUPLEX USB PORTS, HUBBELL #USB15X2W
MOUNTED AT 15" AFF U.N.O.



RETRACTABLE CORD REEL W/ DUPLEX 20A RECEPTACLE, CEILING-MOUNTED

POWER DISTRIBUTION



PULLBOX, SIZED AS REQUIRED



WALL MOUNTED JUNCTION BOX, SIZED AS REQUIRED (4"x4" MIN.)



JUNCTION BOX, SIZED AS REQUIRED



FLEXIBLE METAL CONDUIT CONNECTION (WHIP)



MOTOR CONNECTION, 1 ϕ OR 3 ϕ AS INDICATED

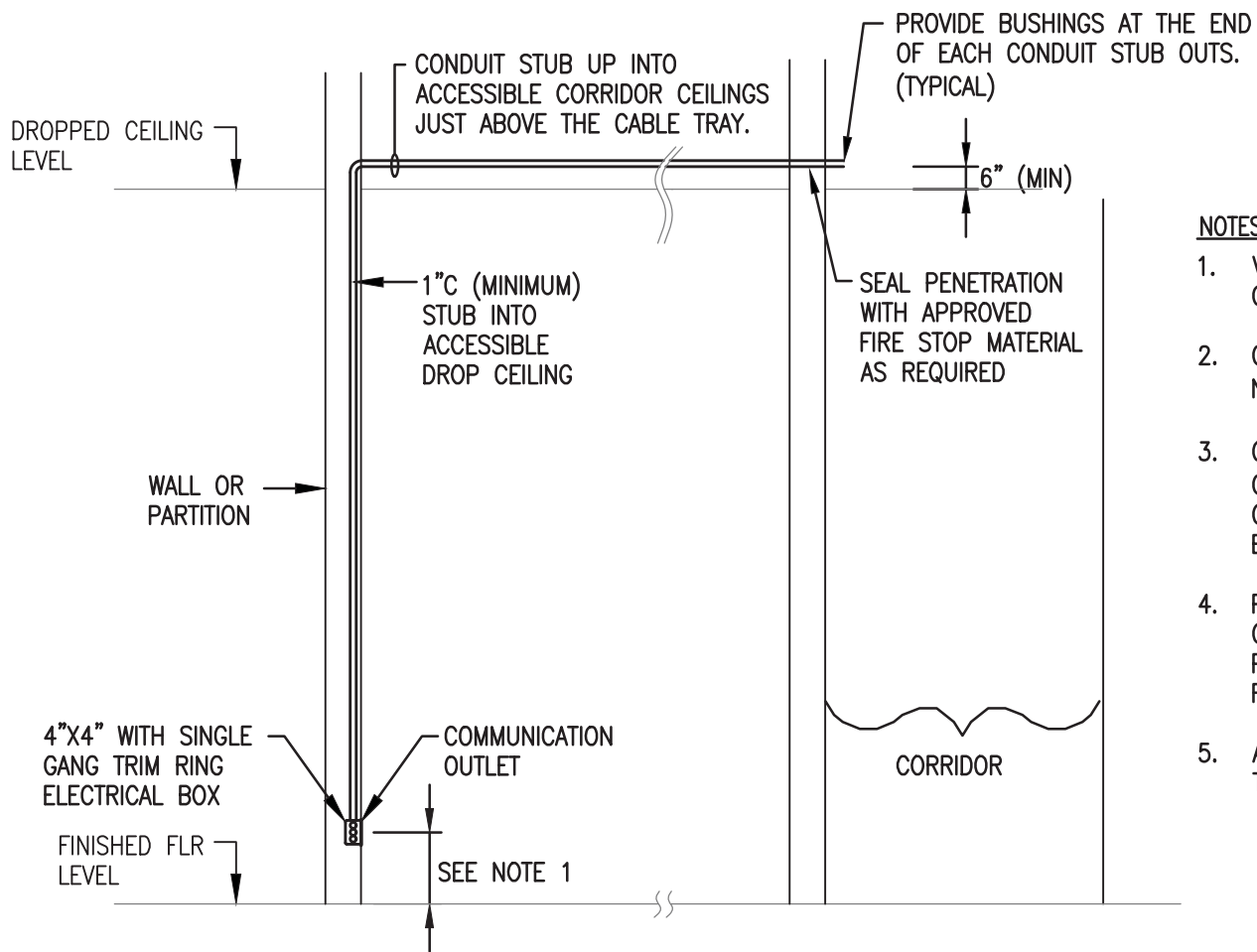


TRANSFORMER, SIZE AND RATING AS INDICATED



PANEL BOARD, SIZED AS INDICATED

PANELBOARD SCHEDULE			HPE2A (EXISTING)			LOCAT
VOLTAGE	277/480V-3 PHASE 4 WIRE		MAIN (A)	MCB	MLO	MOU
			100		X	TY
			WITH GROUND BUS		X	
USE/AND OR AREA SERVED	C/B	CIR. NO.	A	B	C	CIR. NO.
LIGHTING COMMONS	20/1	1	-			2
LIGHTING - CORRIDOR COVE	20/1	3		-		4
LIGHTING - CORRIDOR WALL WASH	20/1	5			-	6
LIGHTING - BIO LECTURE	20/1	7	-			8
LIGHTING - CLASSROOM SOUTH	20/1	9		-		10
LIGHTING - PREP	20/1	11			-	12
LIGHTING - CADAVER LAB 2318	20/1	13	500			14
SPARE	20/1	15		-		16
SPARE	20/1	17			-	18
SPARE	20/1	19	-			20
SPARE	20/1	21		-		22
SPARE	20/1	23			-	24
SPARE	20/1	25	-			26
SPARE	20/1	27		-		28
SPARE	20/1	29			-	30
SPARE	20/1	31	-			32
SPARE	20/1	33		-		34
SPARE	20/1	35			-	36
SPARE	20/1	37	-			38
SPARE	20/1	39		-		40
SPARE	20/1	41			-	42
TOTAL LOAD PER PHASE:			500	0	0	TOTAL KVA
project name and number			DATE:	03/16/17		AMP

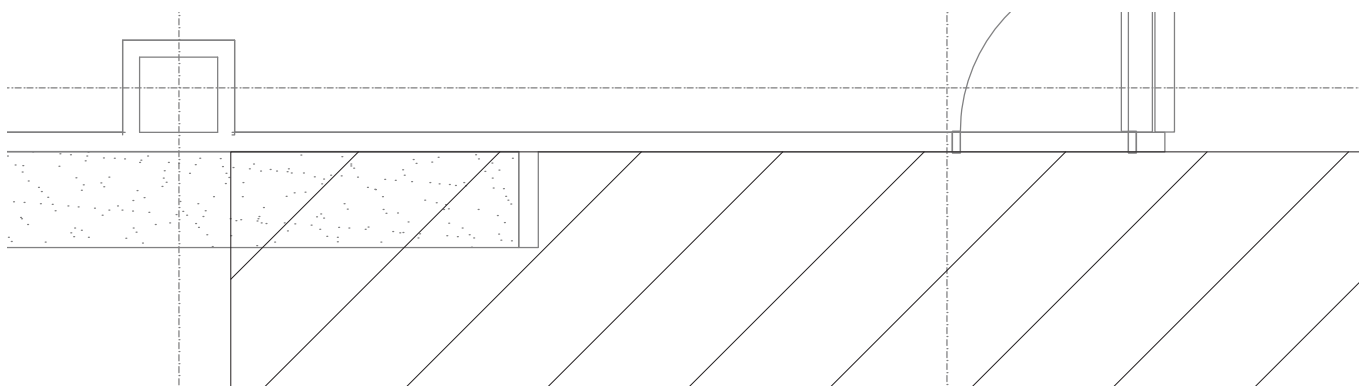


NOTES:

1. VERIFY IN FIELD OR WITH COMMUNICATION OUTLET MANUFACTURER.
2. COMMUNICATION OUTLET SHALL BE NO FEWER THAN FOUR INCHES FROM CORRIDOR CEILING.
3. OUTLET SHALL CONSIST OF A GANG TRIM RING AND A COMMUNICATION OUTLET BRIDLE RINGS ALONG WITH THE TRIM RING.
4. PROVIDE BACK BOXES, BRIDLE RINGS, CEILING BRIDLE RINGS AND ALL CABLE TRAY PANEL TO BE INSTALLED WITH FACEPLATES, AND ALL OTHER ACCESSORIES AS REQUIRED.
5. ALL COMMUNICATION RACKS SHALL BE INSTALLED IN THE COLLEGE FACILITIES.

1 COMMUNICATION OUTLETS INSTALLATION

SCALE: NTS



CONDUIT NOTES (BY EC):

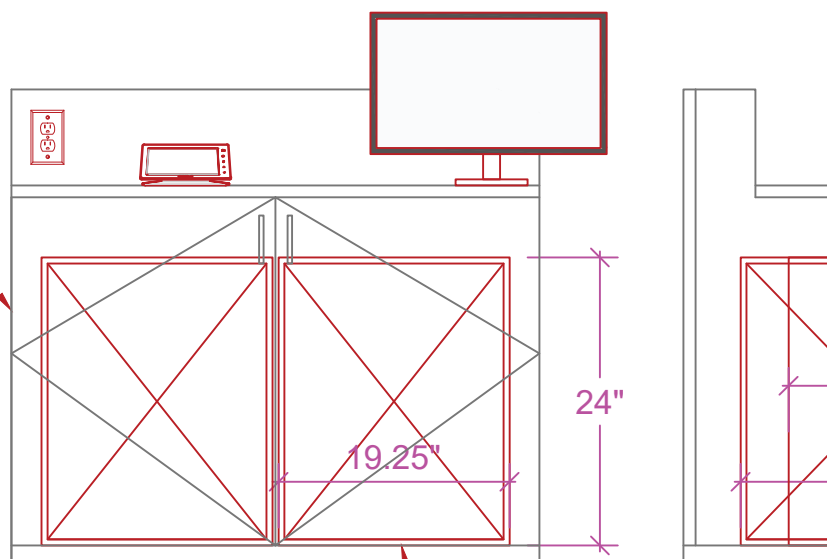
1. THE CONDUIT SYSTEM FOR AV CABLE & DEVICES SHALL FOLLOW THE NEC AND ALL LOCAL CODES GOVERNED BY THESE DRAWINGS. ADDITIONAL REQUIREMENTS ARE AS FOLLOWS:
2. ALL RACEWAY SHOWN IN THESE DRAWINGS IS FOR AV CABLE AND IS IN ADDITION TO ANY CONDUIT SHOWN IN THESE DRAWINGS. REQUIRED CONDUIT FOR POWER OR DATA IS IN ADDITION TO CONDUIT SHOWN IN THIS DRAWING.
3. THE STANDARD MINIMUM SIZE FOR ALL AV CONDUIT SHALL BE 3/4" IN DIAMETER UNLESS OTHERWISE NOTED. CONDUIT SHALL BE ROUTED PARALLEL OR PERPENDICULAR TO STRUCTURE ABOVE.
4. ALL CONDUIT SHALL BE CONTINUOUS POINT-TO-POINT (EMT) ELECTRICAL METAL TUBING UNLESS OTHERWISE NOTED. STUBS WILL ONLY BE ACCEPTABLE IN LOCATIONS NOTED AS SUCH.
5. FOLLOW GOOD PRACTICE RELATED TO CONDUIT INSTALLATION. THIS INCLUDES ALLOWABLE BEND RADIUS AND ASSURANCE THAT THE PATHWAYS ARE CLEAR OF DEBRIS AND SHARP EDGES. UTILIZE PLASTIC BURSTED CONDUITS TO PREVENT SHARP EDGES THAT MAY DAMAGE CABLE DURING INSTALLATION.
6. CONDUIT SHOWN FOR SIZE REQUIREMENTS.
7. EC TO PROVIDE SLEEVES AND PENETRATIONS AS REQUIRED.
8. REGARDLESS OF PATHWAY TYPE, ALL CABLING SHALL BE SUPPORTED AT A 5'-0" MAXIMUM INTERVAL.
9. CONDUIT RUNS SHALL NOT CONTAIN 90° CONDUIT BODIES.
10. UNINTERRUPTED, STRAIGHT, AND LEVEL CONDUIT RUNS SHALL NOT EXCEED 100 CONTIGUOUS FEET. FOR RUNS EXCEEDING 100', INSERT PULL BOXES AT 100' INTERVALS, MAXIMUM.
11. IF A CONDUIT RUN REQUIRES MORE THAN TWO 90° BENDS, THEN PROVIDE A PULL BOX BETWEEN SECTIONS. IF A CONDUIT RUN REQUIRES A REVERSE BEND (BETWEEN 100° AND 180°) THEN INSERT A PULL BOX WITH AN ANGLE HAVING AN ANGLE FROM 100° AND 180°. IF A CONDUIT RUN REQUIRES MORE THAN TWO 90° BENDS BETWEEN SECTIONS THEN FOR EACH ADDITIONAL BEND EITHER DERATE THE CONDUIT CAPACITY BY 15% OR USE THE NEXT LARGER CONDUIT.
12. DO NOT CONSIDER A PULL BOX AS A BEND. ALL CONDUITS MUST RUN STRAIGHT THROUGH A PULL BOX EITHER BEFORE OR AFTER THE PULL BOX.
13. BACKBONE CABLE CONDUIT FOR FIBER OPTICAL CABLES SHALL BE PROVIDED WITH INNER-DUCT SIZED TO FIT THE CONDUIT TRADE SIZE.
14. CONDUIT TIED TO BUILDING GROUND.
15. ELECTRICALLY ISOLATE CONDUIT SYSTEM FROM EQUIPMENT RACK.
16. EC TO PROVIDE PULL STRINGS AND BACK BOXES AS REQUIRED.
17. REFER TO PLAN VIEWS FOR DEVICE QUANTITIES AND LOCATIONS.
18. NOTES ASSOCIATED WITH CONDUIT FILL REFERING TO CABLE TYPES AND QUANTITIES ARE FOR REFERENCE ONLY. CONTRACTOR TO VERIFY REQUIRED CABLE TYPES AND QUANTITIES BEFORE INSTALLATION.
19. VERIFY ALL LOCATIONS WITH OWNER.

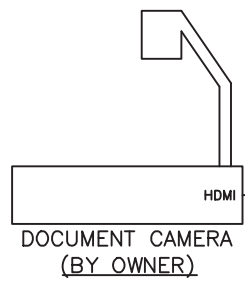
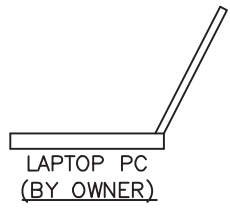
CABLE TYPE	MANUF.	MODEL # NON-PLENUM	MODEL # PLENUM	DESCRIPTION
A	WEST PENN	812	25812	ANTENNA CABLE - RG-58
CN	CRESTRON	CRESNET-NP	CRESNET-P	CRES-NET
D				LAN/DATA - BY OTHERS
DAV	WEST PENN	4246	254246	AV DATA - CAT6
8G	CRESTRON	DM-CBL-8G-NP	DM-CBL-8G-P	DIGITAL MEDIA 8G STP
H	EXTRON	HDMI-PRO SERIES		MOLDED HDMI CABLE
M	WEST PENN	291	25291	MIC/LINE CABLE - 22 AWG
P	WEST PENN	224	25224	LOW VOLTAGE POWER/
S16	WEST PENN	225	25225	DIST. LOUDSPEAKER CABE
SD	WEST PENN	6350	256350	DIGITAL VIDEO CABLE - F

5 CABLE TYPE SCHEDULE

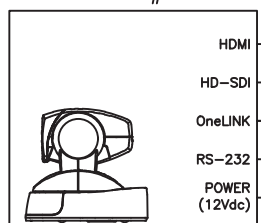
NOT TO SCALE

FREE STANDING STAINLESS STEEL TEACHING STATION "BUNKER" TO MATCH STAINLESS CABINETS. SEE ARCHITECTURAL DRAWINGS FOR ACTUAL BUNKER DETAILS. **BY GC**





CAM #1



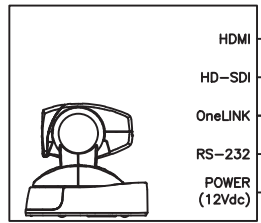
PTZ CAMERA
VADDIO ROBOSHOT 20 UHD
W/ IN-CEILING HALF-RECESSED ENCLOSURE

FB
A



CAM #1

CAM #2

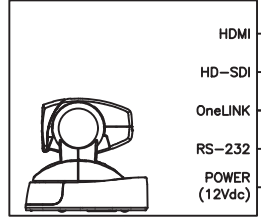


PTZ CAMERA
VADDIO ROBOSHOT 20 UHD
W/ IN-CEILING HALF-RECESSED ENCLOSURE



CAM #2

CAM #3

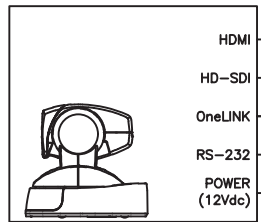


PTZ CAMERA
VADDIO ROBOSHOT 20 UHD
W/ IN-CEILING HALF-RECESSED ENCLOSURE



CAM #3

CAM #4



PTZ CAMERA
VADDIO ROBOSHOT 20 UHD
W/ IN-CEILING HALF-RECESSED ENCLOSURE



CAM #4

